THIS IS SCHEDULE PART 2 REFERRED TO IN THE FOREGOING AGREEMENT BETWEEN TIE AND THE INFRACO

SCHEDULE PART 2

EMPLOYER'S REQUIREMENTS

Erratum to Version 4

Erratum	Date	Comments
001	24/04/08	Page 48: Section 2.15: The footnote "Damian has already instructed this change." – is to be ignored.
002	24/04/08	Page 90: Section 7: The footnote "The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum." – is to be ignored.
003	24/04/08	Page 147: Section 10.1.5: The reference in the last sentence to Schedule 32 is incorrect. It should read "The Noise and Vibration Policy is included in Schedule Part 29 (*tie and CEC Policies*)".
004	24/04/08	Page 174: Section 12.9 - The reference to Schedule 45 should refer to Schedule Part 40.
005	24/04/08	Page 209: Section 17.1: Last paragraph The reference to Section 32 should read Schedule Part 29. After Project Safety and Quality Interface Document add (40-91-PLA-002).
006	24/04/08	Page 273: Section 23.16.6 - Schedule 7 - Performance Regime is incorrect. This should now refer to Schedule Part 6.
007	24/04/08	Page 609: Section 40.1.2 – Final paragraph Performance payment regime – The reference to Schedule 7. This should now refer to Schedule Part 6.
008	24/04/08	Page 634: Section 40.2.4 Last line Reference to Clause 52 of Infraco should read as Clause 52.20.1.
009	24/04/08	Page 635: Section 40.2.4 Table 93 Fault Category 3 "Edqual Service elements in Schedule 7" should read "Equal Service elements in Schedule Part 6".
010	24/04/08	Page 645: Section 40.2.8 Last set of bullet points at bottom of page Reference to Schedule 7 Performance Measurement System should read as Schedule Part 6.
011	05/05/08	Page 40 Section 2.8 Table 2 reformatted to show entire contents (see attached)
012	05/05/08	Page 41 Section 2.8 Table 3 reformatted to show entire contents (see attached)
013	05/05/08	Page 42 Section 2.8 Table 4 reformatted to show entire contents (see attached)
014	05/05/08	Page 431 Section 29.14 Table 83 see updated version (see attached)
015	05/05/08	Page 610 Section 4.2.2 Table 89 see updated version (see attached)
016	05/05/08	Page 50 Section 2.16(b) 4th bullet - delete "Leith" and replace with "Ocean Terminal or Newhaven according to service"
017	05/05/08	Page 147 Section 10.1.7 - delete "Section 68 of the Edinburgh Tram Line Act 2006" and replace with "Section 63C of the Edinburgh Tram Line Act 2006"
018	05/05/08	Page 169 Section 12.8 Update reference to ISO 10005-1995 to ISO 10005-2005
019	05/05/08	Page 260 Section 23.13.3 - delete "Network" from section heading
020	05/05/08	Page 264 Section 23.14.3 - delete "Network" from section heading
021	05/05/08	Page 266 Section 23.15.3 - delete "Network" from section heading
022	05/05/08	Page 318 Section 24.5 Change reference to Schedule 22 of the Tram Supply Agreement to Schedule 23 of the Tram Supply Agreement
023	05/05/08	Page 318 Section 24.6 3rd paragraph should read "The Trams shall have a key suiting system that provides a logical hierarchy of access to cleaners, inspectors, drivers and maintenance staff. It shall not be part of the general suite but tram specific as detailed in Section 22.2.1 of these Employer's Requirements."

Erratum	Date	Comments
024	05/05/08	Page 622 Section 40.2.2 Table 92 Structures SO3 and SO4 - delete "(if CEC own it)" from the comments column
025	05/05/08	Page 625 Section 40.2.2 Table 92 Structures S20 to S31 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
026	05/05/08	Page 627 Section 40.2.2 Table 92 Retaining Walls W03 to W19 - insert "the Operator is responsible for cleaning and graffiti removal" to the comments column
027	05/05/08	Page 632 Section 40.2.4 Final paragraph headed "**Further Maintenance Activities**" - delete bullet "removal of graffiti" and bullet "cleaning"
028	05/05/08	Page 644 Section 40.2.8 Under heading "Reporting Period Review", 4th bullet relating to maintenance report, sub-bullets 1 and 2 - delete "including cleaning"
029	05/05/08	Page 646 Section 40.2.10 3rd paragraph - delete "operational phase" and replace with "Term"
030	05/05/08	Page 652 Section 40.2.19 - delete section and insert "Not used"
031	05/05/08	Page 652 Section 40.2.20 - delete bullets 1 to 4, and 6
032	05/05/08	Page 662 Section 40.3.9 1st paragraph - delete "will be established in detail during the tender process" and replace with "in the Tram Maintenance Agreement"
033	05/05/08	Page 665 Section 40.4.1 9th paragraph 3rd sentence - replace with "The Edinburgh Tram Network design shall be selected such that all equipment/systems used in the design shall continue to be available for the design life specified and that the Infraco shall give tie a minimum of 12 months notice where any supplier intends to cease supply of any component. The Infraco shall recommend a strategy for managing such obsolescence and effect replacement of such components where these fail."
034	05/05/08	Page 672 Section 40.5.2 6th bullet - amend to read "evidence of product whole life cycle experience to date in other service use"
035	05/05/08	Appendix 1 – ET Brand Guidelines as referred to in Section 5 (see attached)
036	13/05/08	Page 182 Section 12.12 - Add new sentence to paragraph 3 "The temporary traffic diversion modelling and assessment required to support the Infraco's Traffic Management Plan (TMP) and Work Site Strategy Plan (WSSP) shall be provided by tie (via traffic management consultants) during the Construction Works"
037	13/05/08	40.2.1 - 3rd sentence, delete "Pre-operational Period" and insert "Sectional Completion"
038	13/05/08	Table 90 - Roads, Defect Repairs, Tram Stops - insert "cleaning, graffiti and waste removal by CEC" in the comments column.
039	13/05/08	Table 90 - Signals, Tram Detection Loops - insert "2 hours (22:01-06:00)" in the minimum response time column.
040	13/05/08	Table 91 - Defect Reporting, Tram Stops - insert "cleaning, graffiti and waste removal shall be carried out by the Operator" in the comments column.
041	13/05/08	Table 91 - Removal of Obstructions on Tramway and Platform - insert "2 hours (22:01-06:00)" in the minimum response time column.
042	13/05/08	Table 94 - Pest Control - delete "cleaning of bird's droppings and" from the tie specific requirements box.

Employer's Requirements

Erratum 011

Table 2 (Page 40 Section 2.8)

Network / Phasing	Service frequency commencing at:	Monday - Friday (trams per hour)					
		first tram 06:00	06:45	07:00	07:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Saturday (trams per hour)					
		first tram 06:00	06:45	07:30	07:50	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Network / Phasing	Service frequency commencing at:	Sunday (trams per hour)					
		first tram 07:00	07:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx. 23:15 Trams run from the Airport - City Centre only

[b] from approx. 23:15 Trams run from Granton - City Centre only

[c] from approx. 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

Employer's Requirements

Erratum 012

Table 3 (Page 41 Section 2.8)

8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) and Service Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45	23:15
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6	6a
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6	6
1a	Haymarket to Newhaven	0		6	8	8	6	6	8	6	6
1a	Newhaven to Haymarket	0		0	6	8	6	6	8d	6	6
1b	Airport to Ocean Terminal	0	6	8		8	6	6	8	6	6a
1b	Ocean Terminal to Airport	6	6	8		8	6	6	8	6	6
1b	Granton to Haymarket	0	6	8		8	6	6	8	6	6 b
1b	Haymarket to Granton	6	6	8		8	6	6	8	6	6c

Networking (Phasing) andService Frequency commencing at:		Saturday (trams per hour) first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	8		8	8	6	6	0
1a	Haymarket to Newhaven	0		6	8		8	8	6	6	0
1a	Newhaven to Haymarket	0		0	6		6	8d	6	6	0
1b	Airport to Ocean Terminal	0	6	6	8	8	8		6	6a	0
1b	Ocean Terminal to Airport	6	6	6	8	8	8		6	6	0
1b	Granton to Haymarket	0	6	6	8	8	8		6	6b	0
1b	Haymarket to Granton	6	6	6	6	8	8		6	6c	0

Networking (Phasing) andService Frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6a	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6d			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6a	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Haymarket	0	6		6	6	6		6	6b	0
1b	Haymarket to Granton	6	6		6	6	6		6	6c	0

Notes:
a) from approx 23:15 trams run from Airport - St Andrew Sq only
b) from approx 23:15 trams run from Granton - St Andrew Sq only
c) from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle
d) from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Employer's Requirements

Erratum 013

Table 4 (Page 42 Section 2.8)

Phase	Service Frequency	Saturday (trams per hour)					
	commencing at:	First tram 06:00	06:45	07:30	07:50	23:15	Last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6a	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	6	6	6a	0
1b	Ocean Terminal to Airport	6	6	6	6	6	0
1b	Granton to Newhaven	0	6	6	6	6b	0
1b	Newhaven to Granton	6	6	6	6	6c	0

Employer's Requirements

Erratum 014

Table 83 (Page 431 Section 29.14)

Table 83 - Depot Plant and Equipment to be Provided (updated 020508)

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
1		Cleaning Equipment										
	1.1	Tram Cleaning Equipment	Equipment for cleaning of tram interiors	110V Industrial vacuum cleaning equipment, ≥ 2kW power Equipment to allow removal Floor polishing equipment	P	Generally used in stabling areas However can be used throughout the Depot	T	O	O	O	O	6
	1.2	Tram pressure washer	Industrial washer for general tram cleaning within the Depot including bogie washing	Self powered Hot water/steam - self heating Pressure variable up to ≥200 bar Flow rate ≥12 l/min Lance and hose ≥10m Detergents compatible with Tram external finishes	M	Throughout Depot	T	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	1.3	Infraco pressure washer	Removal Removal of fly posters General cleaning	Features as per Tram pressure washer Mobile towable bowser with capacity for up to one shift of cleaning Infraco to ensure interchangability with tram pressure washer Readily transportable on back of road-rail and other road vehicles	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
	1.4	Tram Washing Plant	Fixed plant for cleaning of Tram exterior	Unidirectional >15 tph continuously Minimised water consumption, maximised water recirculation controllable and monitored from Control Centre via SCADA system Self contained Pre-wet One pair application brushes Automatic end wash Two pair water wash brushes Dryer Operates from -5°C ambient external temperature within shelter Final details TBD with tram supplier ≥70% water recycling	F	Alongside main workshop	I	O	O	O	O	1

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				Backflow prevention devices shall be installed. Treatment of wastewater to meet appropriate standards prior to connecting to site drainage system shall be provided.								
	1.5	Rail Groove Cleaning Equipment	P-way cleaning	Vacuum equipment to remove detritus/debris from grooved track including drain boxes and points Able to clean drains and gullies employing water jets Transportable on road/rail vehicle, lifted with crane or fork lift truck	M	Across the ETN	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				Self powered for full shift Easy collection/disposal of detritus/debris								
	1.6	Parts washer	Infrastructure/Tram component cleaning & degreasing in dirty workshop	Able to wash components ≤100kg, ≤750mm diameter	F	Within dirty workshop	I	I/T	I	I	User	1
	1.7	Floor scrubber	Depot floor cleaning	Industrial vacuum/brush scrubber equipment Compatible with floor finishes	M	Within Depot building	T	T	T	T	T	1
2		Mechanical Handling										
	2.1	Shunter	Manouveuring Trams within workshop	Battery powered Road/rail capability Capable of towing/propelling single Trams Speed up to 3 km/h Local and remote control	M	Throughout Depot tracks Road capability to move between tracks on	T	O/T	I/T	O	User	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				Charging facilities Coupler at each end		hardstanding						
	2.2	Tram lifting system and stands	Lifting Trams to allow routine maintenance and removal of bogie(s)	Fixed underfloor system providing flush floor when not in use. Ability to lift fully functional, unladen tram. Synchronised lift from single control panel. Ability to stop and lock lift at any vertical positionInterlocking to protect Tram in event of system/component failure. Manually positioned stands to be provided Interlocking with OLE if required.	F	Main workshop	I	T	T	T	T	1 set

	No	Description	Function	Feature	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.3	Fixed high level access platforms	To allow access to all equipment mounted on Tram roof	Capable of providing access to all roof mounted equipment on tram Decking to prevent tools or small to components falling through Handrails and toeboards to prevent personnel/material falling Access/egress gates interlocked with OLE End protection	F	Main workshop	I	T	I	T	T	2 sets
	2.4	Overhead crane	Bridge type crane spanning 2 roads within the workshop to allow all material within main workshop to be transported up to and including size/weight of motor bogie	≥6.3 tonne capacity Vertical clearance <960 mm from hook (fully raised) to top of crane Traverses below OLE Interlocked with OLE Remote control using hand held device	F	Main workshop	I	T/I	T	T	User	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				Multi-speed faciltiy - lift, traverse and travel Long and cross travel to cover all areas over the two roads								
	2.5	Mobile crane	Facilitate removal of miscellaneous equipment including bogie components within the dirty workshop	≥2t capacity Powered operation	M	Throughout workshops	T	T/I	T	T	User	1
	2.6	Bogie workstands	To allow dismounted bogies to be maintained	Allows bogie to be manoeuvred along the stub track in the dirty workshop Wheel locks Capable of supporting both trailer and motor bogie	M	Dirty workshop	T	T	T	T	T	1
	2.7	Other tram equipment stands	Various stands to allow items of equipment to be stored and readily maintained when dismounted from the Tram	Infraco to propose depending on tram design Expected to include stands for doors,	M	Throughout Depot	T	T	T	T	T	

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				windows, body panels etc…								
	2.8	Accommodation bogies	To allow Trams to be moved within workshop once bogies have been removed or the Tram has been split at any articulation	Allows Tram to be manoeuvred throughout the depot once any combination of bogies has been replaced Allows entire tram to be manoeuvred throughout the depot once any articulation has been split	M	Throughout Depot	T	T	T	T	T	
	2.9	Fork lift truck	Lifting and transporting miscellaneous equipment	Battery powered Charging facilities Road wheels >3 t lifting capacity Drum handling equipment Crane arm Capable of accessing	M	Throughout the Depot but limited to hard standing areas when outside	T & I	T/I	T & I	T & I	User	1 plus 1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				all shelving and racking in stores- Infraco to demonstrate								
	2.10	Pallet truck	Lifting & Transporting equipment particularly in stores	Manually manoeuvred, hydraulic lifting the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose
	2.11	Hand trolleys	Transporting tools and spares	Unpowered the Infraco to propose requirements. Infraco to provide integrated solution	M	Throughout the Depot but limited to hard standing areas when outside	I	T/I	T/I	T	User	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.12	Infraco lifting slings	General slings for lifting infrastructure heavy components on system and in Depot building	Infraco to propose. Stand for storage	P	Use on system infrastructur e	I	I	I	I	I	The Infraco to propose
	2.13	Tram lifting slings	Specific lifting gear to allow all equipment to be removed and replaced.	Raised hook on overhead crane can be no more than 5390 mm ARL the Infraco to propose Stand for storage	M	Use in Depot building only	T	T	T	T	T	Tramco to propose
	2.14	Windscreen/window removal equipment	For use in replacing tram windscreens and side windows	Mobile stand capable to being used to access both windscreen and side windows Electrically powered vacuum beam with suckers adapted to windscreen design Audio/visual alarm in the event of suction loss	M	Use in Depot building only	T	T	T	T	T	1

	No	Description	Function	Transfer	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
	2.15	Re-railing equipment	For use in re-railing trams out on the System	Variety of jacks/beams/slides to be proposed by the Infraco Airbags Slew locking devices Capable of being readily transported on the road/rail vehicle	M	Used any where on system including Tramstops	T	T	T	T	T	1 set
	2.15	Stop boards	To indicate the presence of equipment/personnel/trams on the tracks	The Infraco to propose requirements. Infraco to develop integrated solution	P	Throughout System	I	T/I	I	T/I	User	≥20
3		Workshop & Stores Furniture										
	3.1	Shelving and racking	Storage of spares and other material	Heavy duty The Infraco to propose requirements. The Infraco to develop integrated solution	F	Stores	I	T/I	I	T/I	User	The Infraco to propose
	3.2	Tram staging	for Tram inspections/repairs	The Infraco to propose any	M	Used within Depot	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Requirements	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				additional staging required		building						
	3.3	General staging	For infrastructure inspections/repairs	The Infraco to propose any additional staging required	M	Across Edinburgh Tram Network	I	I	I	I	I	The Infraco to propose
	3.4	Shelving	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.5	Workbenches	Equipment maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.6	Cupboards	Storage of minor items/documents	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	I	T/I	User	The Infraco to propose
	3.7	COSHH cupboard	Storage of COSHH items	The Infraco to propose requirements. The	F	Dirty workshop	I	T/I	I	T/I	user	The Infraco to propose

	No	Description	Function	Remarks	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				Infraco to develop integrated solution								
	3.8	Workshop stools	Personnel comfort when working	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Throughout workshops	I	T/I	T/I	T/I	User	The Infraco to propose
4		Fixed Plant										
	4.1	Air conditioning maintenance equipment	Specialist tools for filling/emptying refrigerant	The Infraco to propose	F	Anywhere in Depot building	T/I	T/I	T/I	T/I	T/I	The Infraco to propose
	4.2	Tyre replacement equipment	Specialist tools for tyre splitting/removal/balancing /bearing replacement	The Infraco to propose	F	Dirty workshop	T	T	T	T	T	1
	4.3	Underfloor wheel lathe	In-situ reprofiling of Tram tyres	Capable of producing a range of wheel profiles. Tolerances to be agreed between the Infraco Swarf conveyed to skip for removal by means of forklift truck capable of turning all wheels on one Tram within	F	Within Depot building.	I	T	T	T	T	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				eight hour shift								
	4.4	Sand Plant	Refilling of Tram sanding equipment	Minimum silo capacity 30 tonnes Capable of receiving sand delivery directly from road vehicle Allows Tram driver to fill an empty tram within 5 minutes Rate of fill to be sustainable for 30 minutes. In no circumstances shall the interval between the filling of two Trams exceed 10 minutes The physical condition of the sand shall not deteriorate when stored Sand deliveries to a	F	Dedicated facility	T	O	O	O	↓T	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Owned	Quantity
				Tram shall stop automatically when the tram sand box is full Sand filling nozzles to be compatible with the sand filling inlets on the trams Signal interlocking to inhibit the movement of a tram if the sand filling nozzles are not returned to their correct storage position.								
	4.5	Machine tools	General machine tools required for maintenance	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	T/I	T/I	User	The Infraco to propose
	4.6	Paint booth	Respraying of removable Tram panels	For use with water based paints integrated compressor	F	Outside workshop	T	T/I	T/I	T	User	1
	4.7	Pantograph	to calibrates and align	The Infraco to	F	Throughout	T	T	T	T	T	1

	No	Description	Function	Remarks	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
		maintenance & load test jig	tram pantograph off Tram roof	propose		workshops						
	4.8	Suspension setting equipment	To allow suspension to be set/shimmed without using tram lift	The Infraco to propose	M	Throughout workshops	T	T	T	T	T	1
	4.9	Diesel generator	Back up power source	Capable of connection to the depot LV switchboard and other plant requiring an external energy source. Capable of providing at least three day continuous operation.	M	Across network	*	I, T & O	I*	I		*To be rented by the Operator if and when required.
5		Hand & Mobile Tools										
	5.1	Infrastructure tools	Hand tools	The Infraco to propose	P	Across ETN	I	I	I	I	I	The Infraco to propose
	5.2	Tram tools	Hand tools	The Infraco to propose	P	Across ETN	T	T	T	T	T	Tramco to propose
6		Welding Shop Equipment										
	6.1	Ferrous welding equipment	General infrastructure repairs	The Infraco to propose requirements. Infraco	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose

	No	Description	Function	Remarks	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				to develop integrated solution								
	6.2	Aluminium welding equipment	Specialist Tram and Tram shelter repairs	The Infraco to propose requirements. The Infraco to develop integrated solution	F	Dirty workshop	I	T/I	I	T/I	User	The Infraco to propose
7		Battery Shop Equipment										
	7.1	Tram battery charger	To recharge Tram Batteries	The Infraco to propose	P	Battery room	T	T	T	T	T	The Infraco to propose
	7.2	Infrastructure battery chargers	To recharge various batteries used in power supply, control and comms equipment	The Infraco to propose and develop solution compatible with tram battery charger	P	Battery room	I	T	T	T	T	The Infraco to propose
8		Instrumentation and Test Equipment										
	8.1	Tram test equipment	To allow testing of measurement and testing of tram equipment	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted. As a minimum, proposal to	M/P	The Infraco to propose	T	T	T	T	T	The Infraco to propose

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				include; headlight tester, tools to allow event recorder to be downloaded and interrogated, tools to allow CCTV systems to be downloaded and interrogated, tools to allow PA and PID announcements to be re-configured.								
	8.2	Infrastructure and Fixed systems test equipment	To allow measurement and testing of infrastructure and fixed systems	The Infraco to propose. Note any overlap with "Special Tools" to be highlighted as a minimum, proposal to include; OLE height and stagger gauge, stray current data loggers, noise measurement equipment, ride measurement equipment, point	M/P	The Infraco to propose	I	I	I	I	I	The Infraco to propose

	No	Description	Function	Remarks	Fixed/Mobile/ Portable	Location used	Supplier	User	Maintainer	Access Control	Cleaned	Quantity
				setting detection equipment, ≥3 sets of live line testing equipment								
9		Infrastructure Maintenance Equipment										
	9.1	Portable P&C grinders	To dress points and crossings	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.2	Track welding equipment	to build up profiles/replace sections of track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable tamping equipment	To build up track ballast to realign track	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.3	Portable lighting equipment	To illuminate work/collision sites	The Infraco to propose	M	On Site	I	I	I	I	I	1 set
	9.4	Portable generators	To power site tools/lights	The Infraco to propose	P	On Site	I	I	I	I	I	2
	9.5	Track measuring Equipment	To allow track line and levels to be measured	The Infraco to propose	P	On site	I	I	I	I	I	1 set
10		Road Vehicles										

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
	10.1	Road - rail vehicle	To move about the system carrying mobile equipment and personnel	Able to operate on UK roads Able to operate on all parts of the ETN To be equipped with demountable ≥2 man-basket to enable OLE inspection throughout the ETN Capable of towing a tram including ability to apply tram brakes from cab of road-rail vehicle Capable of having snow plough attached in both road and rail mode Crane with capacity ≥6t and a reach (reduced capacity) of at least 4m. Able to transport other equipment items as set out elsewhere in	M	Mobile throughout ETN and road network	I	I	I	I	I	1

	No	Description	Function	Features	Fixed/Mobile/Portable	Location used	Supplier	User	Maintainer	Access Control	Trained	Quantity
				this list Able to transport ≥3 personnel in cab Payload capability ≥10t This will make it a requirement that the driver has a LGV driving license. Powered winch with ≥8t pulling capacity								
	10.2	Other road vehicles	Miscellaneous vehicles to be proposed by Infraco	The Infraco to propose	M	Throughout road network	I	I	I	I	I	The Infraco to propose
	10.3	Road/rail trailer	Trailer with large man lift for OLE inspection/repairs	Capable of being towed to site by road/rail vehicle or truck	M	Throughout road network	I	I	I	I	I	1

Employer's Requirements

Erratum 015

Table 89 (Page 610 Section 4.2.2)

Table 89 – Infrastructure and Equipment Responsibilities Allocation Matrix
(updated 020508)

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Tram Stop Structure																
Platform surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Inclined Approach		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Canopy		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Inside surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External Roof surfaces		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Integral Lighting		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Internal seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Furnishings																
Stop Name Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Static Information Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Guard Rails/Barriers (as applicable)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Lighting Columns		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓
Lighting Lanterns		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Litter Bins		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
External seating		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Platform Edge White Line		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Advertising Signage		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Stop Equipment																
CCTV Cameras		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Public Address		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Loudspeakers																
Hearing Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Information Disolavs		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Passenger Alarm/Help ooints		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Ticket Vending Machines (maintained & serviced by TEL)		N/A	N/A	N/A	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓
Drainage (Interface defined in Table 93)		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Trackside Equipments																
Stop Equipment Cabinets		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stop Equipment Cabinet Equioment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Traction Isolator Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinets		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Control Cabinet Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Point Heater Cabinets, Point Heaters & Controls		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Road Junction Cabinets		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Road Junction Cabinet Equipment		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✓	✗
Point Machines (including Manual Control)		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Contact Wire & Supports		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Poles		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Pole mounted Equioments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall Fixings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
OLE Wall fixed Equipment		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signal Heads (Roadside)		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓

Tram Signal Posts (Trackside)		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Signals Posts		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Tram Detector Loops		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Lighting on OLE Masts		N/A	N/A	N/A	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cable ducts		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trackside cables		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Cable drawpits		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Structures (Bridges, Retaining Walls etc)																
Over Bridges See Table 95 for split		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Under bridges See Table 95 for solit		N/A	N/A	N/A	✓	✗	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓
Retaining walls		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Misc Structures		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Swept Path		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Swept Path Markings		N/A	N/A	N/A	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✗	✓
Track																
Trackwork		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Points & Crossings		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Track Drainage		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Field' Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Stations																
Sub Station Buildings		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Compounds		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Sub Station Parking Facilities		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Monitoring Points		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Stray Current Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Earthing Equipments		N/A	N/A	N/A	✓	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Trams																
Free issue' tram mounted equipments		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Trams		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓

Tram saloon & Drivers cabs		N/A	N/A	N/A	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗	✗	✓
Radio																
Portable radios		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Radio Base stations		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓
Landscaping																
Soft landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓
Hard Landscaping		N/A	N/A	N/A	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✗	✓

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
Stores, Workshops and Maintenance Area															
Ground Floor Level		Stores Office Centrally located	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Heavy Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Heavy store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Visitors Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Workshop Cleaners Room	n.a	✔	✔	✘	✘	✔	✘	✔	✘	✘	✔	✔	✘
		Light Store (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Light Store (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Infrastructure Workshop		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Dirty Workshop / Machine Shop		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Clean Workshop (Infraco)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Clean workshop (Tramco)		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Lobby	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Male Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Toilets	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Female Showers	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Staff Corridor	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Infrastructure Admin	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Admin	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		First Aid	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Switchroom		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Infrastructure Manager	n.a	✔	✘	✘	✘	✘	✔	✔	✘	✘	✔	✘	✘
		Maintenance (Tramco) Manager	n.a	✘	✔	✘	✘	✘	✔	✔	✘	✘	✘	✔	✘
		Store Room (Cleaners?)	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✘	✘	✘
		Staff Entrance Hall	n.a	✔	✔	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Drying Room	n.a	✔	✔	✘	✘	✘	✔	✔	✘	✘	✔	✔	✘
		Tram Batteries		✘	✔	✘	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Equipment Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		UPS Room		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘

Floor	Room No.	Description	User Competence Assessor	Used by			Cleaned by			Maintained by			Access Controlled by		
				Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**	Infraco	Tram Maintainer	**Transdev**
		Compressor Room - Air tools		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Tram Maintenance Area		✘	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Maintenance Area Transit Zone		✔	✔	✔	✘	✔	✘	✔	✘	✘	✘	✔	✘
		Inspection Pits		✘	✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘
		First Floor office accommodation	n.a	✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
Furnishings - Used, Cleaned, Maintained and Controlled as appropriate															
		Chairs, Desks, Tables, Filing cabinets etc	As Appropriate	✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
		Kitchen and Catering Equipment		✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
		Reception Desk & Furnishings		✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
		Control Room Furnishings		✘	✘	✔	✘	✘	✔	✔	✘	✔	✘	✘	✔
		Lockers, Coat Rails etc		✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
		Training Room furnishings (Projector, Screen etc)		✘	✘	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔
External															
		Depot Yard		✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔
		Depot Stabling Area		✘	✘	✔	✔	✔	✔	✔	✘	✘	✘	✘	✔
		Electrical Sub Station		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Power Energy Building (Electric, Gas etc)		✔	✘	✘	✔	✘	✘	✔	✘	✘	✔	✘	✘
		Depot Car Park		✘	✘	✔	✘	✘	✔	✔	✘	✘	✘	✘	✔

Description	User Competence Assessor	Used by			Cleaned by				Maintained by				Access Controlled by			
		Infraco	Tram Maintainer	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev	Infraco	Tram Maintainer	CEC	Transdev
Miscellaneous																
Communication & Control links		N/A	N/A	N/A	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓

	LEGEND
	Provided by Tram Maintainer
	Provided by the Infraco
✓	Responsible
✗	Not Responsible

Employer's Requirements

Erratum 035

Appendix 1 – ET Brand Guidelines

BRAND GUIDELINES JANUARY 2008

Edinburgh Trams

USB00000033_0043

Welcome to the Edinburgh Trams brand.

The Edinburgh Trams brand plays a crucial part in our communications with our customers and in creating a strong, memorable and recognisable image for the system. The brand has been specifically developed to sit alongside Lothian Buses as part of a co-ordinated presentation of public transport in Edinburgh.
For the strategy to succeed it is vital that all those involved in the delivery and service of the system adhere to the guidelines contained in this manual.
This will ensure that the Edinburgh Trams brand remains coherent and consistent. It is a well known fact that a well managed and consistently implemented brand helps inspire public confidence and trust.
By working within these guidelines you will help contribute to that process.

Phil Wheeler

Convener, Transport, Infrastructure and Environment
City of Edinburgh Council

Willie Gallaher
Chairman tie

David Mackay
Chairman TEL

Introduction

The elements and architecture of the Edinburgh Trams brand draw heavily from the Lothian Buses identity. This is to reinforce the strategy that has been adopted to create a genuinely integrated public transport system for Edinburgh.

Colours, typography and graphics are consistent between the two modes and are immediately recognisable as 'family members'.

The contents of this manual define how the branding must be implemented if the integrity of the visual relationship between the two modes is to be maintained.

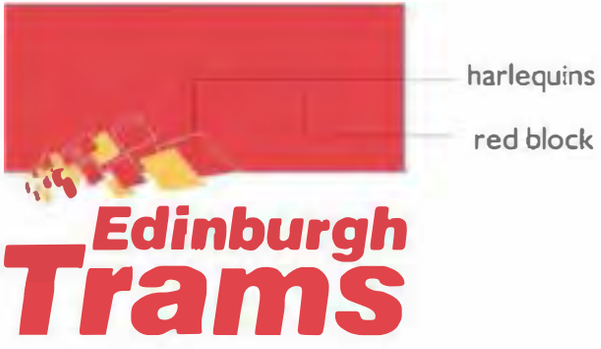
In essence the branding is clean, simple and easy to understand - precisely the values the tram service provides.

Glossary

The key terms used in this document are as follows:

The Mark

A combination of the harlequins, the logotype and the red block.



The Logotype

The text of Edinburgh Trams set in Swiss 721 BT. The logotype is used with the harlequins and the block in fixed relationships to form marks.

Edinburgh
Trams

The Exclusion Zone

The minimum area around marks or logotypes that must be kept free of other graphic elements. This is to ensure that they are reproduced clearly and legibly without interference from other visual devices.

Guide to using the Mark

This page describes how the mark and the red block should be used.

Some simple rules are:

1. Never extend the red block unless the extended width of the red block to the left is more than 2 times the width of the mark and the extensions bleed off the page or media as illustrated by the header above. The extension to the right edge of the media should be half the width of the mark.

2. The red block should never be reduced in height when part of the mark alone but can be extended in height when the width is extended subject to rule 1.

3. The height should only be extended if the block is to bleed off the page or media.

Colour Glossary

To assist those who are involved in reproducing the Edinburgh Trams identity we have described here the primary specifications for print, screen and paint.

Print

PMS
This is short for the Pantone Matching System. This system is used to specify proprietary 'spot' colours. Spot colours are individually mixed for printing.

The letter 'C' after the colour number shows a colour's appearance on coated paper stock. The letter 'U' after the number shows a colour's appearance on uncoated paper stock.

CMYK
These initials represent the colours used in the four colour printing process: Cyan, Magenta, Yellow and Black (Kohl). Different combinations and percentages of these four colours are used to make matches to the 'spot' colours.

Screen

RGB
This is short for Red, Green, Blue the primary colours of light. RGB is used for reproduction on screens and electronic display systems.

Web
To make colours that can be reproduced on internet and intranet sites, Web safe colours should be specified. Web safe colours provide a greater degree of consistency than RGB colours when there is no control over the equipment used to view the site.

Paint

NCS
This is short for Natural Color System. NCS provides a wide range of colour specifications applicable to paints and other materials.

Other systems such as RAL and British Standard BS4800 have a limited number of Edinburgh Trams colour matches. Approval needs to be sought before using these systems.

Typography

We have two fonts: Humanist 521BT for general use and Swiss 721 BT which is only used to create the Logotype.

Only Roman, Bold and Light versions of Humanist 521 should be used with italic versions as appropriate.

Humanist 521 BT

Roman **Aa**

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Bold **Aa**

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Light Aa

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890

Mark usage

The mark shown here is the only acceptable version to be used.

No other colours should be used and the mark should never be stretched or the proportions altered in any way.

Mark usage

When using a single colour mark the version on the right shows how to reverse out of white while the version on the left demonstrates reversing from black or another colour.

Mark usage

Another option when using a single colour mark, for example when positioned over an image as illustrated here, is to use a transparent mark.

Exclusion Zone

The dotted line indicates the zone into which no other graphic devices should be placed.

Colours

Three core colours make up the brand palette:
Red
Gold
Madder

In certain circumstances gold metallic ink in the form of PMS 873 can be used.

Print

Red	Gold	Madder
PMS 186	PMS 124	PMS 188
C 0% M 100% Y 81% K 4%	C 0% M 28% Y 100% K 6%	C 0% M 97% Y 100% K 50%

Screen

R 227 G 25 B 55	R 238 G 178 B 17	R 139 G 15 B 4

Web

R 227 G 25 B 55	R 238 G 178 B 17	R 139 G 15 B 4

Stationery

Letterheads should follow the layout and formatting shown here. Guidance on fonts is provided in the typography section.

Edinburgh Trams

Edinburgh Trams Limited
City Point
Haymarket Terrace
Edinburgh
EH1 7YU

T [redacted]
F
e m.il info@tramsforedinburgh.com

Mr G. McCluskey
19 Williams Street
Edinburgh
EH12 9QT

24th November 2007

Our ref: ETL/1234

Dear Mr McCluskey

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exercitation ullamcorper suscipit lobortis nisl ut aliquip ex ea commodo consequat. Duis autem vel eum iriure dolor in hendrerit in vulputatevelit esse molestie consequat, vel illum dolore eu feugiat nulla facilisis at vero eros et accumsan et iusto odio dignissim qui blandit praesent luptatum zzril delenit augue duis dolore te feugait nulla facilisi.

Yours sincerely

Andrew McKinnon

Operations Director

Stationery

Business cards follow the same format as the letterhead.

Edinburgh Trams

Marketing

The examples we show here illustrate the basic image and values the Edinburgh Tram brand should convey:

Clean

Simple

Easily understood

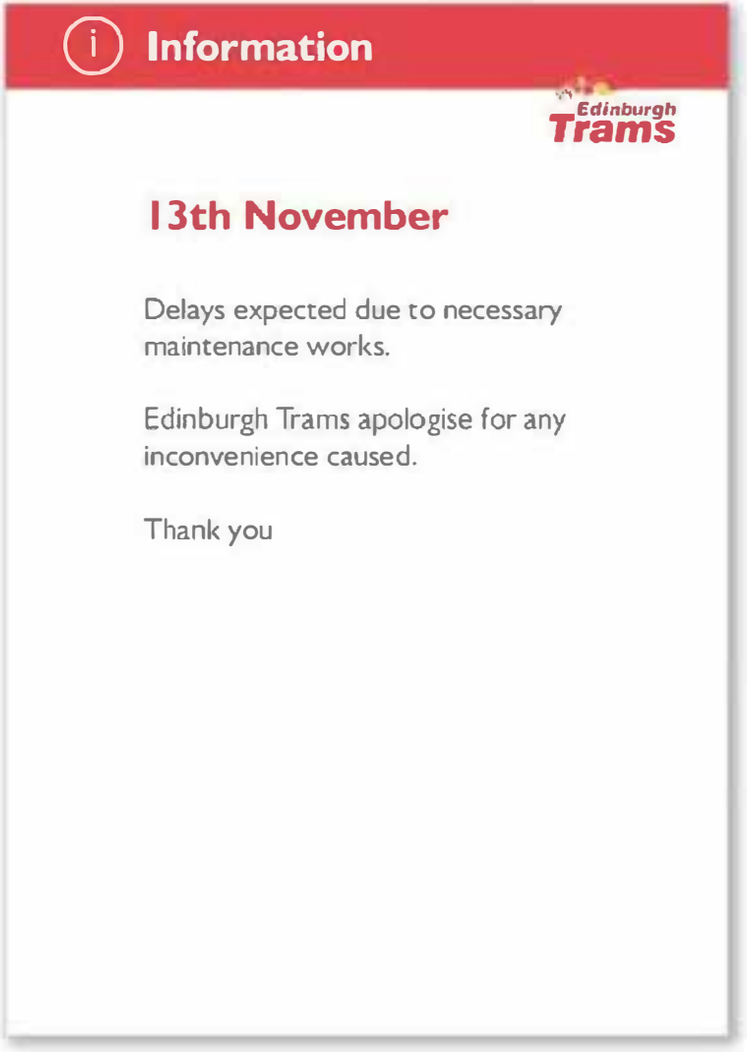
Passenger information

Again information should follow the 3 basic rules:

Clean

Simple

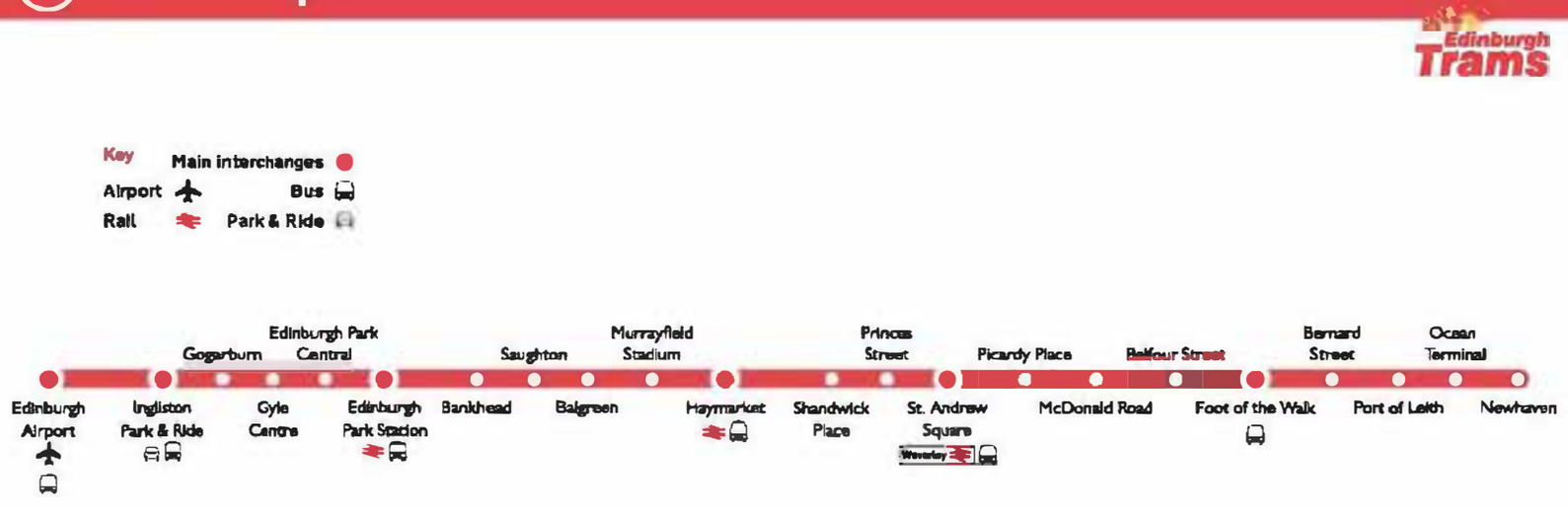
Easily understood



Edinburgh Trams

Passenger information

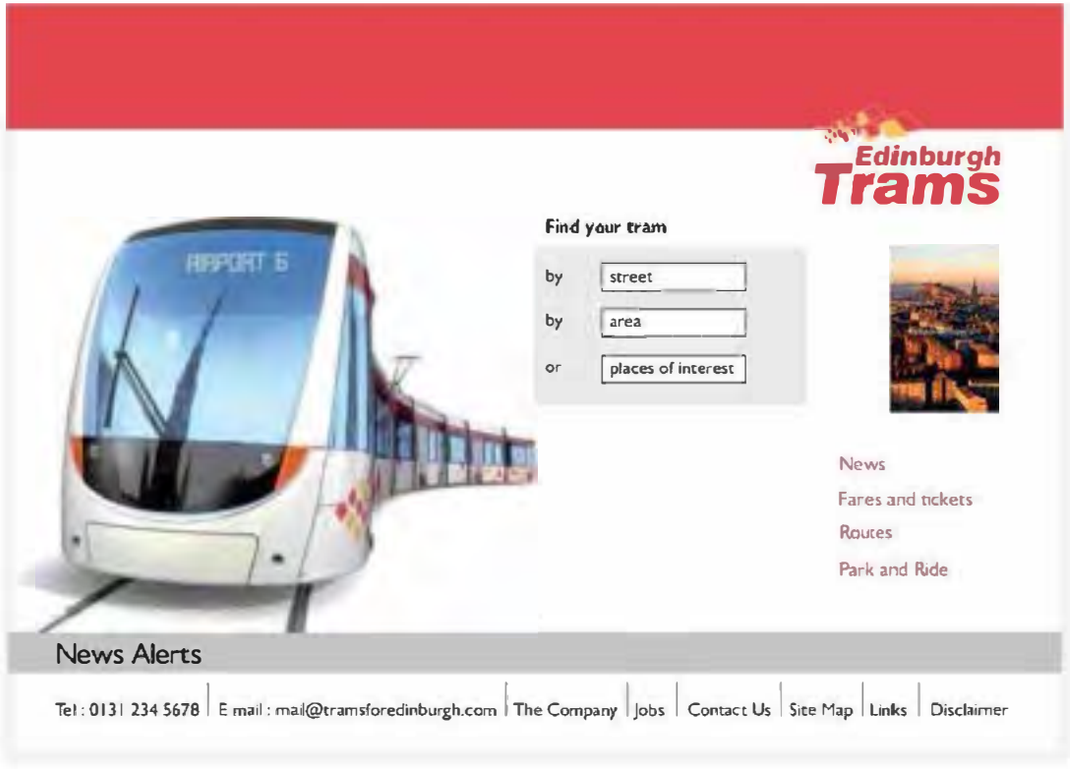
Route map



Web site

The web site should share the same layout and 'feel' as its sister site for Lothian Buses.

Consistency in navigation and layout help to reinforce the integrated transport concept.



Edinburgh Trams

Pictograms

Informational pictograms

Statutory pictograms

Directional pictograms

Space Bar

External design

Reinforcing the strategy of creating a visually integrated public transport system for Edinburgh, the tram livery draws from the Lothian Bus livery. Some modifications have been made in order to satisfy the Rail Vehicle Accessibility Regulations (RVAR) such as the red door colour that provides the required contrast of the doors from the tram body.

Colours follow the Brand palette with the exception of the 'gold' where, on the livery only, a gold vinyl is to be used as on Lothian Buses and not by using the specifications in this document.

Four designated advertising zones have been identified to control the revenue generating advertising presence that the business plan requires. Two trams have been allocated for 'all over' advertising and they will be subject to a strict, separate, design protocol.

Interior

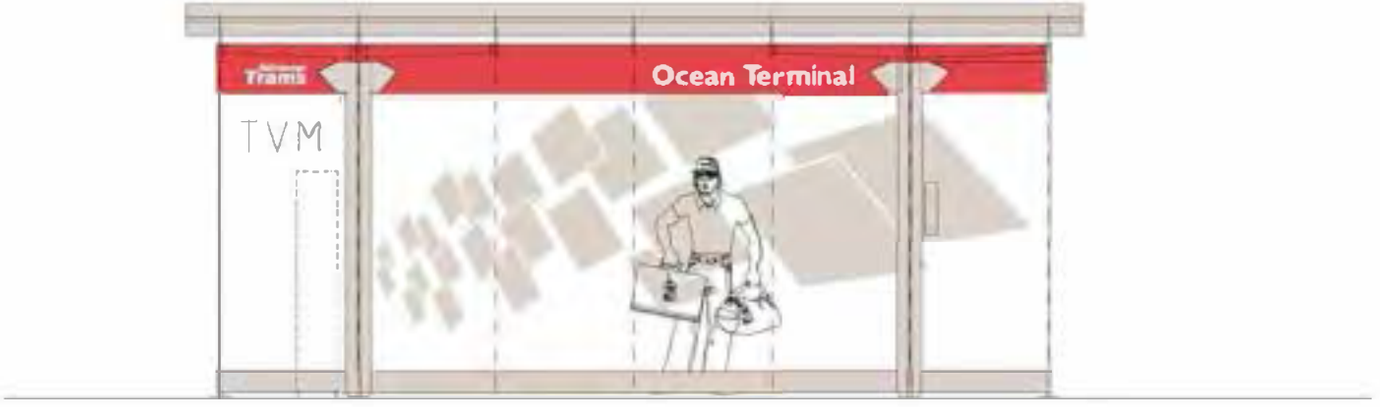
As with the exterior the tram interior will use some of the same colours and finishes to be found on the buses. These will have to be adapted to ensure compliance with RVAR as there are strict technical guidelines on issues such as colour contrast based on Light Reflection Factors which affects all the visible surfaces within the vehicle. Compliance with RVAR is a legal requirement and the end result will be determined in consultation with the DfT Mobility Unit.

The image opposite is an early iteration of the proposed tram interior and will be developed through the process described above.

Tram stops

The finishes of the tram stop elements are generally of a neutral colouration.
The introduction of the Edinburgh Trams' key red as a highlight colour should therefore be used sparingly and appropriately as indicated here. The red has been introduced as an integral, functioning part of the shelter structure and serves to carry the high level stop sign. Elsewhere the red is introduced as signage or through information points.

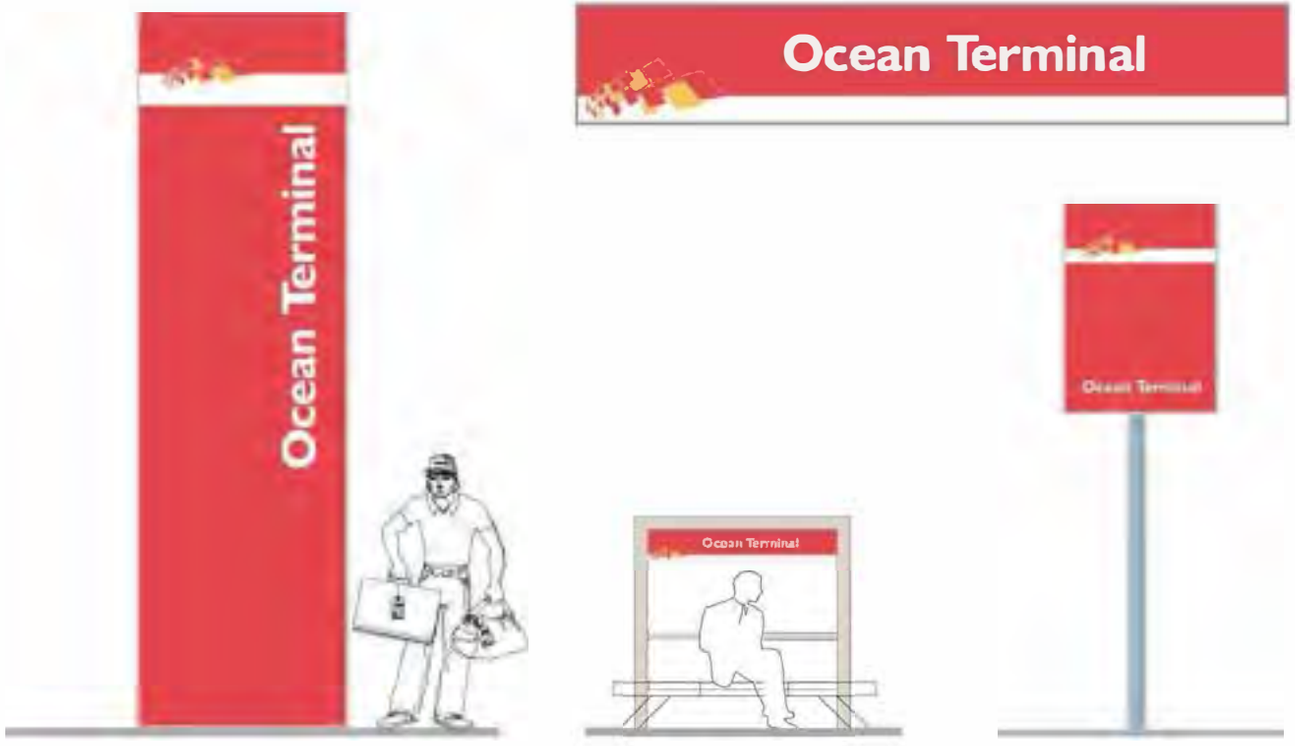
Subtle use of the harlequins can be made on such areas as glazing manifestation as illustrated here. A further example of using the branding in a functional, rather than superficial, way.



Signage

The signage concept has been conceived to create strong, highly visible and legible points of reference and information.

As part of the tramstop elements they follow the principle of introducing the Edinburgh Trams key red in a controlled, functional manner whilst reinforcing the identity and aiding recognition.



Colours

The red, madder and gold are freely available in a variety of finishes such as paint and powder coating by using the RAL specification here.

Uniforms

To assist those who are involved in procuring the staff uniforms the following images are intended as a simple guide to make sure the image conveyed through the uniforms is consistent with other areas of the brand's application.

By keeping the uniforms neutral the key red can then be introduced as a detail. As with other elements of the system the red should be used sparingly as shown here.

Name badges

Name badges follow the guidelines established for communications.

Contacts

For assistance with any aspect of the contents of these guidelines please contact either:

Jen Johnston
tie limited
Citypoint
65 Haymarket Terrace
Edinburgh
EH12 5HD

Tel:
Fax:
e mail: jen.johnston@tramsforedinburgh.com

or

Iain Coupar
Marketing Director
Transport Edinburgh
55 Annandale Street
Edinburgh
EH7 4AZ

Tel:
Fax:
e mail: icoupar@transportedinburgh.com

Document Management Sheet – Employer's Requirements

Version	Summary	Date	Modified	Checked	Approved
3.6	Version updated to include: 1) Legal alignment changes agreed on meeting at Tuesday 11.03.08 2) Technical adjustments by RK and AS 3) CEC changes that resulted from their review 4) Revised s26	14/03/08	14/03/08		
3.6a	Version updated to include: 5) Revised s28.13 6) Revised s23 7) Ref check – not complete. 8) Incorporation of DLA (SF) checks. 9) Depot Scope changes.	19/03/08	19/03/08	SH	
3.6b	Updated as per Pinsents comments 03.04.08	03.04.08		MC/SH	
3.6b	For issue	07.04.08	07.04.08	SH	GG/SB
4.0	Final	16.04.08	16.04.08	SH	GG/SB

Trams for Edinburgh

..connecting our Capital

Edinburgh Tram Network

Employer's Requirements

Edition: v4.0 April 2008

V 4.0

Table of Contents

1 Introduction

1.1 Summary of Overall Scope

The Infraco shall be fully responsible for the works and services described in these Employer's Requirements and in the Agreement:

1.2 Infraco Works

Summary Scope of Infraco Works

Detailed requirements associated with the infrastructure and equipment for the Infraco Works are described within other Sections of these Employer's Requirements and the Agreement.

The scope defined within this section is limited to a summary of the principal elements of the Infraco Works:

- the supply of Trams in accordance with the Tram Supply Agreement;
- the provision of maintenance as defined in the Tram Maintenance Agreement and Section 40 (Maintenance) of these Employers Requirements;
- the provision of Trackwork - A total of approximately 18.8km and 5.5km (for phases 1a and 1b, respectively) of track kilometres, on street and off street trackform;
- the provision of Tramstops - A total of 22 Tramstops and 1 staff only Tramstop for Phase 1a, and 9 Tramstops for Phase 1b, together with associated infrastructure;
- the provision of Tramstop furniture, systems and equipment;
- the provision of interchange facilities as provided in the design information;
- the provision of points and crossings including point machines, their power supplies, point heating and the control thereof, detection and indication;
- the provision of traffic / tram signals;
- the provision of Tram detection system;
- the provision of all 11kv, 400volt and 230 volt power supplies;
- the provision of traction substations and d.c. traction distribution;
- the provision of OLE (Including all trackside isolators);

- the provision of supervisory control, and communication systems and sub-systems including all field, Tram (free issue for installation by Tram Supplier) network and central control and interface equipment;
- Develop and manage an EMC strategy that includes appropriate immunisation of all Third Party neighbouring systems including Network Rail.
- Accept delivery of fixed and portable Ticket Vending Machines from tie and then undertake the installation of such machines and the provision of the necessary supporting infrastructure (including power supplies, communication links and foundations). The maintenance of these machines is not within the scope of the Infraco;
- Provision of the Depot containing:
  - A depot building containing a maintenance workshop and associated workshops, offices, stores and equipment;
  - The Control Centre (First Floor) and associated equipment room (Ground Floor);
  - The Edinburgh Tram Network administration offices;
  - A depot yard and stabling area;
  - A traction power substation;
  - A building services transformer and associated works;
  - All necessary services and utility connections;
  - A boiler house;
  - Hard-standing for a diesel alternator; and
  - The Depot access road.
- Provision of Tram associated road works;
- Provision of traffic management;

- Provision of road furnishings;
- Provision of bridges, structures and retaining walls, including the necessary services and facilities e.g. lighting, drainage, fencing and guardrails, earthing and bonding etc.;
- Civil works including earthworks (inclusive of contamination removal, demolition, Site clearance, excavation, bridges and structures, all necessary temporary works and drainage;
- Demolition/modification of certain buildings as identified in the design phase.
- Relocating the War Memorial at Haymarket Junction (the Infraco shall be required to obtain confirmation from tie prior to such re-location that tie is satisfied that all relevant Consents have been obtained by the Infraco;
- Landscaping including, hard landscaping, soft landscaping, boundary treatments;
- Provision of lighting;
- Provision of signage;
- Provision of fencing;
- The provision of all temporary works and installations (to allow construction of the Edinburgh Tram Network and achievement of delivery of the Edinburgh Tram Network into service) including the provision of connections to appropriate power supplies.
- to carry out and/or manage to completion the design of the Edinburgh Tram Network, including the management coordination, and specification and implementation of the necessary works for the modification of the Urban Traffic Control System;
- to procure and install all materials and equipment, required for the complete operating Edinburgh Tram Network, as summarised and as further detailed within these Employer's Requirements;
- to supply documentation as defined within these Employer's Requirements, including design documentation, as-built documentation, statutory information, as-built information, maintenance documentation and training documentation;
- to energise the Edinburgh Tram Network including liaison with and management of all interested and affected parties;

- to provide access and support for driver training;
- to provide comprehensive management and technical and maintenance services and Deliverables to ensure that all of the above is delivered in full compliance with these Employer's Requirements.

1.3 Phase 1a Scope Statement Regarding Inclusion for the Phase 1b Option

Phase 1a shall meet these Employer's Requirements and provide full functionality as a standalone tram network. The scope for Phase 1a shall include the following elements in order to facilitate the addition of Phase 1b as an option instructed later under this Agreement.

1. The structure, earthworks and necessary works at Roseburn Junction shall include all sub-structure, structures, earthworks, ductwork, drainage and fitting out to bottom of rail fixing, including the provision for the OLE spur connection for Phase 1b from Phase 1a and OLE supports, for the delta connection of Phase 1b with Phase 1a. The structure, earthworks and works shall extend as a minimum such that the subsequent construction of Phase 2b does not interfere with the operation of Phase 2a except to the extent allowed by the possessions detailed below.

2. Plain line shall be installed along the Phase 1a route through the Roseburn Junction, however the Infraco shall ensure that the design and construction shall provide for the turnouts to be installed in a maximum of one 54 hour possession of the Phase 1a inbound and outbound tracks between Murrayfield and the Western end of Haymarket Yards turnback. Traction power supply sectioning shall allow the turnback of service trams throughout the possession. In addition, up to 28 normal night-time possessions shall be available for preparatory works and commissioning works.

3. The central supervisory, control and communications systems provided by the Infraco for Phase 1a shall have sufficient capacity and functionality to accommodate the incorporation of Phase 1b. This shall include all software, firmware, databases with the same control and indication functionality as for Phase 1a. All central control system hardware shall be provided to allow the connection of the Phase 1b infrastructure by means of cable connection alone.

4. The central supervisory, control and communications systems shall be designed and configured such that the commissioning of Phase 1b infrastructure shall be possible without material impact on the passenger services operating on Phase 1a or the operational Control Centre prior to assimilation of Phase 1b with Phase 1a.

5. Documentation, drawings, manuals, spare parts and training shall be provided for Phase 1a on a standalone basis, but shall be in the form that is expandable to accommodate Phase 1b as and when constructed..

2 Operations and Performance

2.1 Scope

The scope of this Section of the Employer's Requirements defines the Operations & Performance requirements applicable to the Edinburgh Tram Network (ETN) which the Infraco must comply with.

2.2 Network Description and Principles

The Edinburgh Tram Network will operate as a 'line-of-sight' tramway, with tramway signalling provided at road junctions and at tramway junctions where appropriate. A fleet of Trams will serve the ETN providing level boarding with low level platforms located along the routes.

Figure 1

For ease of reference, a diagram of the Edinburgh Tramway Network is shown in Figure 1 above.

The route in the city from Newhaven to Haymarket (approximately half of Phase 1a) and from West Granton Access to Granton Square (approximately a third of Phase 1b) runs mainly on-street with varying degrees of segregation. The Roseburn corridor (approximately two thirds of Phase 1b) is a segregated offstreet alignment, shared with a combined footpath and cycleway. Most of the route between Haymarket and the Airport (the remaining half of Phase 1a) is segregated from road traffic.

The whole ETN will consist of double track.

The Depot, located at Gogar, will provide maintenance and stabling facilities for the entire fleet of Trams operating on the ETN. It will also contain the administration and management offices, including an operations and Control Centre, from where the ETN will be managed and maintained.

Transport Services shall be operated in accordance to a timetable, as agreed between the Operator and tie, to achieve reliable and consistent operation at the required tram frequencies.

Throughout these Employer's Requirements reference is made to three timetables that shall be progressively introduced in response to patronage demand growth. These are intended to allow for reliability growth and Operator familiarisation with the Edinburgh Tram Network. The following definitions shall apply:

- **Operational Timetable**

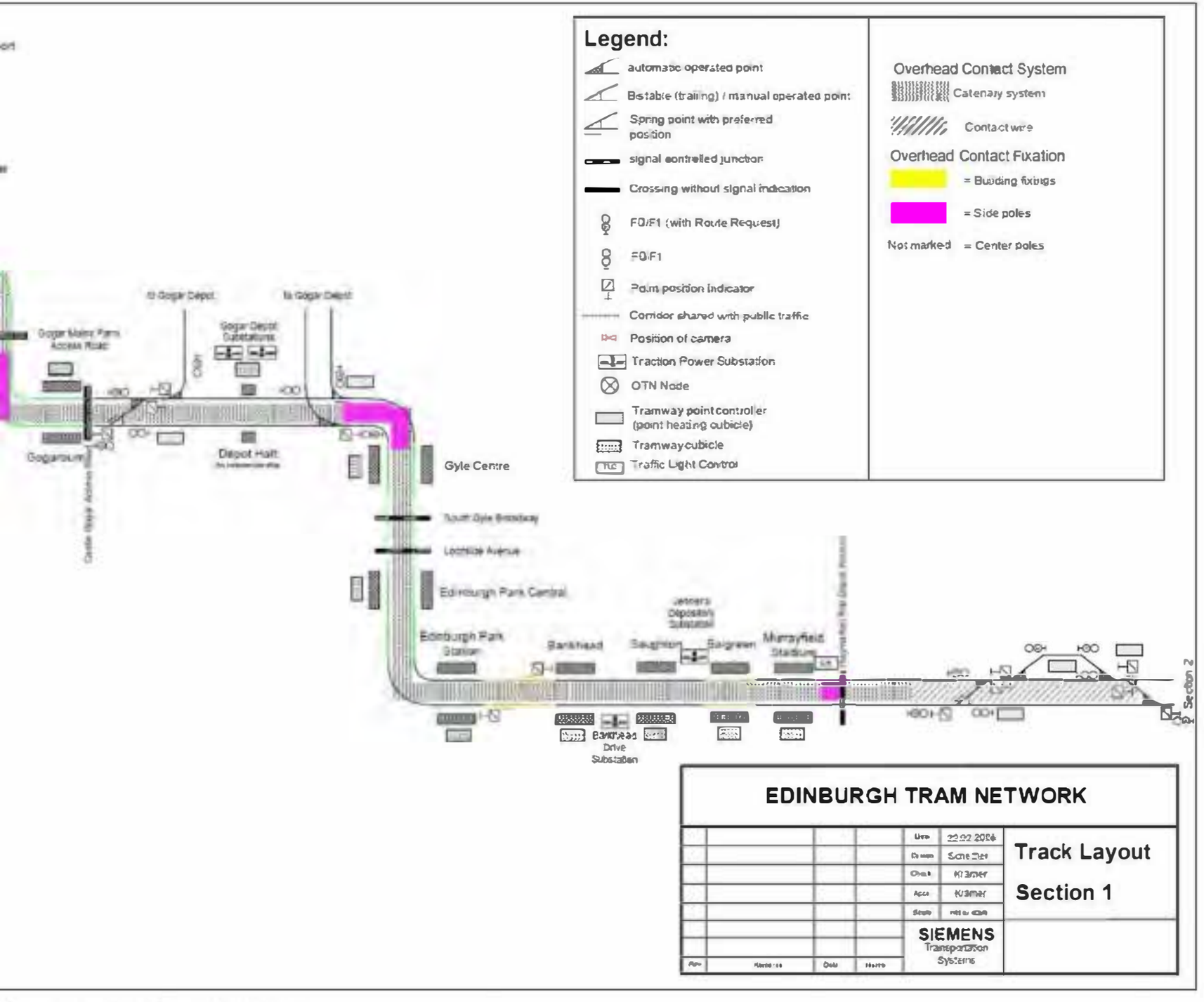
  A timetable developed by tie, which provides Trams at a frequency of twelve Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. Six Trams per hour in each direction are operated on the sections between Haymarket and the Airport and between Ocean Terminal and Newhaven. For Phase 1b, Trams at a frequency of six trams per hour in each direction on the section between Haymarket and Granton square shall be operated. The Operational Timetable shall be in effect from the Service Commencement Date for a minimum of one year.

- **AM and PM Peak Enhanced Timetable:**

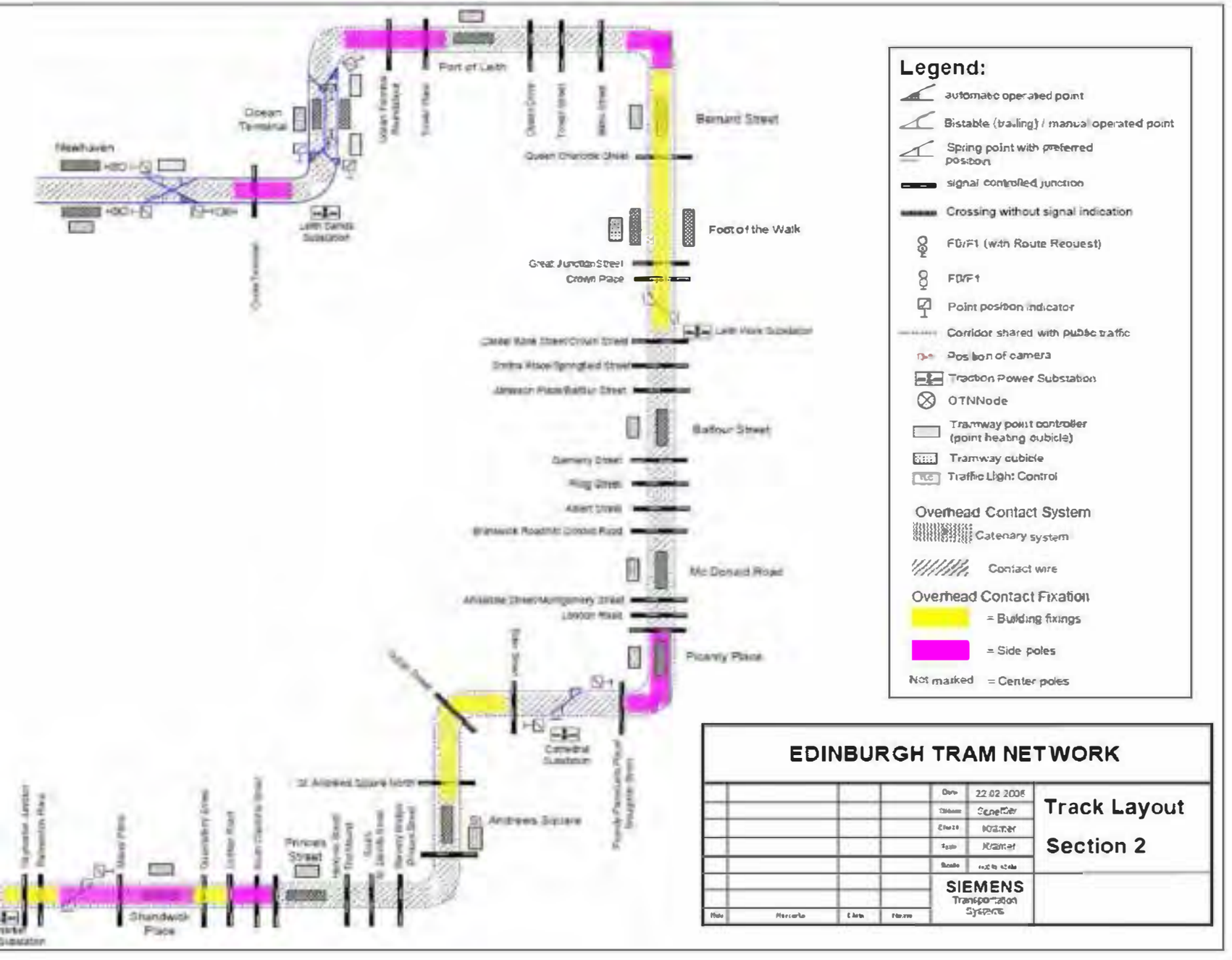
  A timetable developed by tie, which provides Trams during the AM and PM peaks at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight trams per hour in each direction on the section between Haymarket and Granton square for the AM and PM peak times only, reverting to the Operational Timetable during the inter peak period. The AM and PM Peak Enhanced Timetable shall be introduced no earlier than one year after the Service Commencement Date and shall be operated for a minimum of six months.

- **Enhanced Timetable:**

  A timetable developed by **tie**, which provides Trams at a frequency of sixteen Trams per hour in each direction on the common section between Haymarket and Ocean Terminal. For Phase 1b providing Trams at a frequency of eight Trams per hour in each direction on the section between Haymarket and Granton square. The Enhanced Timetable shall be introduced no earlier than two years after the Service Commencement Date.



Phases 1a and 1b Network Diagram



Phases 1a and 1b Network Diagram

2.3 Specific Operations and Performance Requirements

2.4 Tramstop Location and Types

The Tramstop location and types are detailed in the following table. The acronyms given are provisional.

	Tramstop	Platform Style
	PHASE	
AIR	Edinburgh Airport	1 Centre
IPR	Ingliston Park and Ride	2 Side
GBN	Gogarburn	2 Side
DEH	Depot Halt (Staff Only)	2 Side
GYL	Gyle Centre	2 Side
EDP	Edinburgh Park Central	2 Side
EPS	Edinburgh Park Station	2 Side
BNK	Bankhead	2 Side
SGT	Saughton	2 Side
BAL	Balgreen	2 Side
MUS	Murrayfield Stadium	2 Side
HAY	Haymarket	2 Side
SHP	Shandwick Place	1 Centre
PST	Princes Street	1 Centre
SAS	St Andrew Square	1 Centre
PPL	Picardy Place	1 centre
MDR	McDonald Road	1 Centre
BFS	Balfour Street	1 Centre
FOW	Foot of the Walk	2 Side
BER	Bernard Street	1 Centre
POL	Port of Leith	1 Centre
OCT	Ocean Terminal	1 Centre, 1 Side
NEW	Newhaven	2 Side

	PHASE	
GRT	Granton	1 Centre
SSQ	Saltire Square	2 Side
CPK	Caroline Park	2 Side
WPN	West Pilton	2 Side
CTL	Crewe Toll (for Western General)	2 Side
TEL	Telford Road	2 Side
CRA	Craigleith	2 Side
RAV	Ravelston	2 Side
ROS	Rosebum	2 Side

Table 1 – Edinburgh Tram Phases 1a and 1b Network Tramstop Location and Details

2.5 Expansion (including Line 3)

The Infraco shall ensure that the ETN shall be designed to permit expansion to include the following elements:

- Phased implementation of the ETN and associated fleet increases (including the implementation of the Phase 1b Option);
- Addition of Phase 2 of the ETN (as shown in Figure 1), including provision of Lower Granton Road stop, to close the loop along the sea front between Newhaven and Granton Square using the powers in the Edinburgh Tram (Line One) Act 2006;
- Addition of Phase 3 of the ETN (as shown in Figure 1), including associated stops at Ingliston West, Ratho Bridge and Newbridge South, from Ingliston Park and Ride to Newbridge using the powers in the Edinburgh Tram (Line Two) Act 2006;
- Addition of Line Three (From the junction of Princes Street/South St. Andrew Street to Royal Infirmary);

Extensions to the ETN set out above are not currently covered by these Employer's Requirements. However, the ETN must be designed in such a way as not to impede this future expansion.

For the avoidance of doubt, the following are covered by these Employer's Requirements.

- Future frequency increases beyond the enhanced service frequency of 8 & 8 tph;
- Increased operating hours beyond the scheduled last Tram of 23:59 and before the scheduled first Tram at 06:00;
- Associated impacts of increased staff numbers from 361 initially anticipated up to a maximum of 403 e.g. accommodation at the Depot.

2.6 Depot Locations

The Edinburgh Tram Network Depot is located at Gogar and shall be capable of providing capacity for the stabling of 27 trams of 44m in length, clear of fouling points in the stabling area.

The Depot shall be capable of future expansion to provide the capacity required for the identified future service frequencies and/or the requirements for Line Three, such that the Depot can be extended to stable 36 Trams of 44m in length, clear of fouling points in the stabling area.

2.7 Service Patterns, Operating Hours and Frequencies

The ETN shall support a daily service, all year round. The proposed initial service patterns, operating hours and frequencies are as follows:

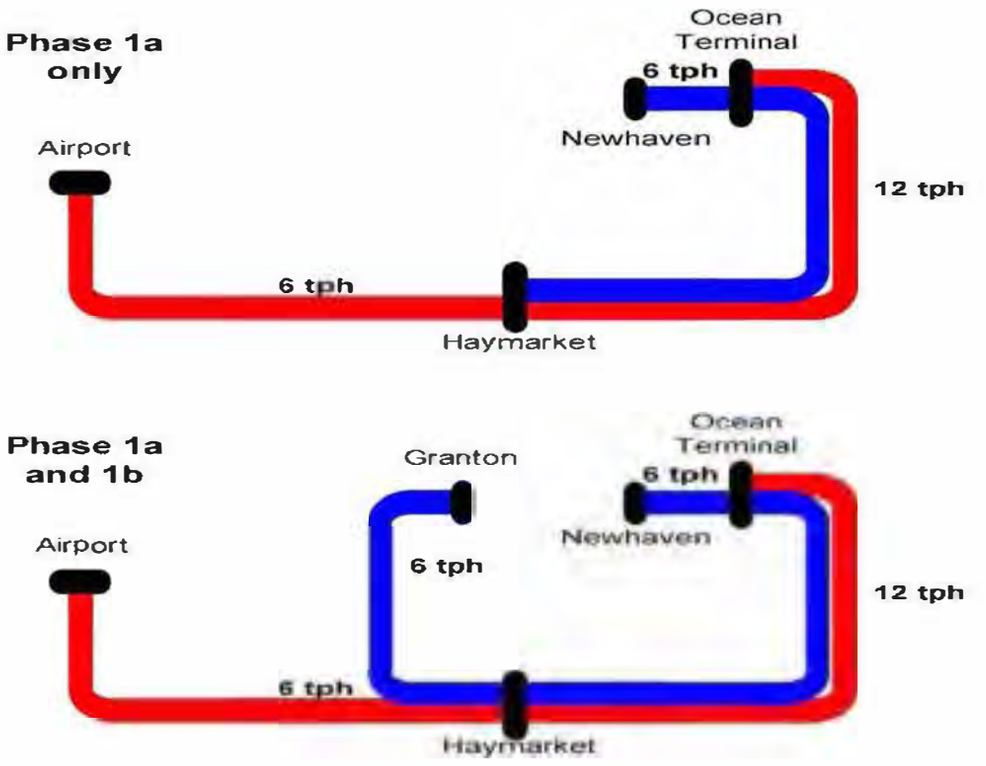


Figure 4 - Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario

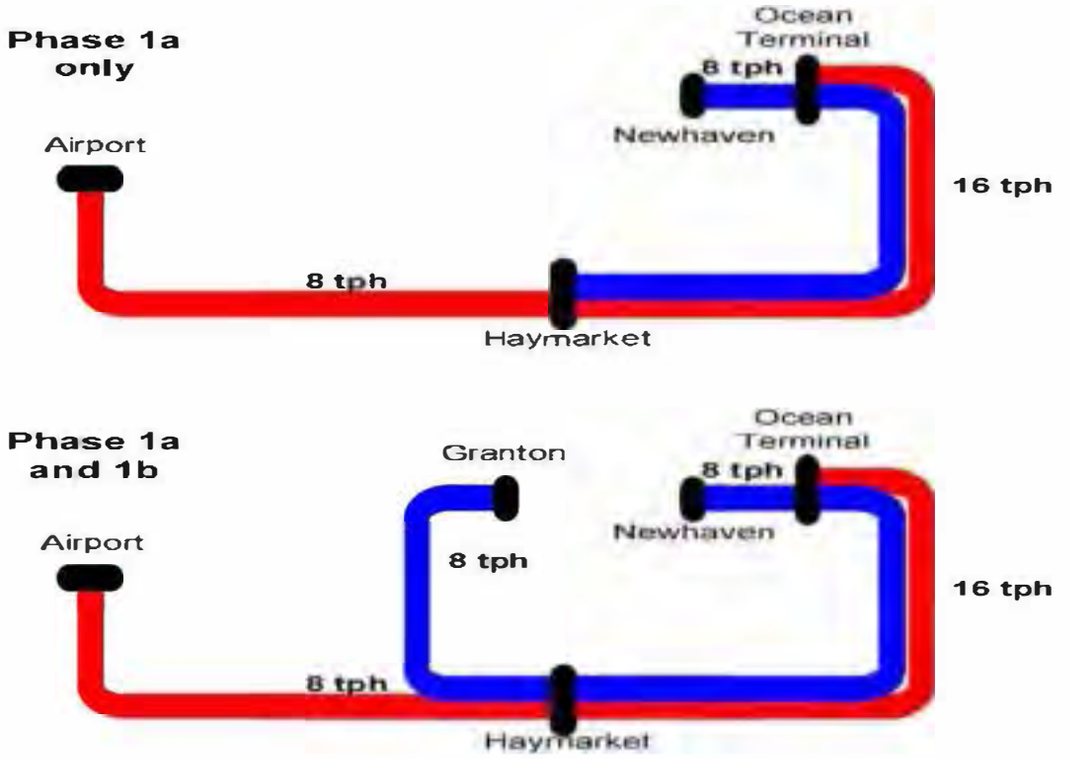


Figure 5 - Peak Service Pattems for the Enhanced AM & PM Peaks Timetable and the Enhanced Timetable 8 & 8 Tram per hour scenario

2.8 Operating Hours and Frequencies

The first and last Tram services and frequencies for 6 & 6 Tram per hour scenario are shown in Figure 4 - service patterns for the Operational Timetable 6 & 6 Tram per hour scenario and for 8 & 8 Tram per hour scenario in Figure 5.

These scenarios are based upon the following assumptions and conditions:

- The two balanced services combine to give a total of 12 or 16 Trams per hour per direction on the common section between Ocean Terminal and Haymarket are required during the daytime to replace withdrawn bus services (and therefore demand and capacity) on Leith Walk;
- For the purposes of ramping up/down service Short workings between Edinburgh Airport (Phase 1a) / Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) and St. Andrew Square are based on terminating Trams at St. Andrew Square. The location of the turnback is at York Place;
- Edinburgh Airport service Tram frequency is ramped up/down from Ocean Terminal. Granton Square (Phase 1a & Phase 1b) or Haymarket (Phase 1a only) service Tram frequency is ramped up/down from Newhaven;
- Trams going into service between Gogar Depot and Ocean Terminal/Newhaven will run "in service" from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15 Monday to Saturday inclusive);
- Haymarket (Phase 1a only) or Granton Square (Phase 1a & Phase 1b) service Trams going out of service running between Newhaven and Gogar Depot will run "in service" as far as the Gyle;
- St. Andrew Square curtailed Trams going out of service running between St. Andrew Square and Gogar Depot will run "in service" as far as the Gyle;
- Edinburgh Airport service Trams going out of service will run "in service" from Ocean Terminal to Edinburgh Airport with a short "dead run" from Edinburgh Airport to Gogar Depot;

- The period of time between the last Tram returning to the depot at night and the first Tram leaving the Depot in the morning Monday to Saturday inclusive is anticipated to be 4hrs 30 min, although this may be subject to amendment. Work requiring possessions will have to be agreed with the Operator. Subject to agreed possessions, work may be allowed on the Edinburgh Tram Network infrastructure for 3 hours and 45 minutes, depending on location, each night and allowing time for the implementation and withdrawal of isolations and/or possessions; and

- The provision of Transport Services is based on the requirement to always have a Tram present at the Airport Tramstop.

Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable

1b	Airport to Ocean Terminal	0	6	[redacted]	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	0
1b	Granton to Newhaven	0	6		6[b]	0
1b	Newhaven to Granton	6	6		6[c]	0

		Sunday (trams per hour)					
Network / Phasing	**Service frequency commencing at:**	first tram **07:00**	**07:45**	**08:00**	**08:20**	**23:15**	last tram **23:59**
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6	[redacted]		6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 2 23:15 Trams run from the Airport – City Centre only

[b] from approx 2 23:15 Trams run from Granton - City Centre only

[c] from approx 2 23:15 Trams run from Newhaven - Haymarket continuing in service on TL2 to Gyle

First and last Tram services and frequencies for 6 & 6 tram per hour Operational Timetable

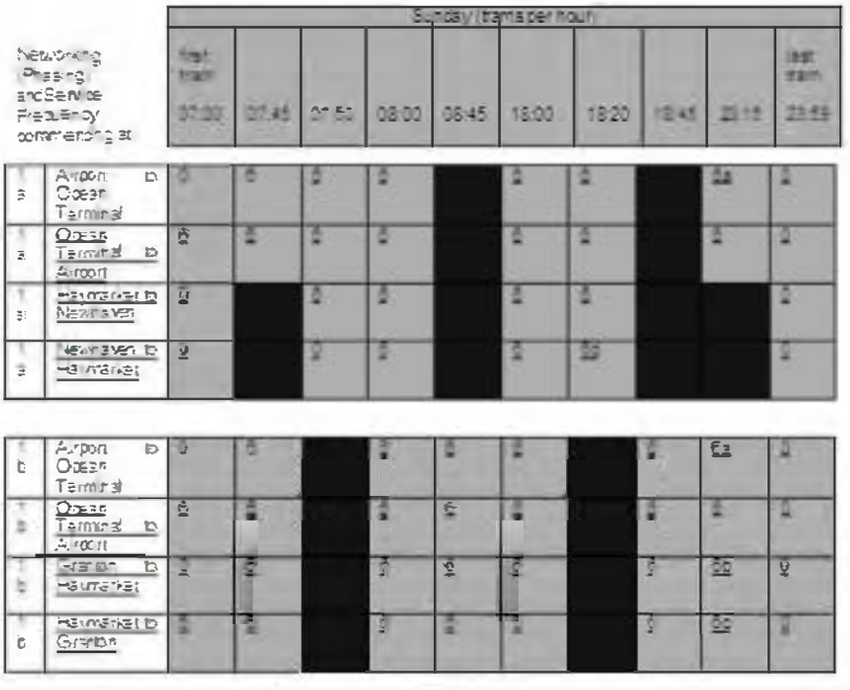
Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Networking (Phasing) andService Frequency commencing at:		06:00	06:45	07:00	07:20	07:45	09:45	15:45	19:00	19:45
1a	Airport to Ocean Terminal	0	6	8	8	8	6	6	8	6
1a	Ocean Terminal to Airport	6	6	8	8	8	6	6	8	6
1a	Haymarket to Newhaven	0	[redacted]	6	8	8	6	6	8	6
1a	Newhaven to Haymarket	0	[redacted]	0	6	8	6	6	8d	6
1b	Airport to Ocean Terminal	0	6	8	[redacted]	8	6	6	8	6
1b	Ocean Terminal to Airport	6	6	8	[redacted]	8	6	6	8	6
1b	Granton to Haymarket	0	6	8	[redacted]	6	6	6	6	6
1b	Haymarket to Granton	6	6	8	[redacted]	8	6	6	8	6

Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario

Phase	Service Frequency commencing at:	Saturday (trams per hour) First tram 06:00	06:45	07:30	07:50	23:15
1a	Airport to Ocean Terminal	0	6	8	6	6a
1a	Ocean Terminal to Airport	6	6	8	6	6
1a	Haymarket to Newhaven	0	0	8	6	0
1a	Newhaven to Haymarket	0	0	0	6	0
1b	Airport to Ocean Terminal	0	6	8	6	6a
1b	Ocean Terminal to Airport	6	6	8	6	6
1b	Granton to Newhaven	0	6	8	6	6b
1b	Newhaven to Granton	6	6	8	6	6c

Table 5 - First and Last Tram Times for the Enhanced AM & PM Peak Timetable



Notes:

a) from approx. 23:15 Trams run from Airport – St Andrew Sq. only.
b) from approx. 23:15 Trams run from Granton – St Andrew Sq. only.
c) from approx. 23:15 Granton Trams run from Newhaven – Haymarket continuing in service on to Gyle.
d) from approx. 19:20 (18:%0 Saturday and 18:20 Sundays) Haymarket Trams running from Newhaven – Haymarket continue in service to Gyle.

The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Table 6 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced Timetable

Network (phasing) and service frequency commencing at:		Monday - Friday (trams per hour)									
		06:00	06:45	07:00	07:20	07:45	19:00	19:20	19:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[c]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Saturday (trams per hour)									
		first tram 06:00	06:45	07:30	07:50	08:15	18:30	18:50	19:15	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8	8		8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8	8		8	8		8	8	0
1b	Granton to Newhaven	0	4	4		8	8		4	4[c]	0
1b	Newhaven to Granton	4	4	8		8	4		4	4[c]	0

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6[d]			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Newhaven	0	6		6	6	6		6	6[b]	0
1b	Newhaven to Granton	6	6		6	6	6		6	6[c]	0

Note: The numbers in individual cells give the service frequency starting from the time at the top of the relevant column.

Notes:

[a] from approx 23:15 trams run from Airport - St Andrew Sq only

[b] from approx 23:15 trams run from Granton - St Andrew Sq only

[c] from approx 23:15 Granton trams run from Newhaven - Haymarket continuing in service on to Gyle

[d] from approx 19:20 (18:50 Saturdays and 18:20 Sundays) Haymarket trams running from Newhaven - Haymarket continue in service to Gyle

2.9 Service Frequencies and Expansion

The design of the ETN shall support the Operational Timetable and Enhanced Timetable service frequencies set out in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable, Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario and Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario. In addition to this, the ETN shall operate the same service pattern as set out in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario above, but with the Trams per hour increased by 50% throughout without upgrade or loss of performance for up to a maximum of 2 hours between Ocean Terminal and Picardy Place, and indefinitely between Picardy Place and the Airport.

The service patterns for the ETN are defined as the Operational Timetable (as shown in Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable), the AM and PM Peak Enhanced Timetable (as shown in Table 3 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario) and the Enhanced Timetable (as shown in Table 4 - First and Last Tram Times for the 8 & 8 Tram per Hour Enhanced AM & PM Peak Scenario).

A simulation indicating the power consumption of the ETN service patterns as defined above and considering the braking energy regeneratated by the Tram shall be performed during design phase.

2.10 Special Working and Degraded Operation

Special working is required at certain times of the year, as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street to allow for the short workings on the network routes, when sections of the ETN shall be closed to allow for example Hogmanay, the Edinburgh Festival and other special events and festivals.

The design of the ETN shall allow services to be turned back at the locations detailed in Table 7 - Turnback Locations. The precise chainages where turnbacks are to be installed is shown on the alignment drawings.

ID	Location
	PHASE 1a
EPS	Edinburgh Park Station
HAY	Haymarket Yards
SHP	Shandwick Place
PPL	Picardy Place
FOW	Foot of the Walk (Leith Walk)

OCT	Ocean Terminal
	PHASE 1b
CTL	Crewe Toll

Table 7 - Turnback Locations

Note that Trams may also be turned back at Gogar Depot, and the facility to allow this shall be provided by the Infraco.

The individual services will be reconfigured to operate using the turn-back facility nearest to the affected area. An example is the requirement to close Princes Street for Hogmanay. In this situation the services shall be reconfigured as detailed in Table 8 - Reconfiguration of Service due to the Closure of Princes Street.

Service alteration for Closure of Princes Street			
Original Route of Service	Affected Area	Trams / Hour	Revision
Between Airport and Ocean Terminal	Princes St. section closed	6 or 8	Services run between Airport and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven
Between Haymarket and Newhaven (Phase 1a only)	Princes St. section closed	6 or 8	No service runs between Haymarket and Picardy Place[a]. Services run between Picardy Place and Newhaven
Between Granton Square and Newhaven (Phase 1b)	Princes St. section closed	6 or 8	Services run between Granton Square and Shandwick Place. No service runs between Shandwick Place and Picardy Place. Services run between Picardy Place and Newhaven

a – Assumption that no services will run the short leg Haymarket to Shandwick Place when Princes Street is closed.

Table 8 - Reconfiguration of Service due to the Closure of Princes Street

2.11 Journey Time and Runtime

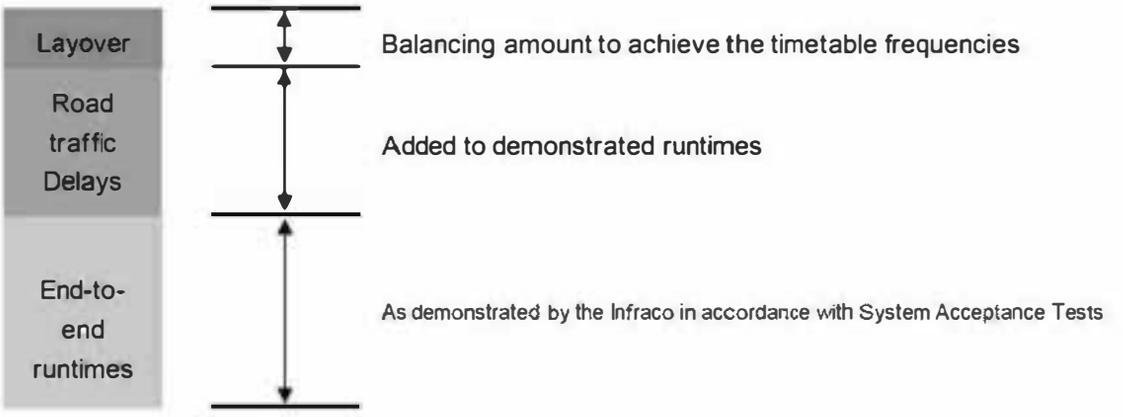


Figure 6 - Maximum Journey Times

The required maximum journey times for the Edinburgh Tram Network, quoted as operational journey time including dwell times of 25 seconds at each Tramstop, as defined during Preliminary design shall be as follows:

Phase 1a Airport to Ocean Terminal	in either direction including 25 secs dwells at Tramstops	42mins 18 secs
Phase 1b Granton Sq to Newhaven	in either direction including 25 secs dwells at Tramstops	39mins 26 secs

For the avoidance of doubt these are end to end journey times and the Infraco shall demonstrate during System Acceptance Tests defined in Section 23.18 (Testing and Commissioning) of these Employer's Requirements the trip times which can be achieved by the Trams running on the ETN infrastructure as developed and adjusted from the above base line in accordance with Section 2.12. These do not include layover time at the turnback stops as shall be agreed between the Operator and **tie** in order to develop the Operational Timetable.

2.12 Journey Time and Runtime

The Infraco shall continue to develop and refine the runtime model as the design progresses and, at a frequency of no less than every three months or upon tie's request, provide updated reports demonstrating that the maximum run times can be achieved. The Infraco shall also prepare a model of the electricity consumption linked to the run time model and shall use reasonable endeavours to optimise the system design and construction to minimise electricity usage.

Reference should be made to the Runtime Simulation Stage 3 Report (ref: ULE90130-SW-REP-00238-V3) for vehicle performance characteristics and actual driver operations.

The operational and modelling assumptions that shall be used in all modelling of runtime and operational timetables are set out in Table 9 - Operational and Modelling Assumptions.

Item	Value	Notes
Door Performance	12 seconds	Defined as the time for the doors to open and close including DDA requirements and passenger and driver reaction times.
Boarding and Alighting Time	13 seconds	Defined as the time between the doors being fully open and the sounding of the door closing tone.
Dwell Times	25 seconds a constant in modelling and during end to end journey time tests, to be refined for the purposes of the timetables to be Tramstop specific	Average dwell, made up of the door performance time and the boarding and alighting time
Loading	AW2 all seated 4 pass/m2 standing	
Gradient	+/- 8% Max. Note: This value is the maximum allowable gradient for track design.	Gradient data for the complete ETN has been developed in the design phase This identified major gradients at St. Andrew Square and the line alongside Gogar Depot

2.13 Operational Allowances and Rules for Timetabling

An operational allowance will be added to the end to end runtimes demonstrated through testing to meet those quoted in this section to ensure a robust Operational Timetable is constructed.

Requirement	Allowance
Operational Journey time allowance	Newhaven to Haymarket = 1.5 minutes Ocean Terminal to Airport = 1.5 minutes Newhaven to Granton Square = 45 secs (Phase 1b only)
Layover	4 minute minimum or 10% of timetabled runtime, whichever is the greater taken at the terminus for each end to end trip with the exception of the Airport Tramstop where a Tram is required to always be present. Crew change-over locations to be determined as the Operational Timetable is refined.

Table 10 - Operational Runtime Allowances

2.14 Miscellaneous Operational Requirements

2.15 Comfort Break Facilities

Facilities shall be available for driver comfort breaks at the nominated layover locations detailed in Table 11 - Layover Facilities

ocation	ien
Edinburgh Airport	Crew Change Facility[1]
Ocean Terminal	Normal Terminus
Granton Square	Normal Terminus
Haymarket	Crew Change Facility

Table 11 - Layover Facilities

[1] *Damian has already instructed this change.*

At these locations access shall be provided to a suitable toilet with hand washing facilities.

Crew Change Facility

A crew changing facility shall be provided adjacent to the Haymarket Tramstop. This facility shall provide tram crew with access to a toilet with hand washing facilities, a drinking water supply, suitable heating, power, lighting, drainage and connection to the telephone network.

2.16 Performance and Reliability

The design and construction of the ETN shall be demonstrated by RAMS analysis to enable the individual systems availability targets stated in these Employer's Requirements to be met. It shall enable an overall tram punctuality for System technical causes of at least 99% in accordance with the calculation of the Punctuality Service Element contained in Schedule 6 of the Agreement.
As measured on a 28 day basis at the following monitoring points along the route at least 99% of the Trams shall be no earlier than one minute and no greater than two minutes late, caused by technical failure, compared to the scheduled headway.

Monitoring points

a) Phase 1a: for the purposes of monitoring arrival and departure headways between Trams:

- Edinburgh Airport.

b) Phase 1a: for the purposes of measuring departure headways between Trams only:

- Edinburgh Park Station;
- Haymarket;
- Foot of the Walk;
- Leith; and
- Picardy Place.

c) Phase 1b: for the purposes of measuring departure headways between Trams only:

- Crewe Toll (northbound only); and
- Granton Square.

The performance mechanism for Infraco is contained within this Agreement. The design of the ETN shall be such that it allows the ETN to operate safely and effectively in all modes.

Normal Mode being that used to establish the operational timetable. Degraded Mode being restricted operation due to failures or disruption on the tramway or the adjacent highway network.

2.17 Network and Service Pattern

See table 2 – Service Patterns for the Operational Timetable 6 & 6 Tram per hour scenario and table 5 – Peak Service Patterns for the Enhanced AM & PM Peaks Timetable and table 6 – the Enhanced Timetable 8 & 8 Tram per hour scenario] for further information; for daily service patterns; and note that trams are to be co-ordinated between OCT and HAY to give an even headway pattern in both directions.

2.18 Layover s

The Operational Timetable and the Enhanced Timetable developed by the Operator and the Infraco's Proposals shall allow for the following:

- An operational Tram can always be present at the Airport Tramstop;
- Additional layovers to be added to the minimum values to deliver the required headways where appropriate. This additional layover maybe apportioned along the route; and
- The minimum layover requirements are as set out in these Employer's Requirements and these shall be apportioned at the terminus Tramstops only.

Allowance for perturbations that are not road traffic delays:

- These shall be apportioned along the route, as can be seen in Figure 6 - Maximum Journey Times.

2.19 Calculation of Minimum Round Trip Times

In this section, the minimum round trip times for each of the service options are calculated. The calculations add up the elements that are required to establish the round trip times, and the source of each element is stated.

Table 12 - Ocean Terminal – Edinburgh Airport Service (Phase 1a and Phase 1b)

OCT – AIR	
00:42:18	OCT - AIR (includes dwell time)[a]
00:04:52	AM junction delay (OCT - HAY)[b]
00:01:30	additional delay between HAY - AIR[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:48:50	Total

AIR – OCT	
00:41:59	AIR - OCT (includes dwell time)[a]
00:06:01	AM junction delay (HAY - OCT)[b]
00:01:30	additional minutes of junction delay between AIR - HAY[c]
00:00:10	10 seconds on each leg for crossover at terminal Tramstop[d]
00:49:40	Total

Layovers	
00:04:55	Minimum layover at OCT end for Airport service[e]
00:10:00	Minimum layover at AIR end for Airport service[f]
00:07:30	Minimum layover at AIR end for Airport service[f]
00:14:55	Total min layover for 6 & 6 tram per hour scenario
00:12:25	Total min layover for 8 & 8 tram per hour scenario
01:53:25	Minimum round trip time for 6 & 6 tram per hour scenario
01:50:55	Minimum round trip time for 8 & 8 tram per hour scenario

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW REP-00238 v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

c of additional junction delay between Haymarket and Edinburgh Airport.

d Estimate of additional time to move through the crossover at the terminus / tumback

e Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

f Based on Headway of 10 or 7.5 minutes, from the requirement for Airport layover in Section 32.

Table 13 - Newhaven – Granton Square Service, (Phase 1b only)

NEW – GRT	
00:02:49	NEW – OCT (includes 25s dwell time)[a]
00:36:28	OCT – GRT (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between HAY - GRT[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:45:04	Total

GRT – NEW	
00:37:00	GRT - OCT (includes dwell time)[a]
00:02:26	OCT - NEW (includes 25s dwell time)[a]
00:06:01	AM junction delay (NEW - HAY)[b]
00:00:45	additional delay between NEW - HAY[c]
00:00:10	10s on each leg for crossover at terminal Tramstop[d]
00:43:56	Total
00:04:15	Minimum layover at NEW end for Granton service[e]
00:04:07	Minimum layover at GRT end for Granton service[e]
00:08:22	Total min layover
01:37:22	Minimum round trip time

Notes:

a Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

b Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103)(AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays)

c Transdev estimate of additional junction delay between Haymarket and Granton Square.

d Transdev estimate of additional time to move through the crossover at the terminus / turnback

e Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario).

Table 14 - Newhaven – Haymarket Service (Phase 1a only)

NEW - HAY	
00:02:49	NEW - OCT (includes 25 seconds dwell time)[a]
00:18:58	OCT - HAY (includes dwell time)[a]
00:04:52	AM junction delay (NEW - HAY)[b]
00:01:30	Additional delay between NEW - HAY
00:00:10	10 seconds on each leg for crossover at turnback[c]
00:00:54	Additional movement from HAY to turnback[e]
00:29:13	Total

HAY - NEW	
00:19:11	HAY - OCT (includes dwell time)[a]
00:02:51	OCT - NEW (includes 25 seconds dwell time)[a]
00:06:01	AM junction delay (HAY - NEW)[b]
00:01:30	Additional delay between HAY- NEW
	10 seconds on each leg for crossover at terminal
00:00:10	Tramstop[c]
00:00:54	Additional movement from turnback to HAY[e]
00:29:07	Total
00:04:00	Minimum layover at NEW end for Haymarket service[d]
00:04:00	Minimum layover at HAY end for Haymarket service[d]
00:08:00	Total min layover
01:06:20	Minimum round trip time

Notes:

[a] Data from 'Edinburgh Tram Network Stage 3 Runtime Simulation Report' (Doc Ref: ULE90130-SW-REP-00238v2).

[b] Data from 'Mott Macdonald Report - Traffic Interface Report' (Doc Ref: 0003048//REVC/241103). AM Junction delays between Haymarket and Leith Walk have been used as greater than PM delays.

[c] Transdev estimate of additional time to move through the crossover at the terminus / turnback

[d] Layover calculated from Table 17 – Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

[e] Transdev estimate of runtime between HAY and Haymarket Turnback (20kph over 300m = 5.6m/s over 300m = 54 seconds)

2.20 Summary to Establish Fleet Size

The minimum round trip times determined in Section 2.19 above are used in Tables 15 to 18 to determine the tram Peak Vehicle Requirement (PVR) and fleet size for Phase 1a & Phase 1b:

	OCT - AIR service	NER - HAY service	NER - GRS service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	10:00	10:00	10:00
Trams per hour	6	6	6
Minimum round trip time (hr:min:sec)	01:53:25	01:06:20	01:38:52
Actual round trip time needed to provide required headways and minimum layover (hr:min:sec)	02:00:00	01:10:00	01:40:00
Total additional layover to achieve headways (min:sec)	06:35	03:40	01:08
Peak number of trams	12	7	10

Table 15 - Number of Trams needed for each service (based on 6 & 6 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	19	22
Standby/maintenance/repair/training	3	3
Total tram fleet required	22	25

Table 16 - Number of Trams needed for each Phase (based on 6 & 6 Trams per hour scenario)

	OCT - AIR service	NEW - HAY service	NEW - GRT service
Service used on Phase	1a and 1b	1a only	1b only
Headway (min:sec)	07:30	07:30	07:30
Trams per hour	8	8	8
Minimum round trip time (hr:min:sec)	01:50:55	01:06:20	01:37:22
Actual round trip time needed to provide required headways & minimum layover (hr:min:sec)	01:52:30	01:07:30	01:37:30
Total additional layover to achieve headways (min:sec)	01:35	01:10	0:08
Peak number of trams	15	9	13

Table 17 - Number of Trams needed for each service (based on 8 & 8 Trams per hour scenario)

Network Option	1a	1a and 1b
PVR	24	28
Standby/maintenance/repair/training	3	3
Total tram fleet required	27	31

Table 18 - Number of Trams needed for each Phase (based on 8 & 8 Trams per hour scenario)

2.21 Tram Fleet Kilometre Usage

The journey times and fleet sizes calculated above can be used to derive an approximate annual fleet and per Tram kilometre run of:

INITIAL OPERATING TIMETABLE

6tph	Daily	Days	Km	6tph	Daily	Days	Km
Weekdays	5531	261	1443591	Weekdays	7103	261	1853883
Saturdays	5363	52	278876	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**1999003**	**Total**			**2569663**
Per Tram 27 trams			**74037**	**Per Tram 27 trams**			**95173**
ENHANCED AM & PM PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	6217	261	1622596	Weekdays	7840	261	2046240
Saturdays	5363	52	320150	Saturdays	6950	52	361400
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2219282**	**Total**			**2762020**
Per Tram 27 trams			**82196**	**Per Tram 31 trams**			**89097**
FLAT DAYTIME PEAK SERVICE							
8tph	**Daily**	**Days**	**Km**	**8tph**	**Daily**	**Days**	**Km**
Weekdays	7436	261	1940796	Weekdays	9347	261	2439567
Saturdays	7292	52	379184	Saturdays	9224	52	479648
Sundays	5318	52	276536	Sundays	6815	52	354380
Total			**2596516**	**Total**			**3273595**
Per Tram 27 trams			**96167**	**Per Tram 31 trams**			**105600**

Figure 7 – Operational Timetable

The principal assumptions are:

- 'Empty' running to and from the Depot is included;

3 General

3.1 Definitions

In these Employer's Requirements, Schedule 1 (Definitions and Interpretation) and the following definitions shall apply:

Table 19 - Definitions

Term	Definition
Act	An Act of Parliament or the Scottish Parliament following consideration and approval of a Bill
AFC	Automatic Fare Collection (see also TVM)
AIP	Approval in Principle for structures
ALARP	As low as reasonably practicable
Approval	(see Consent); also an approval of detail by an authority where consent is deemed to be granted by with prior conditions.
AutoCAD	Proprietary software used for engineering design
AW0 – AW5	Standard loading conditions for Tram Vehicles defined at Section 22.2.3
BRB	British Railways Board
BS	British Standard
CAA	Civil Aviation Authority
Case for Safety	All necessary documentation, information and other requirements pursuant to the Railways and Other Guided Transport Systems (Safety) Regulations 2006;
CAR	Corrective Action Report
CCTV	Closed Circuit Television
CIBSE	Chartered Institute of Building Services Engineers
CMS	Central Management System
COCP	Code of Construction Practice
COMP	Code of Maintenance Practice
Communications Plan	The Plan to be developed in accordance with the Employer's Requirements
COSHH	Control of Substances Hazardous to Health Regulations 1998
DAT	Delivery Acceptance Test
DCCB	Direct Current Circuit Breaker
DDA	Disability Discrimination Act
Developed	The enlarged Kinematic Envelope that takes into account all of the possible effects of

Term	Definition
Kinematic Envelope (DKE)	curvature, including superelevation of the track together with end and centre throw of the Tram. It is speed dependent and unique to a particular location at a given speed (See also Static Envelope, Dynamic Envelope and Kinematic Envelope) (See also RSPG Part 2 Section G – Guidance on Tramways).
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
DSD	Drivers Safety Device
Dynamic Envelope	The Static Envelope enlarged to the maximum possible displacement of the Tram in motion on straight track. It takes into account suspension characteristics and allowances for maintenance and wear of Trams. (End and Centre throw is not included.) (See also Static Envelope, Kinematic Envelope and Developed Kinematic Envelope.) (See also RSPG Part 2 Section G – Guidance on Tramways)
EDMS	Electronic Document Management System
EIA	Environmental Impact Assessment
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMP	Environmental Management Plan
Enhanced Timetable	The Timetable described at Part 1a with 16 trams per hour Hay to Oct
ES	Environmental Statement
FAT	Factory Acceptance Test
GDPO	Town and Country Planning (General Development Procedure)(Scotland) Order 1992
GPR	Ground penetrating radar
Grandfather Rights	A longstanding right where the original reason and date of the granting of the right is unknown
GSN	Goal Structured Notation
HCI	Human Computer Interface
HF	Human Factors
HLM	High Level Model
HMRI	Her Majesty's Railway Inspectorate (or the appropriate approval regime in force)
HS	Historic Scotland
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilating and Air Conditioning
ICP	Independent Competent Person
ISO	International Organisation for Standardisation
ITSO	Integrated Transport Smartcard Organisation - a non profit sharing, member owned organisation supported by the Department for Transport

Term	Definition
ItN	Invitation to Negotiate
JRC	Joint Revenue Committee
Kinematic Envelope (DKE)	The Dynamic Envelope enlarged to allow for the permitted tolerances in track gauge, alignment, level and cross-level and the dynamic and static effects of track wear. It is speed dependant. See also Static Envelope, Dynamic Envelope and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
LBC	Listed Building Consent
LHMP	Landscape and Habitat Management Plan
Lifecycle Replacement Plan	The Plan to be developed in accordance with the Employer's Requirements
Line 3	A planned extension of the Edinburgh Tram Network to the south east. Line 3 is not currently being progressed although some safeguarding provisions are required.
LRU	Line Replaceable Unit
LRV	Light Rail Vehicle
Maintainer	Infrastructure and Tram Vehicle maintenance
Markov Analysis	Reliability modelling method
MUDFA	Multi-Utilites Diversion Framework Agreement
MX	Proprietary software used for engineering design
NCR	Non Conformance Report
NR	Network Rail
OEM	Original Equipment Manufacturer
OLE	Overhead Line Equipment
Operational Timetable	The Timetable described at Table 2 – First and Last Trams for the 6 & 6 Tram per Hour Operational Timetable Table 2 – First and Last Tram Times for the 6 & 6 Tram per Hour Operational Timetable - Hay to Oct
ORR	Office of Rail Regulation
ORS	Operational Radio System
OTMR	On Tram Monitoring and Recording
PA	Public Address System
Pan	Pantograph
PCC	Point Control Cabinet
PCS	Point Control System
PHC	Point Heating Cabinet
PHP	Passenger Help Point
PEHP	Passenger Emergency Help Point

Term	Definition
PID	Passenger Information Display
Prior Approval	Written approval by any approving body evidencing prior consent.
QA	Quality Assurance
Quality Management Plan	The Plan to be developed in accordance with the Employer's Requirements
RAMS	Reliability, Availability, Maintainability and Safety
RSPG	Railway Safety Principles and Guidance
RSP2	Ralilway Safety Publication 2 – Guidance on Tramways
RTPI	Real Time Passenger Information
RVAR	Rail Vehicle Accessibility Regulations
Safety Management Plan	The Plan to be developed in accordance with the Employer's Requirements
SAT	System Acceptance Test
SCADA	Supervisory, Control and Data Acquisition
SCC	Supervisory Control and Communications
SCT	Site Commissioning Test
SEPA	Scottish Environment Protection Agency
Shadow Running	Validation of the Operational Timetable without carrying passengers
SIT	System Integration Test
SP	Swept Path
SSSI	Site of Special Scientific Interest
STAG	Scottish Transport Assessment Guidance
Static Envelope	The maximum cross-section of Trams loaded or unloaded at rest on straight and level track, taking account of tolerances in the manufacture of the trams and the effects on the suspension of tram loading and tram loads arising from the wind and other weather. See also Dynamic Envelope, Kinematic Envelope, and Developed Kinematic Envelope. (See also RSPG Part 2 Section G – Guidance on Tramways)
Sub-System	An individual technical element e.g. communications, Tram etc.
SUC	Statutory Utility Company
SUDS	Sustainable Urban Drainage System ('soakaways')
The System	Collectively the technical sub-systems that together form the Edinburgh Tram Network.
System Interface	The interaction point between the sub-systems
Test Plan	The proposals developed by the Infraco for the structured and programmed testing of the components and the System

Term	Definition
Test T1 – T5	Formal Test requirements defined at Tests and Commissioning
TPDS	Tram Position and Detection System
Tramway Path	The area reserved for a moving tram in its environment. (See also RSP2 – Guidance on Tramways)
Transdev	"Transdev Edinburgh Tram Limited" (TETL) the Edinburgh Tram Network Operator
TRO	Traffic Regulation Order
TRY	Test Reference Year
TTRO	Temporary Traffic Regulation Order
TSS	Traction Sub-Station
TSS	Technical Support Services – advisors to tie.
TVM	Ticket Vending Machine (see also AFC)
UTC	Urban Traffic Control
UPS	Uninterruptible Power Supply
WBS	Work Breakdown Structure
WEBS	West of Edinburgh Busway Scheme

3.2 Infraco Services

3.3 General

This section provides a summary of the services that shall be required to be undertaken by the Infraco throughout the duration of the Infraco Works, or during particular stages of the Infraco Works, as appropriate.

3.4 Management and Technical Services

3.5 Summary of Deliverables

This section summarises the Deliverables that shall be provided by the Infraco. The Deliverables shall be provided in accordance with the requirements of the Agreement and shall be reviewed in accordance with the Review Procedure.

The Infraco shall complete the Deliverables set out hereunder, in the timescales agreed, and as identified in the Submittal Programme referred to.

In addition to the required Deliverables, this section also develops, where appropriate, the management and technical systems and services that shall be required to be provided by the Infraco to meet these Employer's Requirements. The Infraco shall develop and submit the following Deliverables for approval by **tie** in accordance with the Review Procedure.

Table 20 - Table showing Summary of Deliverables

Communications, Meetings and Reporting
Communications Plan
Meetings Schedule
Progress Photos
Progress Reports
Site Reports
Topics Register
Programme
Programme to include Design, Construction, Snagging, Commissioning, training, shadow running and opening to passenger service
Time Chainage Diagram
Management Plans
Construction Health and Safety Plan

Construction Plan
Construction Stage Environmental & Sustainability Management Plan(s)
Documentation associated with the completion of all research, surveys and inspections
Environmental Action Plan (EAP)
Infraco KPI Reporting
Infraco Performance Measurement
Network Rail Interface Plan
Overall Approvals Management Plan and Approvals Management Plan
Project Health & Safety File
Project Management Plan
Quality Forms (associated with the Project Safety and Quality Interface document)
Quality Management Plan
Research, Surveys and Inspections
Safety Forms associated with the Project Safety and Quality Interface document.
Safety Management Plan
Schedule of Internal Audits
System Safety Management Plan
Testing and Commissioning Plans
Training Plans

Design Deliverables

Earthing and Bonding Plan
Case for Safety for the Network or Geographical Sections as applicable
Design Stage Configuration Management Plan
Design Stage Verification & Validation Plan
Detailed Cause Consequence Analysis
Functional Hazard Analysis
Hazard Log & Risk Register
Interface Control Documents
Interface Schedules
List of Applicable Standards
Procurement Plan
Requirements Specification / Database
Scheme Plan
Road Network Plan of affected areas
System Architecture Specification
System Design Specification
System Design Test Specification
System Interface Management Plan
System Interface Register

Detailed drawings and other detailed design documentation

Archaeological & Heritage Mitigation Plan
Boundaries Treatment Management Plan
Construction Advice
Construction Site Drainage Plan
Initial and Final Buildability Reports
Landscape and Habitat Management Plan
Method of Working around Protected Species
Other construction advice as noted
Procedures for dealing with Unidentified Apparatus or Recorded Artificial Obstructions
Schedule 3 (Code of Construction Practice) Deliverables
Schedule and Conditional Surveys of Structures / Buildings Documentation (Dilapidation)
Strategy for controlling Invasive and Alien Species
Survey Photographs of Reinstatement Work
Temporary Works, Security and Fencing Arrangements Plan
Waste Management Plan

Cost Management

Actual / Planned / Forecast Spend Tables / Curves
Change Control Schedule and background information
Cost Loaded Programme / Earned Value Analysis based on WBS structure
Cost Report
Schedule of Compensation Events and background information
Value Management Estimates / Analysis

Risk

Commissioning Risk Control Report
Construction Risk Control Report
Infraco Assumptions Register
Infraco Risk Management Plan
Infraco Risk Register
Operational and Maintenance Report
Residual Risk Control Report
Risk Progress Reports

Traffic Management and TTROs

Access Control Permit Procedures
Access Control Permits and Permits to Work
Permits to Work and Utility Permits to Work Procedures
Traffic Management and Work Site Staging Plan
TTRO Obligations and Traffic Management Procedures

Method Statements
Method Statements
Schedule and Conditional Surveys of Structures / Buildings and Documentation (to avoid delay to the Service Commencement Date)
Survey Photographs of Reinstatement Work
Surveys of Structures which may affect Progress
Stakeholder Management Deliverables
Communications Log
Information for the tie monthly newsletter
Procurement Schedule
Traffic Routing Map
Weekly Newsletter
Weekly updates of Progress
Other Deliverables as defined below:
Asset Register
Documentation - As-built Design Drawings
Infrastructure Maintenance Plan
Maintenance Plan
O&M manuals
Overall Approvals Management Plan and Approvals Management Plan
Overall Test and Commissioning Plan
Simulation
Spare Parts manuals
Spare Parts, Tools & Test Equipment
Staffing Plan and Recruitment, Retention and Training Plan
System Acceptance
System Integration – including System Integration Plan

3.6 Design

3.6.1 General Obligations

The Infraco shall be responsible for the complete design of the Edinburgh Tram Network including the achievement of full compliance with the Employer's Requirements. The Infraco shall be responsible for achieving the following:

- The Deliverables necessary to enable the Edinburgh Tram Network to be procured, constructed, tested, commissioned and brought into commercial service and consistent with the requirements for training and Case for Safety (taking account of the need to fully co-ordinate these activities, including with other physically-related projects, so as to minimise overall disruption) to meet these Employer's Requirements and the Programme.
- The Infraco shall produce a tram service simulation that will demonstrate that its implementation of the design will achieve the required run times, power consumption and service performance where defined in these Employer's Requirements;
- The Infraco shall ensure that the design covers all aspects of the Edinburgh Tram Network and the associated works as defined in these Employer's Requirements;

- The Infraco shall approach the design and technical services in a structured manner using a recognised 'V' life cycle model with regard to the integration of design engineering, systems engineering and safety engineering activities;

- The Infraco shall be responsible for ensuring that there are no gaps and omissions in the specification and design of the Edinburgh Tram Network;

- The Infraco shall demonstrate that the design has properly considered and adopted the most advantageous whole life cost solutions;

3.6.2 Design Approach

The design approach shall be as set out in the SDS Agreement. The Infraco shall:

- Adopt, develop and adapt the SDS Management Plans covering Configuration Management and Verification and Validation.

- Undertake such supplementary safety analysis that will allow further development of the Case for Safety concurrent with any design undertaken to prove that the Edinburgh Tram Network is acceptably safe;

- Where any new technologies are proposed by the Infraco, submit reports and presentations analysing and assessing the options and justifying the final selections of technologies in terms of time, cost, quality, safety, risk and maintainability, for review by tie;
- Prepare and maintain the Risk and Hazard Log;
- Prepare and maintain the System Architecture Specification;
- Prepare and maintain the System Design Specification;
- Prepare and maintain the System Design Test Specification;
- Prepare and maintain the Functional Hazard Analysis;
- Prepare and maintain the Detailed Cause Consequence Analysis;
- Prepare and maintain the Requirements Specification / Database;
- Prepare and maintain the Scheme Plan;
- Prepare and maintain the Procurement Plan;
- Prepare and maintain the Interface Schedules;
- Prepare and maintain the Earthing and Bonding Plan;
- Prepare and maintain the detailed drawings and other detailed design documentation;

3.6.3 Transport Modelling

The Infraco shall procure that the SDS provider performs its obligations in respect of

- transport modelling as such obligations are set out in the SDS Agreement.
- detailed traffic junction design recognition and evaluation and wider area effect assessment;
- temporary traffic diversions and support to tie where reasonably required in respect of obtaining the Traffic Regulation Order including impact analysis as defined in section 12.12.

For detailed traffic signal modelling; Infraco shall provide adequate modelling upon which to baseits design.

3.6.4 Environmental

All equipment shall meet its required operational functionality in accordance with these Employer's Requirements. The Edinburgh Tram Network and its components shall take cognisance of, inter alia, the following factors: electrical interference, dust, vibration, supply voltage variations, radio signal variations, solar radiation, temperature, humidity, salt, mist, wind, precipitation, snow etc.

Table 21 shows average temperature and humidity conditions for the region. Based on the given information all equipment shall be suitable for a working life as defined in Design Life of these Employer's Requirements under maximum ambient temperature range from – 9° to + 28 ° C, unless otherwise agreed by tie.

Edinburgh (eastern Scotland)

Sunshine (average hours per day)		Temperatures								Precipitation and humidity				Wet days (more than 0.1 mm/0.004 in)	
		Average daily minimum		Average daily maximum		Highest recorded		Lowest recorded		Relative humidity 900 x		Average monthly precipitation			
		°C	°F	°C	°F	°C	°F	°C	°F	%		mm	in		
Jan	2	1	34	6	42	14	57	-8	17	84		57	2	17	Jan
Feb	3	1	34	6	43	14	58	-9	15	83		39	2	15	Feb
March	4	2	36	8	46	20	68	-6	21	81		39	2	15	March
April	5	4	39	11	51	22	72	-4	25	75		39	2	14	April
May	6	6	43	14	56	24	76	-1	31	76		54	2	14	May
June	6	9	47	17	62	28	83	3	37	75		47	2	15	June
July	5	11	52	18	65	28	83	6	42	78		83	3	17	July
Aug	4	11	52	18	64	28	82	4	40	80		77	3	16	Aug
Sept	4	9	47	16	60	25	77	1	33	80		57	2	16	Sept
Oct	3	7	44	12	54	20	68	-2	28	82		65	3	17	Oct
Nov	2	4	39	9	48	19	67	-4	24	83		62	2	17	Nov
Dec	1	2	36	7	44	14	58	-7	20	84		57	2	18	Dec

Based on readings for 30 years at 55°55' N, 3°11' W, altitude 134 m/440 ft.

Where equipment is enclosed in equipment housings / enclosures the equipment contained therein shall be capable of operating at an external ambient temperature 15°C higher than the upper limit and at a temperature of 5°C lower than the figures in Table 21 taking into account any heat generated by the equipment.

All equipment housings / enclosures that contain electronic equipment shall be so equipped to minimise the occurrence of condensation within the enclosure.

The following data in Figures 8 & 9 are based on the Edinburgh Test Reference Year (TRY) as given by CIBSE. It is a synthesised weather year based on 20 years of record data. CIBSE recommend that this type of weather data be used for analysing energy use and overall environmental performance.

Temperature

Dry Bulb Temperature	MAX 26.7°C	MIN –10.1°C	MEAN 8.43°C
Wet Bulb Temperature	MAX 18.9°C	MIN –10.7°C	MEAN 6.82°C

Figure 8 - Dry Bulb Temperature Analysis 1: Number of Hours per Year That the Dry Bulb Temperature is Greater Than the Given Value

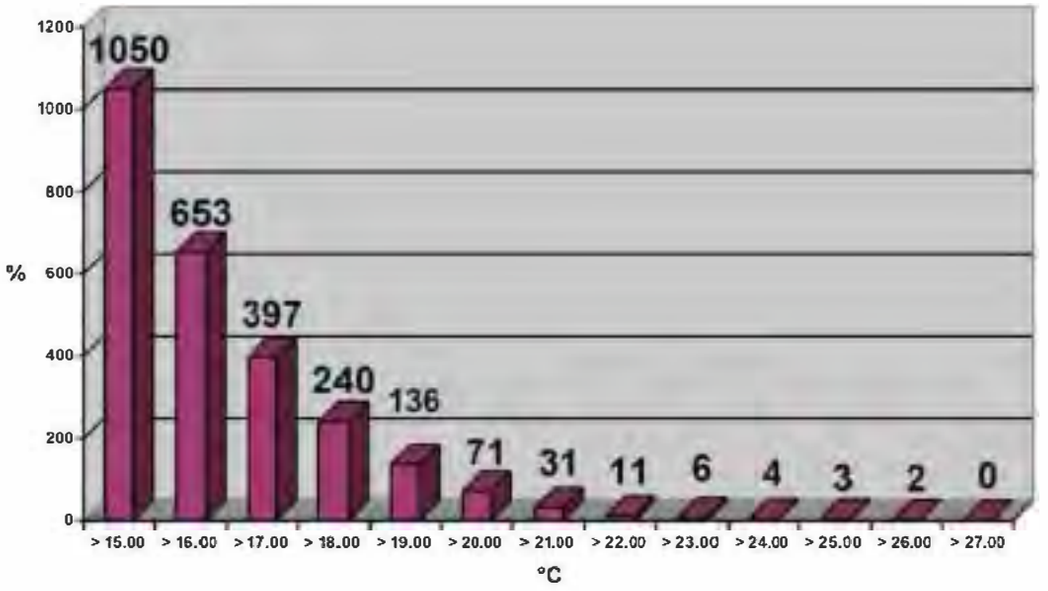
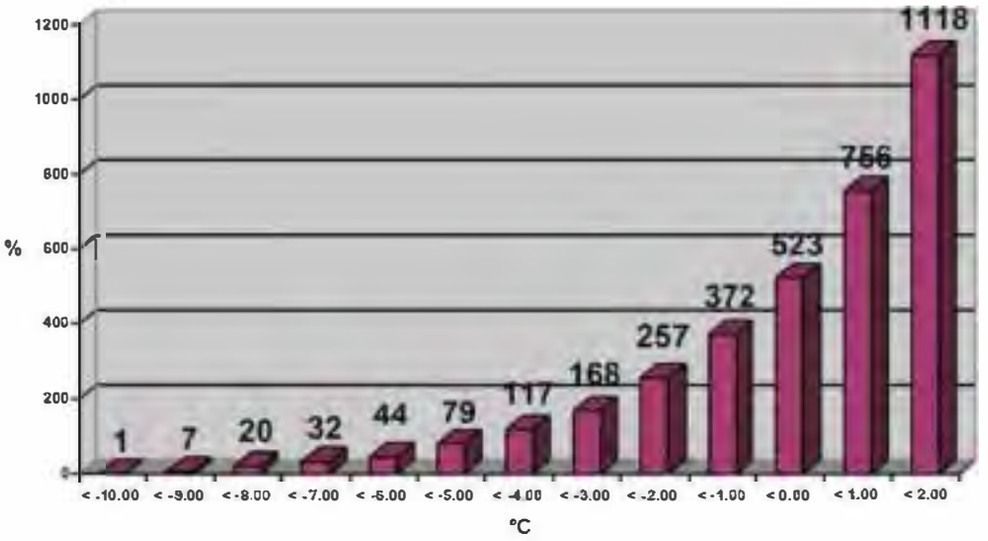


Figure 9 - Dry Bulb Temperature Analysis 2: Number of Hours per Year That the Dry Bulb Temperature is Less Than the Given Value



Wind Speed MAX 19.5m/s MIN 0m/s MEAN 4.6m/s

3.7 Construction-related Deliverables (Schedule 3 Requirements)

The following deliverables, from and with regard to *Schedule 3 (Code of Construction Practice and Code of Maintenance Practice)* are highlighted for submission in accordance with the Review Procedure:

- In accordance with Schedule 3 (Code of Construction Practice and Code of Maintenance Practice), the Infraco shall compile a schedule of all buildings, or other structures, which may be at risk of physical damage as a result of the Infraco Works. Furthermore records of the condition and surveys of any defects shall be prepared by the Infraco;

- Under Schedule 3 (Code of Construction Practice and Code of Maintenance Practice) there is a requirement for the Infraco to undertake works to address defects in existing structures, caused by the Infraco Works. Where such work is completed the Infraco shall be required to take appropriate photographs to fully demonstrate the quality of the reinstatement works;

3.8 Construction Advice and Buildability

The Infraco shall be required to develop a =Buildability Report in accordance with the Review Procedure.

The Infraco shall provide a Buildability Report in accordance with the Review Procedure, which shall address the following.

- The Infraco shall propose construction methods which shall be utilised in respect of the Infraco Works. The Infraco shall also advise tie on the time and cost implications of any alternative solutions proposed by the Infraco and which have been accepted by tie. The Infraco shall initiate the requirements for Temporary Works, and the programme for approvals for such Temporary Works and their execution.

- Notwithstanding the Infraco's obligations with respect to compliance with the third party agreements, the Infraco shall advise tie on the potential impact of the Infraco Works upon neighbouring occupiers and users of nearby roads, railways, buildings and airport facilities and the Infraco shall plan the execution of the Infraco Works in such a way as to minimise disruption and prevent nuisance.

- The Infraco shall advise tie on the provision and layout of the main site office and local Work Sector / Work Section facilities and services to be provided or secured by the Infraco. tie's requirements for office accommodation at the main site office are expressed in this section.

The Infraco shall prepare, maintain and comply with plans, schedules and drawings that shall show the Infraco's proposals for temporary works, security and fencing arrangements throughout the duration of the Infraco Works ("Temporary Works, Security and Fencing Arrangements Plan").

3.9 Site Support Facilities for tie

The Infraco shall be responsible for the provision, servicing, maintenance and removal of the specified tie office accommodation and transport for the use of tie officers and staff

The Infraco shall provide and maintain fully serviced office accommodation and furnishings throughout the duration of the Infraco Works, in accordance with the following requirements:

- Office accommodation to accommodate 10 desks (Infraco supply) each with at least one secure lockable drawer, a swivel cloth upholstered chair. ;
- Three separate offices with a minimum working space of 16m^2;
- 2 meeting rooms suitable for sitting up to 20 and 8 people respectively;
- Male and female toilets. Minimum area 3m^2 each;
- Changing/Locker facilities;
- Kitchen facilities;
- Drying facilities;
- Male & Female shower room;
- Parking for up to 15 cars.

The Infraco shall prepare and submit an office layout based on the accommodation description set out below for approval by tie.

The Infraco shall integrate this accommodation with the Infraco's own accommodation and, subject to proposals which are acceptable to tie, the meeting rooms and welfare facilities may be shared by the Infraco.

3.9.1 Fittings and Furnishings

The Infraco shall also provide the following as minimum requirements:

General Office

- 7 x 4 drawer lockable metal filing cabinets
- 6 wall mounted notice board 1m high 1.5m wide
- 10 waste paper baskets
- 10 telephones connected to 2 lines
- 1 fax machine connected to a separate dedicated line
- 1 high output combined printer and photocopier capable of producing A4 and A3 black and white copies
- 10 connections to internet via broadband, all able to connect at same time
- 1 plan layout table 1 x 2 m
- 1 A0 drawing board and drafting equipment
- 10 desk lamps
- 10 letter tray/ filing baskets
- 2 m of book shelves at 6 of the desks
- 6 large white boards

Meeting Rooms

- Suitably sized tables and the requisite number of chairs for each of the two meeting rooms referred to above.

- 3 flip charts and flip chart paper as required and 1 large wall mounted white board in each meeting room

Changing / drying room

- Lockers c/w locks and keys for 30 people
- 4 chairs
- 30 coat pegs mounted on wall
- 1 boot pull.

General

- A security alarm system
- Access doors, fitted with five lever mortice locks and 6 sets of keys

3.9.2 Services

The Infraco shall provide, install and maintain all the services i.e. Gas, electric, water, drainage, telephone (two lines), broadband etc necessary to ensure effective occupation by **tie** of the accommodation for the duration of the Infraco Works

The Infraco shall provide install and maintain a printer/photocopier capable of producing A4 and A3 size black and white photocopies. The Infraco shall ensure that sufficient stocks of consumables (including paper and toner) are available at all times. Subject to acceptable proposals, the photocopier / fax may be shared by the Infraco and **tie**.

The Infraco shall provide tea, coffee, sugar fresh milk and a supply of drinking water for use by **tie** for the duration of the Infraco Works.

The Infraco shall arrange for the servicing and daily cleaning of the accommodation.

Toilet paper, paper towels, soap, and detergents shall be provided by the Infraco as required.

3.9.3 Equipment

The Infraco shall provide the following equipment for the exclusive use of **tie** throughout the duration of the Infraco Works:

- 10 x 10m long steel tape measures
- 10 x 50m long tape measures
- 10 x high output hand-held torches
- 2 approved electronic utility tracers for tracing/locating cables and pipes
- other consumables as may be required by **tie** (i.e. marker paint etc.).

The Infraco shall provide surveying/setting out equipment to **tie** as reasonably required, in connection with the Infraco Works.

3.9.4 Site Vehicles

The Infraco shall provide, licence, insure (comprehensive for any qualified driver together with any authorised passengers and the carriage of goods or samples), service and maintain four 4 wheeled road vehicles (suitable for the Edinburgh Tram Network) and visitor transport for the exclusive use of tie's representative and staff to enable them to carry out their duties for the duration of the Agreement. The number and type shall be to the specific approval of tie.

The vehicles shall be delivered and maintained by the Infraco in good, roadworthy condition.

The Infraco shall provide fuel, oil and maintenance in conformity with the vehicle manufacturers' recommendations and shall clean the vehicles inside and outside as required by tie.

A suitable replacement vehicle shall be provided by the Infraco in the event any vehicle being out of service for more than 24 hours.

The Infraco shall ensure that each vehicle shall be fitted with approved warning beacons and any other safety equipment as required for work on roads or within the boundaries of the Edinburgh International Airport.

3.10 Spare Parts, Tools and Test Equipment

The Infraco shall be responsible for the provision, delivery, offloading and placing into stores of the necessary Spares Parts, Tools & Test Equipment.

Detailed requirements and deliverables in respect of the Spares Parts, tools and Test Equipment responsibilities are included in the Agreement.

3.11 Documentation

The Infraco shall be responsible for the provision of all as built / constructed / manufactured drawings, manufacturers information, test certification and other documentation to be provided inaccordance with the Agreement.

Detailed requirements and Deliverables in respect of the documentation responsibilities are included within the Agreement and the Maintenance section of these Employer's Requirements.

3.12 Training

The Infraco shall be responsible for all necessary initial training associated with the operation and maintenance of the Edinburgh Tram Network. Detailed requirements and deliverables in respect of the Training responsibilities are included within Section 40 (*Maintenance*) of these Employer's Requirements.

4 Use of Industry Standard Equipment

The Infraco shall base its system supply on Commercial Off the Shelf (COTS) equipment and software. The use of proprietary equipment and software which is not available on a COTS basis is prohibited unless prior written agreement has been obtained from **tie**, other than that which is specified in the Infraco Proposal.

This is to allow the maintenance, extension and modification of the ETN by third party suppliers and maintainers if necessary.

All electronic interfaces between subsystems shall use open standards and shall utilise non-proprietary protocol.

5 System Identity and Branding

A single system identity shall be applied to the ETN. This shall be developed by **tie** through a specialist contractor appointed by **tie**. The output of this contract with the specialist contractor shall be a documented set of design guidelines which shall be incorporated into these Employer's Requirements as Appendix 1 and which shall be complied with by the Infraco in respect of the Infraco Works. The design guidelines shall include the following elements:

- Logo and other elements of the ETN's graphic identity;
- Signage;
- Application of the systems identity to the following:
  - Ticket machines;
  - Stop furniture;
  - Passenger information;
  - Depot.
- Tram livery;
- Tram interior;
- Uniforms;
- Pictograms;
- Other aspects of the ETN which are visible to the public.

6 Design Life

The equipment and systems to be supplied for the Edinburgh Tram Network shall be designed and built by the Infraco to a standard that shall ensure the System as a whole is capable of continuous operation for a minimum period of 15 years from the Service Commencement Date for each Phase.

Individual items of Infrastructure and equipment shall have a design life as indicated in the table below. Where the design life for an item of equipment is not specified, a minimum of 15 years shall be assumed. All design lives are from the Service Commencement Date for each Phase.

Item of Equipment or System	Design Life
Trams	30 years
Structures	120 years
Track Bed	50 years
Track	25 years
Rails in Straight Lines	20 years
OLE	30 years
Power Cables	30 years
Substations and Substation Equipment	30 years
Tramstop Platforms	50 years
Tramstop Superstructure (including shelters and poles)	25 years
Tram Position and Detection equipment	15 years
Passenger Information Displays	10 years
Telephone Handsets	10 years
Telephone PABX	15 years
Voice recorder	15 years
PA Controller	10 years
Loudspeakers	15 years
Hand Portable Radio Handsets	5 years
Vehicle Mobile Radio Equipment	7 years

Item of Equipment or System	Design Life
Radio Base Station Equipment	15 years
Radio Masts and Antennae	15 years
Passenger Help Points	15 years
CCTV cameras	7 years
CCTV Digital Video Recorders	7 years
SCADA outstations	20 years
Fibre Optic Cabling and Patch Panels	25 years
Fibre Optic Switches, Routers, Hubs	15 years
Other communications equipment	15 years
Cabinets	25 years
UPS systems (excluding batteries)	15 years
Copper Communications Cables	25 years
Batteries (if employed)	4 years
Workstations including Monitors	5 years
Servers	5 years
Standard hand tools	5 years
Portable electrical tools	7 years

Table 22 - Equipment Design Life

7 Extensibility

Table 23 below sets out the assumptions being made in the design of Phase 1a and Phase 1b to allow Phases 2 and 3 to be added with minimum change, and also for future increase in service levels on Phase 1a/1b (over the "8+8" pattern) and for the addition on the proposed Line 3 (assumed routing Bridges-Princes St-Haymarket).

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
Track Layout	Roseburn Junction/Delta	Design for full delta	n/a		n/a	n/a
	Balgreen loop and crossover	Design for loop and crossover	n/a		n/a	n/a
	Granton Square	Design for interim terminus	Design for track continuation; build initial as over-run for terminus	n/a	n/a	n/a
	Newhaven	Design for interim terminus	Design for track continuation	n/a	n/a	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Ingliston Junction and P&R Tramstop	Make provision for Phase 3 and long-term aspirations	Alignment design not to preclude an allowance terminating Phase 3 service at Ingliston P&R and for East-West continuation from Phase 1	n/a	n/a	n/a
	Track alignment at Princes St/South St Andrew St Junction	Make Provision for Line 3	n/a	n/a	Alignment to allow pointwork and appropriate future traffic management(See CR078)	n/a
Modelling	Network modelling inc. for TSJs	To support 8+8 service	None	None	None	n/a
Traction Power	Traction Power Supply system (Substations/OLE/cabling)	To support 8+8 service +50% addition	Part of basic design	In basic design	Effectively in basic design, as an alternative use of the increased service design provision	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Definition of Power characteristics (and other parameters for modelling)	Full traction characteristic of the selected tram	n/a	n/a	n/a	n/a
Depot	Stabling sidings	Design for 35, build for 27	Inc. in 8 extra	Inc. in 8 extra	Not specifically included	n/a
	Workshop	8 Berths theoretical maximum; (practically:4 berths plus 2 service roads)	Initial design would accommodate	Initial design would accommodate	Not specifically included	n/a
	Depot staff accommodation	Numbers to be accommodated nominally match fleet that could be accommodated	Initial design would accommodate	Initial design would accommodate	Not included	n/a
	Depot car parking	See drawings	n/a	n/a	Not included	n/a
	Depot Control Centre	Design for 5 desks; provide 3	Design layout would accommodate	Initial provision would accommodate	Design layout would accommodate	n/a

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Depot stores	Design basis	Would accommodate	Would accommodate	Not included	n/a
						n/a
SCC	ODN capacity					
	General capacity	There is an initial +50% requirement above the calculated maximum usage	TBA	TBA	TBA	n/a
	Route coding capacity	3-digit route-coding included	Included in base	n/a	Included in base	n/a
	Radio system capacity	A minimum[2] of two channels at each base station	TBA	TBA	TBA	n/a
Roads	Traffic Signalled Junction design and modelling (inc. at temporary termini)	Phase 1a/1b only	Possibly ductwork at temporary termini	n/a	None	n/a

[2] *The word maximum would allow no channels to be provided and still be compliant! Two channels ok as a minimum.*

Area	Topic	Phase 1a/1b Design Basis	Provision for Phases 2 and 3	Provision for Phase 1a/1b increased service	Provision for ETL3 (Edinburgh Tram Line 3)	Provisions for other purposes
	Traffic Management layout at Princes St/South St Andrew St	Phase 1a only	n/a	n/a	None	n/a
	Traffic signalling ductwork	Design basis	n/a	n/a	n/a	Allowance in design at locations where additional signals might be provided
Tramway Ducting	Ductwork and access chambers	A minimum of 20% addition of the number of ducts	Initial design would accommodate	Initial design would accommodate	Initial design would accommodate	n/a
Utilities	Cross-track ducts	Where agreed with the SUCs, provision of secondary spare duct	n/a	n/a	n/a	Provision in design basis

Table 23 - Extensibility Assumptions

8 Standards

8.1 Principles

Where there is no relevant standard specified in the Agreement, the Infraco Works shall comply as a minimum with relevant current British or European Standards, DfT and/or Scottish Government Publications, Standards and Technical Memoranda or IEC/ISO Standards in accordance with the order of precedence set out in section 8.2.

The Infraco Works shall comply with the ORR Safety Publication 2 and with the requirements of HMRI. Where standards do not exist, the Infraco Works shall comply with Good Industry Practice and all relevant codes of practice and guidance notes. Materials or equipment provided shall be in accordance with regulations and standards appropriate to the United Kingdom or the country of manufacture, but only where in the opinion of tie, compliance with the regulations and standards appropriate to the country of manufacture ensures an equivalent or higher quality than the regulations and standards appropriate to the United Kingdom. In such situations, the onus will be on the Infraco to prove that they are of an equivalent or higher quality.

Where standards are specified in these Employer's Requirements, these shall include any successor or replacement standards, announced or in force before7 August 2007 and in relation to Tram Supply Obligations and Tram Maintenance Obligations only, 14 September 2007, which provide an equivalent or improved quality and standard.

The Infraco shall comply with standards reasonably required by the relevant Roads Authority, including any local standards and amendments to the Design Manual for Roads and Bridges.

The Infraco shall be responsible for identifying all proposed departures from standards: in these instances, the Infraco shall seek the formal approval of tie, and provide all details justifying the departure from standards.

The Infraco shall be responsible for making any necessary applications to the relevant Roads Authority for departure from standards and for complying with the resulting consequences, including those arising from the failure of an application for such departure.

The Infraco shall ensure that all materials, construction and workmanship comprised in the Infraco Works meet the requirements of the British or European standards relevant to the materials used. Materials used should have a British Board of Agrément Certificate wherever reasonably possible which identifies a lifespan for that material.

8.2 Hierarchy of Precedence.

The order of precedence shall be as follows:

1) Legislation;

2) Guidance;

3) Where not included in Guidance;

(i.) British Standards;

(ii.) Scottish Government standards and guidance;

(iii.) Local Authority standards (CEC);

(iv.) Statutory Utility standards;

(v.) International Industry standards.

8.3 The Infraco's Responsibilities

The Infraco in its system integrator role and as the system designer shall be responsible for:

- As appropriate, the development of, and compliance to, robust management processes in respect of compliance with Law and any other relevant standards or regulations included in the Agreement and section 8.2.
- The identification and selection of appropriate standards for all aspects of the Infraco Works
- The identification and definition of any application limits of such standards for all aspects and at all stages of the Infraco Works (such as design, construction, testing and commissioning, operation, and maintenance) in particular at the network, System and subsystem level.
- The identification and successful resolution of any conflicts within and between the obligations contained within this section 8 and Law.

8.3.1 Applicable Standards

Applicable standards are listed in the following table.

Specification No.	Specification Title										
BS 8500 – 1: 2002	Concrete – Complementary British Standard to BS EN 206-1. Method for specifying and guidance for specifier	x	x	x			x		x	x	
BS 8500 – 2: 2002	Concrete – Complementary British Standard to BS EN 206-1. Specification for constituents material and concrete	x	x	x			x		x	x	
BRE Special Digest Nr 1	Concrete in aggressive ground.	x	x	x			x		x	x	
BS 4449: 1997	Specification for carbon steel bars for reinforcement of concrete	x	x	x			x		x	x	
BS 6744: 2001	Stainless steel bars for the reinforcement and use in concrete – Requirements and test methods	x	x	x			x		x	x	

Specification No.	Specification Title										
BS EN 10210 S355 J2H	Steelwork: Hollow sections	x					x				
BS EN 10025 S355J2G3	Steelwork: All other sections	x					x			x	
BS 5400 -	Steel, Concrete and Composite Bridges	x									
BS 5400 - Part 1: 1988	General Statement (see BD 15/92)	x									
BS 5400 Part 2: 1978	Specification for Loads (See BD 37/01)	x									
BS 5400 Part 3: 2000	Code of Practice for Design of Steel Bridges	x									
BS 5400 Part 4: 1990	Code of Practice for Design of Concrete Bridges (see IA.5 and BD 24/92)	x									
BS 5400 Part 5: 1979	Code of Practice for Design of Composite Bridges (see BD 16/82)	x									
BS 5400 Part 9: 1983	Bridge Bearings (see BD 20/92)	x									
BS 5400 Part 10: 1980	Code of Practice for Fatigue (see BD 9/81)	x									

Specification No.	Specification Title										
BS 5930: 1999	Code of Practice for Site Investigations	x	x	x					x	x	
BS 8666: 2000	Scheduling, Dimensioning, Bending and Cutting of Steel Reinforcement for Concrete	x	x	x			x		x	x	
BS EN 206-1: 2000	Concrete - Specification, performance, production and conformity (AMD 13189)	x	x	x			x		x	x	
BS 8500-1: 2002	Concrete – Complimentary British Standard to BS EN 206-1. Method of specifying and guidance for the specifier.	x	x	x			x		x	x	
BA 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BA 41/98 (Feb '98)	The Design and Appearance of Bridges	x									
BA 42/96 (Nov '96)	The Design of Integral Bridges	x									
BA 55/00 (May '00)	The Assessment of Bridge Substructures & Foundations, Retaining Walls & Buried Structures	x									

Specification No.	Specification Title										
BA 57/95 (Aug '95)	Design For Durability	x									
BD 2/79 (Jun '88)	Technical Approval of Highway Structures on Motorways and other Trunk Roads, Part IV: Procedures for Lighting Columns	x		x							
BD 2/89 (Oct '89)	Technical approval of DTp highway structures on motorways and other trunk roads Part 1, General Procedures	x									
BD 7/81 (Aug '81)	Weathering steel for highway structures	x									
BD 9/81 (Dec '81)	Implementation of BS 5400 Pt 10, CP for fatigue	x									
BD 12/95 (Feb '96)	Design of Corrugated Steel Buried Structures with spans not exceeding 8m (including circular Arches)	x									
BD 13/90 (Feb '91)	Design of Steel Bridges Use of BS 5400: Part 3: 1982	x									

Specification No.	Specification Title										
BD 15/92 (Dec '92)	General Principles for the Design and Construction of Bridges Use of BS 5400: Part 1: 1988	x									
BD 16/82 (Dec '82)	Design of composite bridges - Use of BS 5400 Pt 5: 1979 including Amendment No. 1 (Dec '87)	x									
BD 20/92 (Oct '92)	Bridge Bearings Use of BS 5400: Part 9: 1983	x									
BD 21/97 (Aug '97)	The Assessment of Highway Bridges and Structures Amendment No. 1 (Aug '97)	x									
BD 24/92 (Nov '92)	Design of Concrete Highway Bridges and Structures Use of BS 5400: Part 4: 1990 Including Interim Advice Note IA.5 July 1996	x									
BD 28/87 (Jul '87)	Early thermal cracking of concrete including Amendment No. 1 (Aug '89)	x									
BD 30/87 (Jul '87)	Backfilled retaining walls and bridge abutments	x									

Specification No.	Specification Title										
BD 31/87 (Jan '88)	Buried concrete box type structures	x									
BD 33/94 (Nov '94)	Expansion Joints for Use in Highway Bridge Decks	x									
BD 37/01 (Aug '01)	Loads for Highway Bridges	x									
BD 42/00 (May '00)	Design of Embedded Retaining Walls and Bridge Abutments	x									
BD 43/90 (Apr '90)	Criteria and Material for the Impregnation of Concrete Highway Structures	x									
BD 44/95 (Jan '95)	The Assessment of Concrete Highway Bridges and Structures Including Interim Advice Note IA.4 July 1996.	x									
BD 47/99 (Aug '99)	Waterproofing and Surfacing of Concrete Bridge Decks	x									
BD 48/93 (Jun '93)	The Assessment and Strengthening of Highway Bridge Supports	x									
BD 49/93 (Jan '93)	Design Rules for Aerodynamic Effects on Bridges	x									

Specification No.	Specification Title										
BD 52/93 (Apr '93)	The Design of Highway Bridge Parapets	x									
BD 56/96 (Nov '96)	The Assessment of Steel Highway Bridges and Structures	x									
BD 57/95 (Aug '95)	Design for Durability	x									
BD 58/94 (Nov '94)	The Design of Concrete Highway Bridges and Structures with External and Unbonded Prestressing	x									
BD 60/94 (Apr '94)	The Design of Highway Bridges for Vehicle Collision Loads (this does not apply to existing structures).	x									
BD 70/97 (Feb '97)	Strengthened/Reinforced Soils and Other Fills for Retaining Walls and Bridge Abutments (use of BS 8006:1995)	x									
BD 74/00 (May '00)	Foundations	x					x			x	
TD 9/93 (Jun '93)	Highway Link Design	x									

Specification No.	Specification Title										
TD 27/96 (Aug '96)	Cross sections and headrooms	x									
ASO10	Railway sleepers – Jarrah, Karri and Wandoo.		x								
ASO11	Railway crossing timbers – Jarrah.		x								
BS EN 13674-1:2003	Specification for railway rails (partially replaces BS11)		x								
BS47	Fishplates for railway rails.		x								
BS EN 13043:2002	Aggregates for bituminous mixtures and surface treatments for roads.		x	x						x	
BS64	Specification for normal and high strength steel bolts and nuts for railways rail fishplates.		x								
BS729	Specification for hot dip galvanised coatings on iron and steel articles.		x								
BS EN 1097-3:1998	Testing aggregates. (partially replaces BS812)		x								

Specification No.	Specification Title										
BS970	Specification for wrought steels for mechanical and allied engineering purposes.		x								
BS1377	Methods of tests for soils for civil engineering purposes.	x	x	x			x			x	
BS3100 (withdrawn)	Specification for steel coatings for general engineering purposes.		x				x			x	
BS4921	Specification for sheradised coatings on iron and steel.		x				x			x	
BS EN 10270-1:2001	Specification for patented cold drawn steel wire for mechanical springs.		x								
BS6906	Methods of tests for geotextiles.		x								
BS EN 1562	Founding. Malleable cast irons.		x								
BS EN 1563	Founding. Spheroidal graphite cast iron.		x								
BS EN 13481-2	Performance requirements for fastening systems for concrete sleepers.		x								
BS EN 13481-3	Performance requirements for fastening systems for wooden sleepers.		x								

Specification No.	Specification Title										
BS EN 10002 – 1	Tensile testing of metallic materials (method of test at ambient temperature).		x								
BS EN 10025	Hot rolled products of structural steels. General technical delivery conditions		x							x	
ENAAA-2	Railway applications – Track – Fastening Systems Part 2: Performance requirements for fastening system for concrete sleepers.		x								
ISO/R887	Plain washers for metric bolts, screws and nuts.		x								
RT/E/S/40045	Network Rail Standard Electric Points Heating		x								
UIC605OR	Protection from corrosion – measures to be taken on direct current catenaries to reduce the risks on adjacent piping and cable systems.		x								
UIC860	Technical specification for the supply of rails.		x								

Specification No.	Specification Title										
UIC861-2	Standard sections for points rails adapted to the UIC54 and 60kg/m rail sections.		x								
UIC861-3	Standard 60kg/m rail profiles – types UIC60 and 60E.		x								
UIC863	Technical specification for the supply of non-treated track support (wooden sleepers for standard and broad-gauge track and crossing timbers).		x								
UIC863-1	Use of non-European timbers for the manufacture of sleepers.		x								
UIC864-1	Technical specification for the supply of sleeper screws.		x								
UIC864-2	Technical specification for the supply of steel track bolts.		x								
UIC864-3	Technical specification for the supply of spring steel washers for use in permanent way.		x								

Specification No.	Specification Title										
UIC864-4	Technical specification for the supply of fishplates or sections for fish-plates made of rolled steel.		x								
UIC864-5	Technical specification for the supply of rail seat pads.		x								
UIC864-6	Technical specification for the supply of baseplates and for sections for baseplates made of rolled steel.		x								
UIC864-7	Rolled profiles for baseplates for UIC rails.		x								
UIC864-8	Rolled profiles for fishplates for 54kg/m and 60kg/m rails.		x								
UIC866	Technical specification for the supply of cast manganese steel crossings for switch and crossing work.		x								
BS 1363-2:1995	13A plugs, sockets-outlets and adaptors. Part 2, Spec. for 13A switched and unswitched socket-outlets				x			x	x	x	

Specification No.	Specification Title										
BS 1363-4:1995	13A plugs, socket-outlets and adaptors. Part 4, Spec. for 13A fused connection units switched and unswitched				x			x	x	x	
BS 3573:1990	Polyolefin copper-conducted telecommunications cables							x	x	x	
BS 4533-102.1:1990	Luminaires. Particular requirements. Part 102.1 Fixed general purpose luminaires				x				x	x	
BS 4579-1:1970 (withdrawn, replaced by BS EN 61238-1)	Performance of mechanical and compression joints in electric cable and wire connectors. Part 1 Compression joints in copper conductors				x	x	x	x	x	x	
BS 4579-2:1973	Performance of mechanical and compression joints in electric cable and wire connectors. Part 2 Compression joints in nickel, iron and plated copper conductors				x	x	x	x	x	x	

Specification No.	Specification Title										
BS 4662:1970 (withdrawn. replaced by BS 4662:2006)	Specification for boxes for the enclosure of electrical accessories				x	x	x	x	x	x	
BS 4737-4.1:1987	Intruder alarm systems in buildings. Part 4.1 Codes of practice. Code of practice for planning and installation				x				x	x	
BS 5225-1:1975	Photometric data for luminaires. Part 1 Photometric measurements				x				x	x	
BS 5225-3:1982	Photometric data for luminaires. Part 3 Method of photometric measurement of battery-operated emergency lighting luminaires				x				x	x	

Specification No.	Specification Title										
BS 5266-1:1999	Emergency lighting. Part 1 Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment				x				x	x	
BS 5266-3:1981	Emergency lighting. Part 3 Specification for small power relays (electromagnetic) for emergency lighting applications up to and including 32A				x				x	x	
BS 5467:1997 (equivalen european harmonisatio n document to be provided)	Specification for 600/1000V and 1900/3300V armoured electric cables having thermosetting insulation				x		x		x	x	

Specification No.	Specification Title	Structures	Track	Rolling Stock	Power Distribution	Earth Connections	OLE	Signalling	Tramstops	Depot	Trams
BS 546:1950	2-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors. See also Supplement No 1:1960 Specification for plugs made of resilient material				x				x	x	
BS 5486-11:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 11 Specification for particular requirements of fuseboards				(withdrawn, replaced by BS EN 60439)x			x	x	x	

Specification No.	Specification Title										
BS 5486-12:1989 (withdrawn, replaced by BS EN 60439)	Low-voltage switchgear and control gear assemblies. Part 12 Specification for particular requirements of type-tested miniature circuit-breaker boards				x			x	x	x	
BS 5499-1:2002	Graphical symbols and signs. Part 1 Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout				x				x	x	
BS 5499-3:1990	Fire safety signs, notices and graphic symbols. Part 3 Specification for internally-illuminated fire safety signs				x			x	x	x	
BS 5499-5:2002	Graphical symbols and signs. Safety signs, including fire safety signs. Part 5 Signs with specific safety meanings				x			x	x	x	
BS 5649-2:1978	Lighting columns. Part 2 Dimensions and tolerances			x					x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transitops	Depot	Trams
BS 5649-5:1982	Lighting columns. Part 5 Specification for base compartments and cableways			x					x	x	
BS 5649-7:1985	Lighting columns. Part 7 Method for verification of structural design by calculation			x					x	x	
BS 5733:1995	Specification for general requirements for electrical accessories				x	x	x	x	x	x	
BS 5839-1:2002	Fire detection and alarm systems for buildings. Part 1 Code of practice for system design, installation, commissioning and maintenance				x				x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distribution	Traction Overhead Line (please provide equivalent european harmonisation document)	Rolling Stock	Signalling	Transmissions	Depot	Trams
BS 6004:2000 (equivalen european harmonisatio n document to be provided)	Electric cables. PVC insulated, non-armoured cables for voltages up to and including 450/750V, for electric power, lighting and internal wiring				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distribution	Power — Overhead	OLE	Power — Substation	Transmission	Depot	Trams
BS 6121-2:1989 (withdrawn, replaced by BS EN 50262)	Mechanical cable glands. Part 2 Specification for polymeric glands				(withdrawn, replaced by BS EN 50262)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6133:1995	Code of practice for safe operation of lead-acid stationary batteries								x	x	
BS 6290-2:1999	Lead-acid stationary cells and batteries. Part 2 Specification for the high-performance Plant positive type								x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	SC & C	Transhipt	Depot	Trams
BS 6290-4:1997	Lead-acid stationary cells and batteries. Part 4 Specification for classifying valve regulated types								x	x	

Specification No.	Specification Title	[illegible]	Track	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Depot	Trams
BS 6346:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having PVC insulation				x(please provide equivalent european harmonisation doc	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distribution	Overhead Line	OLE	Depot & Stabling	Transmission	Depot	Trams
BS 6651:1999 (withdrawn, replaced by BS EN 62305)	Code of Practice for protection of structures against lightning	x			(withdrawn, replaced by BS EN 62305)x	x	x(withdrawn; refer to "Power")	x	x	x	
BS 6701:1994	Code of Practice for installation of apparatus intended for connection to certain telecommunication systems				x	x	x	x	x	x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Pwr Collection	OLE	SC & C	Transhipe	Depot	Trams
BS 6724:1997 (equivalent european harmonisation document to be provided)	600/1000V and 1900/3300V armoured electric cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire				x	x	x	x	x	x	
BS 7001:1988	Interchangeability and safety of a standardized luminaire supporting coupler								x	x	
BS 7211:1998 (equivalent european harmonisation document to be provided)	Thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire				x	x	x	(refer to "Power")x	x	x	

Specification No.	Specification Title									
BS 7430:1998	Code of practice for earthing	x			x	x	x		x	x	
BS 7654:1997	Single phase street lighting fuses (cut-outs) for low-voltage public electricity distribution systems. 25A rating for highway power supplies and street furniture			x					x	x	
BS 7671:2001	Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition			x	x	x	x	x	x	x	
BS 7919:2001 (equivalent european harmonisation document to be provided)	Electric cables. Flexible cables rated up to 450/750V, for use with appliances and equipment intended for industrial and similar environments			x	x	x	x	x(refer to "Power")	x	x	

Specification No.	Specification Title										
BS EN 12613:2001	Plastic warning devices for underground cables and pipelines with visual characteristics			x	x	x	x	x	x	x	
BS EN 40-1:1991	Lighting columns. Part 1 Definitions and terms			x					x	x	
BS EN 40-3-1:2000	Lighting columns. Part 3-1 Design and verification. Specification for characteristic loads			x					x	x	
BS EN 40-3-2:2000	Lighting columns. Part 3-2 Design and verification. Verification by testing			x					x	x	
BS EN 40-5:2002	Lighting columns. Part 5 Requirements for steel lighting columns			x					x	x	
BS EN 40-6:2002	Lighting columns. Part 6 Requirements for aluminium lighting columns			x					x	x	
BS EN 50085-1:1999	Cable trunking and cable ducting systems for electrical installations. Part 1 General requirements			x	x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 50085-2-3:2001	Part 2-3 Particular requirements for slotted cable trunking systems intended for installation in cabinets				x	x	x	x	x	x	
BS EN 50086-2-1:1996	Conduit systems for cable management. Part 2-1, Particular requirements. Rigid conduit systems				x	x	x	x	x	x	
BS EN 50171:2001	Central power supply systems				x	x	x	x	x	x	
BS EN 50173-1:2002	Information technology. Generic cabling systems. General requirements and office areas				x	x	x	x	x	x	
BS EN 50174-1:2001	Information technology. Cabling installation. Part 1 Specification and quality assurance				x	x	x	x	x	x	
BS EN 50174-2:2001	Information technology. Cabling installation. Part 2 Installation planning and practices inside buildings				x	x	x	x	x	x	
BS EN 50262:1999	Metric cable glands for electrical installations				x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 50310:2000	Application of equipotential bonding and earthing in buildings with information technology equipment				x	x	x	x	x	x	
BS EN 54-10:2002	Fire detection and fire alarm systems. Part 10 Flame detectors. Point detectors				X				x	x	
BS EN 54-11:2001	Fire detection and fire alarm systems. Part 11 Manual call points				X				x	x	
BS EN 54-1:1996	Fire detection and fire alarm systems. Part 1 Introduction				X				x	x	
BS EN 54-2:1998	Fire detection and fire alarm systems. Part 2 Control and indicating equipment				X				x	x	
BS EN 54-3:2001	Fire detection and fire alarm systems. Part 3 Fire alarm devices. Sounders				X				x	x	
BS EN 54-4:1998	Fire detection and fire alarm systems. Part 4 Power supply equipment				X				x	x	
BS EN 54-5:2001	Fire detection and fire alarm systems. Part 5 Heat detectors. Point detectors				X	x		x	x	x	

Specification No.	Specification Title										
BS EN 54-7:2001	Fire detection and fire alarm systems. Part 7 Smoke detectors. Point detectors using scattered light, transmitted light or ionization				X				X	X	
BS EN 55015:2001	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment							X	X	X	
BS EN 60051-1:1999	Direct acting indicating analogue electrical measuring instruments and their accessories. Part 1 Definitions and general requirements common to all parts				X				X	X	
BS EN 60081:1998	Double-capped fluorescent lamps. Performance specifications				X				X	X	
BS EN 60188:2001	High-pressure mercury vapour lamps. Performance specifications								X	X	
BS EN 60269-1:1999	Low-voltage fuses. Part 1 General requirements				X	X	X	X	X	X	

Specification No.	Specification Title										
BS EN 60400:2000	Lamp holders for tubular fluorescent lamps and starter holders				x				x	x	
BS EN 60432-2:2000	Safety specification for incandescent lamps. Part 2 Tungsten halogen lamps for domestic and similar general lighting purposes				x				x	x	
BS EN 60439-1:1999	Specification for low-voltage switchgear and control gear assemblies. Part 1 Type-tested and partially type-tested assemblies				x	x		x	x	x	
BS EN 60439-2:2000	Specification for low-voltage switchgear and control gear assemblies. Part 2 Particular requirements for busbar trunking systems (busways)				x	x		x	x	x	
BS EN 60439-3:1991	Part 3 Particular requirements for low-voltage switchgear and control gear assemblies for installation in places where unskilled persons have access to their use.				x	x		x	x	x	

Specification No.	Specification Title										
BS EN 60439-4:1991	Part 4 Particular requirements for assemblies for construction sites (ACS)				x	x	x	x	x	x	
BS EN 60439-5:1996	Part 5 Particular requirements for assemblies intended to be installed outdoors in public places. Cable distribution cabinets (CDCs) for power distribution in networks				x	x	x	x	x	x	
BS EN 60454-1:1995	Pressure-sensitive adhesive tapes for electrical purposes. Part 1 General requirements				x	x	x	x	x	x	
BS EN 60529:1992	Degrees of protection provided by enclosures (IP code)				x	x	x	x	x	x	
BS EN 60598-1:2000	Luminaires. Part 1 General requirements and tests								x	x	
BS EN 60598-2-18:1994	Luminaires. Part 2-18. Particular requirements. Luminaires for swimming pools and similar applications								x	x	

Specification No.	Specification Title										
BS EN 60598-2-22:1999	Luminaires. Part 2-22. Particular requirements. Luminaires for emergency lighting								x	x	
BS EN 60598-2-23:1997	Luminaires. Part 2-23. Particular requirements. Extra low voltage lighting systems for filament lamps								x	x	
BS EN 60598-2-2:1997	Luminaires. Part 2-2. Particular requirements. Recessed luminaires								x	x	
BS EN 60598-2-3:2003	Luminaires. Part 2-3. Particular requirements. Luminaires for road and street lighting			x					x	x	
BS EN 60598-2-5:1998	Luminaires. Part 2-5. Particular requirements. Floodlights								x	x	
BS EN 60896-2:1996	Stationary lead-acid batteries. General requirements and methods of test. Part 2 Valve regulated types								x	x	

Specification No.	Specification Title										
BS EN 60898-1:2003	Circuit-breakers for overcurrent protection for household and similar installations. Part 1 Circuit-breakers for a.c. operation				x	x		x	x	x	
BS EN 60898-2:2001	Part 2 Circuit-breakers for a.c. and d.c. operation				x	x	x	x	x	x	x
BS EN 60921:1991	Ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60923:1996	Auxiliaries for lamps. Ballasts for discharge lamps (excluding tubular fluorescent lamps). Performance requirements				x	x	x	x	x	x	
BS EN 60925:1991	Performance requirements for d.c. supplied electronic ballasts for tubular fluorescent lamps				x	x	x	x	x	x	
BS EN 60927:1997	Auxiliaries for lamps. Starting devices (other than glow starters). Performance requirements				x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 60929:1992	a.c. supplied electronic ballasts for tubular fluorescent lamps. Performance requirements				x	x	x	x	x	x	
BS EN 60947-2:2003	Low-voltage switchgear and control gear. Part 2, Circuit-breakers				x	x	x	x	x	x	
BS EN 60947-3:1999	Part 3, Switches, disconnectors, switch-disconnect TBA ors and fuse-combination units				x	x	x	x	x	x	
BS EN 60947-4-1:2001	Part 4-1, Contactors and motorstarters. Electromechanical contactors and motor-starters				x	x	x	x	x	x	
BS EN 61008-1:1995	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61008-2-1:1995	Part 2-1 Applicability of the general rules to RCCBs functionally independent of line voltage				x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 61009-1:1995	Residual current operated circuitbreakers with integral overcurrent protection for household and similar uses (RCBOs). Part 1 General rules				x	x	x	x	x	x	
BS EN 61009-2-1:1995	Part 2-1 Applicability of the general rules to RCBOs functionally independent of line voltage				x	x	x	x	x	x	
BS EN 61048:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. General and safety requirements				x	x	x	x	x	x	
BS EN 61049:1993	Capacitors for use in tubular fluorescent and other discharge lamp circuits. Performance requirements				x	x	x	x	x	x	
BS EN 61347-2-1:2001	Lamp control gear. Part 2-1 Particular requirements for starting devices (other than glow starters)				x	x	x	x	x	x	
BS EN 61347-2-3:2001	Lamp control gear. Part 2-3 Particular requirements for a.c. supplied electronic ballasts for fluorescent lamps				x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 61347-2-7:2001	Lamp control gear. Part 2-7 Particular requirements for d.c. supplied electronic ballasts for emergency lighting				x	x	x	x	x	x	
BS EN 61347-2-8:2001	Lamp control gear. Part 2-8 Particular requirements for ballasts for fluorescent lamps				x	x	x	x	x	x	
BS EN 61347-2-9:2001	Lamp control gear. Part 2-9 Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)				x	x	x	x	x	x	
BS EN 61537:2002	Cable tray systems and cable ladder systems for cable management				x	x	x	x	x	x	
BS EN 61558-1:1998	Safety of power transformers, power supply units and similar devices. Part 1 General requirements and tests				x	x	x	x	x	x	
BS EN 61558-2-9:2003	Part 2-9 Particular requirements for transformers for Class III handlamps for tungsten filament lamps				x	x	x	x	x	x	
BS EN 62035:2000	Discharge lamps (excluding fluorescent lamps). Safety specifications				x	x	x	x	x	x	

Specification No.	Specification Title										
BS EN 62040-1-1:2003	Uninterruptible power systems (UPS). Part 1-1 General and safety requirements for UPS used in operator access areas				x	x	x	x	x	x	
BS EN 62040-1-2:2003	Uninterruptible power systems (UPS). Part 1-2 General and safety requirements for UPS used in restricted access locations				x	x	x	x	x	x	
BS IEC 1008-2-2:1990	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCCBs). Part 2-2 Applicability of the general rules to RCCBs functionally dependent on line voltage				x	x	x	x	x	x	
BS 5489-1:2003	Code of Practice for the Design of Road Lighting				x	x	x	x	x	x	
GM/TT0146	Lighting of Railway Premises (Railway Group Standards)								x	x	
GI/RT7010	Lighting of Railway Premises (Railway Group Standards)								x	x	

Specification No.	Specification Title										
GI/GN7607	Guidance for Low Voltage Electrical Installations (Railway group guidance notes)				x	x	x	x	x	x	
GI/RT7007	Low Voltage Electrical Installations (Railway Group Standards)				x	x	x	x	x	x	
GPGLRP3	Good Practice – Lighting for Railway Premises				x			x	x	x	
										x	
EN50121 Pts 1-5	Railway applications electromagnetic compatibility				x	x	x	x	x	x	
2004/40/EC	European directive				x			x		x	
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x			x		x	

Specification No.	Specification Title	Structures	Track	Roads	Power Distribution	Fare Collection	OLE	Signalling	Telecoms	Depot	Trams
ENV50129: 1998	Safety related electronic systems for signalling.				(not applicable)x			x		x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.							x		x	
	Methods for assessing the safety integrity of safety related software of uncertain pedigree (SOUP), Health and Safety Executive				(not applicable)x			x		x	
	Edinburgh Tram Earthing Systems Policy	x	x		x	x	x	x	x	x	

Specification No.	Specification Title										
EN50128: 2001	Railway Applications – Communications, signalling and processing systems – software for railway control and protection systems.				(not applicable)x	x	x	x	x	x	
IEC61508: 1998	Functional safety of electrical/electronic/programmable electronic safety related systems.				(not applicable)x			x			
MPT 1331	Code of Practice for Radio Site Engineering							x			
MPT 1362	Code of Practice for installation of mobile radio equipment in land based vehicles							x			
MPT 1327	A Signalling Standard For Trunked Private Land Mobile Radio Systems (June 1997)							x			

Specification No.	Specification Title										
G1/RT7015	Railway Group Standard (Feb 2003)					x					
BS EN50126	Railway applications- The specification and demonstration of Dependency, Reliability, Availability, Maintainability and Safety.		x		x	x	x	x	x	x	x
BS EN50149	Railway applications – Fixed installation-Copper and Copper alloy grooved contact wire.						x				
BS EN50119	Railway applications - Fixed installation-electric traction-Overhead Lines.						x				
BS EN50206-2 –	Pantographs for Light Rail vehicles						x				
BS EN50125-1	Railway applications - Fixed installations, Environmental conditions						x				
BS EN50317,	Railway applications - Fixed installations, Requirements for and validation of measurements of dynamic interaction between pantograph and contact line						x				

Specification No.	Specification Title										
BS EN50151	Railway applications - Fixed installations, Special requirements for composite insulators						x				
BS EN50345	Railway applications - Fixed installations, Insulating synthetic rope assemblies for support of overhead contact lines						x				
BS EN50318	Railway applications - Fixed installations, validation of the simulation of dynamic interaction between pantograph and contact line						x				
BS EN 50122-1	Railway Applications – Fixed Installations Part 1: Protective provisions relating to electrical safety and earthing				x		x				
BS EN 50122-2	Railway Applications – Fixed Installations Part 2: Protective provisions against the effects of stray currents caused by d.c. traction systems				x						

Specification No.	Specification Title	Structures	Track	Roads	Power Distr.	Fare Collection	OLE	[illegible]	[illegible]	Depot	Trams
BS EN 60146	Semiconductor convertors – General requirements and line commutated convertors				x						
BS EN 50123	Railway Installations – Fixed installations – d.c. switchgear				x						
IEC 850 (IEC 60850)	Supply voltages for traction systems										
BS 2618	British Standard Specification for Electrical Traction Equipment				(not applicable)x						
BS 6290	Batteries				x						
BS 7354	Battery Duty Calculations.				x						
CP 1013	Earthing.				x						
BRB Spec. DC 112	DC Power Cables.				x		x				

Specification No.	Specification Title										
BS 6360 (IEC 60228)	Cable Conductors.				x		x				
BS 6899 Type GP2	DC Power Cable Insulation.				x		x				
IEC 228 (BS 6360)	Conductors for Multicores.				x		x				
DMRB	The United Kingdom Design Manual for Roads and Bridges (as amended by any City of Edinburgh Council specific requirements)	x		x							
TSM	Traffic Signs Manual			x							
MCDHW	The Manual of Contract Documents for Highway Works;			x							
SHW	Specification for Highway Works;			x							
HCD	Highway Construction Details.			x							
CEC	'Edinburgh Standards for Streets'.			x							
NRSWA	New Roads and Street Works Act 1991			x							

Specification No.	Specification Title										
CEC	Measures Necessary Where Apparatus is Affected by Major Works (Diversionary Works)			x							
CEC	Specification for the Reinstatement of Openings in Roads			x							
	Code of Practice for the Co-ordination of Street Work and Works for Road Purposes and Related Matters			x							
	Utility specific specifications (to be advised by each utility)			x							
RSPG Part 1, 1966	Railway Safety Principles and Guidance, Safety Principles	x	x	x	x	x	x	x	x	x	x
RSPG Part 2, Section G	2005, Railway Safety Principles and Guidance, Tramways	x	x	x	x	x	x	x	x	x	x
RVAR	Railway Vehicle Accessibility Regulations								x		x
GM/RC1500	1994-12, 2001-10 Code of Practice for EMC between the railway and its neighbourhood				x	x	x	x	x	x	x

Specification No.	Specification Title									
EN55013	Sound and television broadcast receivers and associated equipment. Radio disturbance characteristics. Limits and methods of measurements.							x		x	x
GE/RT8015, 2002	Electromagnetic compatibility between railway infrastructure and trains.										x
ECE43	1990-08, Uniform Provisions Concerning the Approval of Safety Glazing and Glazing Materials (Rev1 08.1990).								x	X	x
prEN13129-3	2003-10, Railway Applications – Air conditioning for urban and suburban rolling stock – Part 1: Comfort parameters										x
BS EN 779	2002-12-05, Particulate air filters for general ventilation - Determination of the filtration performance									x	x
BS 857	1967-06-30, Specification for safety glass for land transport										x

Specification No.	Specification Title										
BS 6853 1999-01-15	Code of Practice for fire precautions in the design and construction of passenger carrying trains or European equivalent Standard										x
BS EN 50121-3-1 2000-12-15	Railway Applications - Electromagnetic compatibility - Rolling stock - Train and complete vehicle										x
BS EN 50125-1	Railway Applications – Environmental conditions for equipment										x
BS EN 50155-3-1 2000-12-15	Railway Applications – Electronic Equipment used on Rolling Stock										x
BS EN 50215 1999-09-15	Railway Applications - Testing of rolling stock after completion of construction and before entry into service										x
BS EN 60077-1 2002	Railway Applications – Electric Equipment for Rolling Stock										x

Specification No.	Specification Title										
prEN ISO 3095 1975-09	Acoustics; Measurement of noise emitted by rail bound vehicles										x
prEN ISO 3381 1976-02	Acoustics; Measurement of noise inside rail bound vehicles										x
EN 12663-2000	Railway applications, Structural requirements of railway vehicle bodies										x
EN 13749-2005	Methods of specifying structural requirements of bogie frames										x
VDV 164 1995-04	System for fault detection, fault registration and fault message (FERM) on guided public transport vehicles										x
IEC 60494-2, 2002-08	Railway applications - Rolling stock; Pantographs; Characteristics and tests - Part 2: Pantographs for metros and light rail vehicles						x				x

Table 24 - Applicable Standards

9 Geotechnical

Where the Infraco Works may affect geotechnical and geo-environmental features, including but not limited to, aquifers, ground water and surface watercourses, the Infraco shall comply with the requirements of relevant third parties, the Scottish Environment Protection Agency (SEPA) or other statutory consultees and environmental legislation.

The Infraco shall agree the criteria and methods for the identification, classification, treatment and disposal of material with SEPA, the relevant local environmental health authority or other relevant authority as appropriate. The Infraco shall obtain all necessary consents for the removal, disposal or re-use of materials. Materials not suitable for re-use shall be transported off Site to a licensed facility in accordance with the requirements of the applicable relevant authority and environmental legislation.

The Infraco shall not carry out works or activities which would result in any Site or any land licensed to the Infraco under the Agreement or any adjacent or adjoining property being classified as contaminated land under the Environmental Protection Act 1990, the Contaminated Land (Scotland) Regulations 2000, the Contaminated Land (Scotland) Regulations 2005 and the guidance contained in the Scottish Executive Statutory Guidance for the the Contaminated Land Regime, Edition 2 dated May 2006 and/or any similar environmental legislation, or that would preclude such a classification being removed.

The Infraco shall assess the risk of the ingress of landfill gases, coalfield gases and other hazardous ground gases and implement appropriate measures to mitigate such risks.

The Infraco Works shall be designed and constructed to accommodate reasonably foreseeable changes in the existing and potential future nature and level of ground water, where reasonably practicable.

10 Environment

10.1 Environmental Considerations

10.1.1 General

Environmental Statements have been prepared for Line One and Line Two in accordance with the standing orders of the Scottish Parliament, which require that projects approved by private Act of Parliament must be subject to Environmental Impact Assessment (EIA). EIA in Scotland is governed by the Environmental Impact Assessment (Scotland) Regulations 1999 (S.I. 1999 No. 1). The Environmental Impact Assessments (EIAs) have been undertaken to identify the construction and operational effects of building and operating a tram network in Edinburgh. Each assessment has been documented in a comprehensive Environmental Statement which describes:

- The design of the project and the way it will be constructed and operated;
- Its impacts on the physical, natural and human environment; and
- The measures that will be undertaken to minimise these impacts.

The Environmental Statements report the assessment of the following environmental topics which should be considered by the Infraco:

- The proposed scheme – including an explanation of the need for the scheme, alternatives considered, route alignment and infrastructure description, construction and operational activities;
- Approach to the EIA – summarising the legal requirements, scope and methods used in undertaking this EIA;
- Policy context – provides a review of compliance of Line One and Line Two to relevant national, regional and local policies;
- Traffic and transport;
- Land use - including potential impacts to the agricultural use of land along the route;
- Geology, soils and contamination – including references to hydrogeology and waste management;

- Landscape and visual amenity;
- Ecology and nature conservation;
- Surface water – including water quality and hydrology;
- Heritage - including archaeology;
- Socio-economic effects;
- Noise and vibration;
- Air quality - including local air quality (PM10, NO2), global air quality (CO2) and dust; and
- Cumulative impacts.

The Infraco shall ensure that the environmental impact caused by the Infraco Works shall be no worse than that contained in the Environmental Statements.

10.1.2 Freedom of Access to Environmental Information

The attention of the Infraco is drawn to the requirements of the Environmental Information (Scotland) Regulations 2004 (SSI 2004/520). This Statute permits public access to environmental information held by a Scottish public authority.

10.1.3 Relevant Legislation, Regulations and Guidance

The following are a series of project specific documentation governing various aspects of the environmental considerations of the Edinburgh Tram Network design, construction and operation.

10.1.4 Code of Construction Practice

A code of construction practice was prepared in consultation with the City of Edinburgh Council (CEC), Scottish Natural Heritage (SNH), the Scottish Environmental Protection Agency (SEPA) and Historic Scotland, in order to define **tie**'s minimum standards of construction practice. Compliance with this code is a legal requirement of the Edinburgh Tram (Line One) and (Line Two) Acts (2006) under Section 66 and this code has been developed by **tie** and this developed version is included in Schedule 3 (Code of Construction Practice and Code of Maintenance Practice).

The Code of Construction Practice sets out policies, legislation and guidance relating to the impact of the proposed construction works on the environment and the amenity and safety of residents, businesses, the general public and the physical surroundings adjacent to the ETN. The Code of Construction Practice also provides a list of environmental protection measures to be implemented during the construction of the ETN.

10.1.5 tie's Noise and Vibration Policy

tie's Noise and Vibration Policy (NVP/001 V1.01) sets out the mitigation approach for noise and vibration impacts during the operation of the Tram in Edinburgh. Mitigation requirements relating to noise and vibration impacts during the construction of the ETN route are outlined in the Code of Construction Practice. Compliance with the Noise and Vibration Policy is a legal requirement under Section 66 of the Edinburgh Tram (Line One) and (Line Two) Acts (2006). Other legal requirements relating to noise insulation are set out in Sections 63, 64 and 65 of the respective Acts. The Noise and Vibration Policy is included in Schedule 32 (tie and CEC Policies).

10.1.6 The Tram Design Manual and Urban Design Briefs

A Design Manual and urban design briefs have been prepared for the ETN. Both sets are regarded as supplemental guides to deemed consent for Line One and Line Two under the section 11 (Class 29) of the General Permitted Development (Scotland) Order 1992.

Although permitted development status exists for the ETN it is nonetheless necessary to gain prior approval from the City of Edinburgh Council before the Infraco Works can commence. The Design Manual and urban design briefs are both designed as guides in informing both the design process and the prior approval process. It is therefore important that the Infraco gives appropriate consideration to the contents of the Design Manual and the briefs as major component in the integration of a tram design into the urban fabric of the City.

10.1.7 Landscape and Habitat Management Plan

The Landscape and Habitat Management Plan (LHMP) details the proposals for retention, protection and enhancement of existing planting and habitats, within the Rosebum Corridor. It also sets out details of replacement planting and habitat which are lost as a consequence of the development. The plan will be updated by the Infraco as new information on habitat, landscape proposals and Tram design becomes available. The plan will also include proposals for noise mitigation for properties adjacent to the ETN. Revisions to the LHMP will require to be approved by the City of Edinburgh Council Planning Authority. The procedure for updating the LHMP is set out within Section 68 of the Edinburgh Tram (Line One) Act (2006).

10.1.8 Badger Mitigation Plan

The Badger Mitigation Plan sets out the scope and form of the proposed mitigation measures for avoiding/ reducing adverse impacts on badgers within the Roseburn Corridor. The Plan will be updated by the Infraco as new information on badger social groups and the ETN design becomes available. Revisions to this Plan will be agreed with SNH, CEC and the Edinburgh and Lothians Badger Group (ELBG) and approved by the CEC Planning Authority.

In preparing the detailed environmental design and implementation (including maintenance and monitoring periods) proposals for landscape and ecology the Infraco will ensure that all commitments given in the Environmental Statement and arising from the Scottish parliamentary process relating to the Tram Legislation (including the detailed agreements following discussions with stakeholders) are met.

10.1.9 Protected Species Plan

The Protected Species Plan identifies the constraints governing how all protected species (predominantly located in the Gogarburn area) are to be dealt with.

10.1.10 Archaeological Requirements

All Infraco Works are to be carried out in compliance with the approved AHMP relevant to that location.

10.1.11 Landscape Design

The landscape design shall include, for construction, aftercare and maintenance / monitoring, ongoing for the whole Term. The detailed landscape design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements, and any subsequent side agreements entered into between the CEC, tie and various third parties.

10.2 Ecological Design

The ecological design shall include, for construction, aftercare maintenance and monitoring:, the ecological mitigation proposals will cover the wholeTerm.

The ecological design shall be in accordance with the environmental objectives, principles and requirements given in the Environmental Statements, to ensure that the Edinburgh Tram Network as constructed and operated is in compliance with the Environmental Statements prepared for Parliament, and any subsequent side agreements entered into between the CEC, tie and various third parties (e.g. Scottish Natural Heritage, New Ingliston Limited, Edinburgh and Lothian Badger Group).

The updated and ongoing ecological surveys and mitigation works to be carried out by Infraco shall take into account seasonal constraints and variations and will accommodate ongoing relevant surveys begun by other parties (e.g. biological water quality monitoring). The Infraco shall ensure that the construction, maintenance and monitoring of the Infraco Works complies with all existing UK and EU Environmental legislation concerned with the protection of species and habitats including but not limited to:

- Wildlife and Countryside Act 1981 (as amended in particular by Variation of Schedules 1988, 1992 & 1998);
- The Conservation (Natural Habitats, & c.) Regulations 1994 (as amended);
- Protection of Badgers Act 1992; and
- Countryside and Rights of Way Act 2000 in so far as it extends to Scotland.

The Infraco shall not commence works within any part of the Site until the necessary update surveys of ecological interest in respect of that part of the Site have been undertaken and a survey report has been submitted to tie. Any relevant findings of such surveys shall be included into the Infraco's Landscape and Habitat Management Plan and the Construction Environmental Management Plan (CEMP).

The Infraco shall ensure that:

- Details of all species protected by Law and any structure or place used for shelter or protection by any such species protected by Law within the Site are kept confidential and not disclosed to any person except insofar as is essential for carrying out the Infraco Works; and

- All necessary current licenses, and named license holders, are available before the commencement of any Infraco Works, which may affect species protected by Law and or any structure or place used for shelter or protection by any such species protected by Law.

In the event that the Infraco identifies or becomes aware of any species protected by Law, or any structure or place used for shelter or protection by any species also protected by Law, which could be directly or indirectly affected by the Infraco Works and for which appropriate protection measures have not previously been agreed, the Infraco shall notify **tie** immediately and shall:

- Cease all Infraco Works that may adversely affect such species, structure or place;

- Provide Scottish Natural Heritage and **tie** with any further information of which the Infraco is aware relating to such species, structure or place as may be requested;

- Consult upon and agree mitigation and/or monitoring measures with Scottish Natural Heritage and tie in relation to such species, structure or place; and

- Obtain any necessary licenses to carry out the agreed measures.

The Infraco shall ensure that all construction work is carried out with due regard to the seasonal interests of any flora, fauna or habitat and in particular, all species listed for any degree of protection under Law. The Infraco shall make due allowance for the seasonal constraints in preparing the Programme.

10.3 Construction of Ecological Measures

10.3.1 General

Special ecological measures shall include but not be limited to the requirements for carrying out the Infraco Works:

- fencing;
- safe passage for wildlife;
- the location of nesting or roosting boxes;
- the location of habitat creation measures to be inspected;
- the known location of protected species, and
- the list of licenses obtained or required for working with or within the vicinity of Protected Species; and
- maintaining access to foraging and water.

10.3.2 Site Supervision of Landscape and Ecological Works

The Infraco shall ensure that the environmental Site works shall be inspected and monitored by Infraco's environmental clerk of works who will be supported by Infraco's landscape architect and ecologist, as necessary.

10.3.3 Landscape Works

Planting, seeding and aftercare works shall be carried out by the Infraco.

The Infraco will be responsible for locating all services routes prior to any landscape work being carried out.

10.3.4 Completion of the Planting Works and Completion of the Landscape and Ecological Aftercare Works

On practical completion of the landscape and ecological implementation works and on completion of the three years landscape and ecological aftercare works. The Infraco shall submit the required certificates and arrange a formal inspection of the Infraco Works with tie.

A separate inspection shall be arranged with relevant landowners for any areas of off-site planting.

10.3.5 Construction Environmental Management Plan (CEMP)

The Infraco shall prepare a Construction Environmental Management Plan (CEMP) including specific management / action plans or Method Statements, as necessary, to convey the required level of information for the following:

- Drainage features, including oil interceptors and pollution control valves, treatment of run-off, (including run-off volumes) and the location and appearance of any balancing ponds and/or swales. access or proposed access to the same;
- Carriageway surfacing;
- Working times;
- Noise reduction and abatement;
- Pollution control and contingency plan (see below);
- Discharge, land drainage and abstraction licenses to comply with EA requirements;
- Protection of retained vegetation;
- Maintenance e.g. de-icing;
- Sourcing of construction materials;

- Waste disposal, including disposal of construction waste, arisings, spoil, miscellaneous solids and liquids;
- Topsoil and subsoil handling (strip, storage, amelioration and re-use);
- Management and disposal of any excess soil or spoil arising from the works; and
- Site compounds.

The specific requirements of the pollution control and contingency plan are as follows:

- Compliance with the SEPA pollution prevention guidance;
- Identification and categorisation of surface waters vulnerable to Site works and an assessment of the earthworks that are likely to give rise to silty run off, the routes this is likely to take and the methods to prevent damage from silt;
- Precautions for handling of fuel, oil and other liquids during the works, in particular, near rivers, streams and watercourses;
- Requirements for pollution control equipment;
- How mud and dust will be controlled;
- How water supply boreholes and wells will be protected;
- The measures to be taken to protect watercourses and associated wildlife from, for example, chemical spillages or the introduction of sediment-laden run off; and
- Discharge criteria for suspended solids in run off from the Site during construction and proposals for monitoring and control.

11 Surveys

Surveys and investigations shall be undertaken by the Infraco as required to facilitate the design, construction and maintenance of the Edinburgh Tram Network.

Before commencing any Infraco Works (including investigations) where either the Infraco or **tie** considers there to be potential for a future claim from adjacent property owners or occupiers, the Infraco shall carry out a detailed condition inspection of the relevant properties and infrastructure which may be affected by the Infraco Works. If any such inspection is carried out, this shall be done in conjunction with the owners or occupiers concerned. A condition survey report shall then be prepared and agreed with the owner or occupier.

Condition survey reports prepared under the preceding paragraph shall include photographic evidence of the existing condition of the relevant property or infrastructure including evidence of critical dimensions such as existing crack widths.

The Infraco shall undertake sufficient surveys to prepare a topographical survey model. Relevant sections of the topographical survey model shall be updated by the Infraco at least every six months throughout the period of the Infraco Works, where work has been undertaken in relation to the sections concerned.

The topographical survey model shall include all Works as constructed and the Infraco shall include in each updated topographical survey model all then existing fixtures including:

- principal cabling;
- street furniture;
- structures and buildings;
- trackwork;
- drainage;
- power supply systems including OLE structures;
- ducting and draw pits.

These surveys shall include aspects concerned with:

- dimensions
- condition; and
- inspection for assessment.

The Infraco shall update the photographic records (excluding aerial photographs) and other such data contained in the topographical survey model at intervals of not less than six months.

The Infraco shall provide access to and copies of, when requested, all reports of investigations carried out as part of the Infraco Works.

12 Project Management Processes

12.1 Communication – General

The Infraco shall develop and maintain a "Communications Plan" and this shall be submitted to **tie** in accordance with the Review Procedure.

The Communications Plan shall illustrate how all the communication processes, activities and issues are to be managed, progressed and satisfactorily resolved. The Communications Plan shall detail how the Infraco will communicate with Sub-Contractors, the Operator, **tie**, the MUDFA Contractor, key stakeholders and third parties. The Communications Plan shall also include the intended processes for dealing with enquiries, particularly complaints, from all sources. The Infraco shall refer to the Stakeholder Services in this Section of the Employer's Requirements, in order to ensure that the Communications Plan includes all necessary requirements.

The Infraco shall implement all the requirements of the Communications Plan.

The Infraco shall liaise with the relevant parties to ensure that the Infraco is copied into all relevant communications that are generated by others, in order to ensure that any relevant construction related issues, such as Temporary Works and practical constraints, are identified and addressed.

12.1.1 Meetings

The Infraco shall work with **tie** to develop the meetings schedules and requirements for progress reporting throughout the duration of the Infraco Works. The following table provides an outline of the minimum requirements:

Meetings	Frequency	Chaired by / Minutes taken
Safety Meeting	Weekly	Infraco
Management Review Meetings	Two monthly	tie/Infraco alternately
Project Progress Meetings	Four weekly (Fortnightly prior to Site start)	tie

Meetings	equency	Chaired by / M taken
Design and Planning Meetings	Fortnightly	Infraco
Stakeholder & Third Party Meetings	As required	tie
Site Meetings	Weekly	Infraco
Cost Review Meetings	Four weekly	tie
Risk Review Meetings	Four weekly	tie

Table 25 - Table showing meeting schedules

The primary purpose of these meetings shall be to enable the Infraco to advise on:

- Any safety issues;
- The current state of the programmed Infraco Works;
- Progress made in the various activities;
- Communication issues;
- Third party issues; and
- Commercial issues (Including change control).

The Infraco shall develop and maintain a comprehensive meetings schedule indicating those meetings which the Infraco shall chair and those meetings which the Infraco shall attend.

Prior to commencement on Site, progress meetings shall be held every two weeks. The purpose of these meetings shall be to review progress made by both Parties, and identify and agree actions required.

The Infraco shall provide an agenda, for all meetings to which they are designated as chair. The Infraco shall also provide appropriate documentation in advance of each of the meetings, as defined in the following sections, or otherwise as agreed with tie.

12.1.2 Progress Reporting

Progress reports shall be submitted by the Infraco to tie no later than three Business Days before each progress meeting.

The Infraco's progress reports shall contain comprehensive information and shall be structured in a manner which is commensurate with tie's own reporting structure. The various sections of the progress reports shall require to be agreed with tie, but should include the following:

1. Executive Summary;
2. Health & Safety Report;
3. Quality & Environment;
4. Financial Summary Report; and
5. Project Performance / Programme.

Information provided within the progress reports shall include, but not be limited to, the following:

- Health & safety report including a summary of H&S records
- Summary financial information summarised from the separate cost report including summary and headline data on planned spend/actual spend, forecast spend and summary of costs for Compensation Events and future forecast.
- Planned versus actual resource summary;
- Physical progress against Milestones anticipated/required completion dates;

- Four weekly forecast of all activities;
- Eight weekly critical impact notice (including all information on any internal or external factor which may affect programme delivery);
- Labour histograms detailing planned, actual and forecast across all disciplines;
- The activities commenced or completed since the previous report and upon what dates;
- The expected remaining duration of all activities commenced but not completed;
- Any other additional activities with expected durations, methods, and resource requirements and sequence assumptions;
- Schedule and programme for the delivery of method statements, permits and isolations for the next four weeks;
- Any changes to expected durations, method, resource requirements and sequence assumptions;
- Forecast completion dates for all Infraco Works in each geographical section and intermediate geographical section including any slippage or advance upon the Planned Service Commencement Date and/or the Planned Sectional Completion Dates (as appropriate);
- Programme comparison between actual vs. planned;
- Schedule of information received;
- Schedule of outstanding information;
- Progress photographs;
- Top 10 opportunities; and
- Top 10 risks.

12.1.3 Progress Photos

The Infraco shall on a monthly basis throughout the period until the Service Commencement Date procure that photographs covering all of the Infraco Works are taken by a professional photographer whose appointment the Project shall be approved by **tie**, such approval not to be unreasonably withheld or delayed.

tie shall determine the scope of the photographs referred above.

The Infraco shall ensure that:

- A minimum of 50 digital colour photographs shall be taken on a monthly basis;
- All photos shall be provided in electronic format in a form to be agreed with **tie**;
- One set of 10 inch x 8 inch size prints shall be prepared from the colour photographs referred to above;
- All prints referred to above shall be presented in albums with individual clear plastic wallets and marked on the reverse side with the date that the photograph was taken, the name and address of the photographer, identification reference number and a brief description of Work being undertaken and the direction from which the photograph was taken;
- All prints and negatives shall be delivered to **tie** within two weeks of being taken; and
- Except where **tie** have provided their prior written consent, the photographs shall not be used for any purpose other than as set out in the Agreement.

The Infraco shall procure that all Intellectual Property in respect of the photographs vests in **tie**.

12.1.4 Site Meeting Report

A report shall be submitted by the Infraco to tie no later than one Business Day before each site meeting. The report shall include reference to any significant issues (associated with safety, programme, design, cost, planning and consultee aspects), which have arisen since the previous monthly progress report.

The site meeting report shall also identify actual manpower resources (labour returns), plant and equipment that have occurred on site, for the previous week.

12.1.5 Topic Register

It is tie's intention to continue to develop and maintain a "Topics Register" for the Infraco Works. The Topics Register is used to record all issues as they arise that require to be specifically addressed. The record is then amended as appropriate to track the manner in which issues have been progressed or resolved to the satisfaction of tie. The Infraco is required to add to, or respond to issues as appropriate and attend regular review meetings at which the Topics Register shall be updated and actions assigned by tie.

The Infraco shall participate in the management of the Topics Register.

12.1.6 Work Breakdown Structure

An agreed Work Breakdown Structure is included in the Introduction of these Employer's Requirements. The Infraco shall adopt this WBS to ensure a recognised, structured analysis, by all parties, when interrogating the programme and cost analysis. The WBS may be further developed by the Infraco with the written consent of tie.

Accordingly there shall be a requirement for the Infraco to adopt all aspects of the WBS in the development of programme and cost documentation.

12.2 Programme Management

The Infraco shall undertake programme management including the implementation, regular updating and management of a fully detailed comprehensive Programme illustrating how the Infraco proposes to execute the whole of the Infraco Works in compliance with the Project Programme.

This Infraco Programme shall be prepared using Primavera software in a version compatible with that of tie.

This Programme shall be in Primavera P3e (Version 6 or otherwise as agreed with tie) format and accompanied by a time chainage programme illustrating the same information. The Programme shall be cost and resource loaded and coded to reflect the Infraco's WBS activities as detailed in section 39 of these Employer's Requirements.

The Infraco shall be responsible for liaising directly with **tie**, CEC (and other appropriate third parties) to maximise delivery of the ETN but minimise disruption to public transport and other services, and ensuring that any necessary diversion routes are agreed in recognised time periods prior to the commencement of Infraco works. The Infraco shall also take note of the constraints as identified in 39 of these Employer's Requirements.

The Programme shall be submitted to **tie** in accordance with the Review Procedure within a period which shall ensure that the Infraco Works can be progressed and monitored by the Infraco and **tie** against the details contained therein. The Programme shall clearly identify the following:

- the commencement, construction and completion constraints for all elements of the Infraco Works, separated into sectors by WBS code;
- all Milestones;
- the constraints, procedures, documentation and approvals specified in the Agreement;
- the Infraco manufacture and construction execution strategy, Infraco Works and site testing and commissioning, all constraints, procedures, documentation and approvals periods;
- seasonal constraints and constraints applied by CEC and other third party and statutory bodies as defined in the Agreement;
- the required design approvals and notices;
- all works to be undertaken by any Sub-Contractor;
- sufficient detail to illustrate the integration of the Deliverables with the proposed dates of possessions and the commencement and completion of construction for all elements of the Infraco Works, by WBS code;
- all other projects affecting the Infraco Works and how they are integrated into the Infraco Works. For example, any street works to be carried out by CEC, and works by or on behalf of all third parties (including landowners and developers);

- any witnessing, inspections, testing etc of the Infraco Works which requires to be carried out by third parties;
- long lead time materials and works;
- the identification and duration of all advance works, other than those already underway;
- the requirements and approval periods for traffic management, TROs, TTROs, and including any third party's requirements for notices and road closures;
- the commencement, completion dates and relationships of intermediate geographical section of the Infraco Works within each geographical section of the Infraco Works;
- the links and relationships between all activities and the justification of the underpinning logic;
- all design, manufacture and construction periods;
- the identification and timing of inputs and approvals required from **tie**, third parties, and any Approval Bodies are clearly identified; and
- the interface and relationship with the MUDFA Works;

The Programme shall meet the following minimum requirements:

- shall be in Primavera P3e (Version 6) for detailed implementation;
- shall follow and fully reflect the **tie**'s Work Breakdown Structure ("WBS") included within these Employer's Requirements.
- shall be cost and resource loaded down to coded activities;
- all resource reporting and progress reporting shall be coded to suit the activities contained within the WBS;
- records of time spent against activities shall be completed weekly against planned works as generated by Primavera;

- Any deviations shall be reported in the progress report and include notification of remedial actions for authorisation by tie;
- weekly records shall be collated and delivered to tie by 09:00hrs on the Tuesday following the week to which the records relate;
- the Programme shall also take into account programming input and attendance at meetings, both as required by tie; and
- the Programme shall also contain cost/spend tables and cumulative curves to match the achievement of major milestones and activities within the WBS.

The Infraco shall take into account the availability of alternative materials or components when developing the Programme. The Infraco shall identify those materials and components which require advance ordering and processing. Any advanced orders which are approved shall be identified and defined in the Programme.

The Infraco shall update the Programme every four weeks in line with tie reporting periods to take full account of the Infraco progress in completing the Infraco Works.

A hard and soft copy updated Programme and an Infraco Progress Report shall be submitted by the Infraco to tie no later than three Business Days before each four weekly progress meeting.

12.3 Time Chainage

The Infraco shall also produce, manage, develop and work in accordance with its Time Chainage Diagram.

The Time Chainage Diagram shall be submitted to tie in accordance with the Review Procedure to ensure that the Infraco Works can be progressed and monitored by the Infraco against the details contained therein but in any case, the Time Chainage Diagram shall be submitted not later than six weeks after the Commencement Date. The Time Chainage Diagram shall be updated regularly and be available for inspection or distribution on a monthly basis, during the course of the Infraco Works.

The Time Chainage Diagram shall fully reflect, accommodate and comply with the information detailed on the Programme.

12.4 Planning and Other Consents

The responsibility for the Consents is as set out in Clause 19 of the Agreement.

12.5 Project Management Plan

12.5.1 General

The Infraco shall submit and maintain a plan describing the approach to project management for the delivery of the complete scope of the Infraco Works. This project management plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.5.2 Resource and Competence

A description of the procedures employed to ensure that the required resource and competence level throughout the duration of the Infraco Works shall be achieved.

12.5.3 Documentation

Identify key policies and procedures to deliver such works, infrastructure and equipment to programme, specification, budget and otherwise safely and efficiently and in a manner which is fully integrated with the activities of other relevant contractors.

The approach to the development of a suite of project specific documentation, indicating how they shall effectively be integrated with, and reflect, the Infraco's corporate procedures and policies (including any Joint venture or consortia procedures).

Templates that shall be used for the procurement and delivery of the service deliverables, which shall be required to be prepared by the Infraco.

Outline proposals covering the suite of required documentation including training, maintenance and operations manuals, as-built drawings, design information, testing procedures and proposals, and certification and records (e.g. testing).

12.5.4 Regulations

Management arrangements and procedures for ensuring/monitoring compliance with all applicable Regulations (e.g. HMRI), Law, and the requirements of the Agreement and its Schedules.

12.5.5 Procedures

Details of internal procedures for decision making and review in your management team with particular emphasis on safety, programme, budget, quality, the management and control of non-compliance and the implementation of continuous improvement.

12.5.6 Proposals on reporting and controlling design information requirements

Procedures which shall be followed in obtaining outstanding consents and approvals for the works.

Definition of the process for managing the approvals interface with tie, HMRI, Planning Authority, Roads Authority, Network Rail, the Operator and third parties with whom agreements have been entered into.

12.5.7 Interface Plans

Given that successful co-operation between the Operator, Infraco, and tie is essential to the delivery of a successful project, a description of the key areas of this interface and details which demonstrate how this is successfully achieved.

Details of supply chain process/procedures, in particular provide details of the criteria for selection of sub-contractors/suppliers for this project.

Details of how the Tram Provider shall be managed.

Details regarding the commissioning and handover of the Edinburgh Tram Network or Geographical Sections thereof to the Operator shall be provided.

12.5.8 Design

Clear definition of the areas where the Infraco shall undertake design work and an explanation of where the Infraco believes this deviates from the previous design work done.

12.6 Construction Management Plan

The Infraco shall submit and maintain a Construction Plan relating to the Programme. This Construction Plan shall include sections to clearly and separately describe the approach to the specific topics set out below.

12.6.1 Mobilisation

Detailed mobilisation plan, to incorporate comprehensive details of all aspects of mobilisation including, but not limited to, number of work sites, the facilities on each, a general arrangement drawing of main sites, lay down areas, materials storage, welfare and car parking. This should detail timescales and immediate resource availability and should also provide details of the permissions required and assumptions made.

12.6.2 Plant

A description of the plant that will be used for the construction of the project and of how long the plant will be used. This should include description in relation to plant used for specialist purposes such as rail laying or wire stringing (these should be separately identified).

12.6.3 Sub-Contractors

Details of the sub-contractor management and control process during the construction phase, including how the performance of sub-contractors will be measured and reviewed and how sub-contractor compliance with standards will be assured.

12.6.4 Method Statements

A description of the process by which method statements shall be developed and approved, and a schedule summarising those method statements that are anticipated. An initial schedule shall be submitted in accordance with the Review Procedure and this shall be updated from time to time with agreement from tie.

12.6.5 Avoidance of Disruption

Description of the management process for ensuring that traffic disruption is kept to a minimum, particularly in relation to Traffic Management and TTRO requirements. Details of procedures of how unforeseen works (that are out with the area covered by the Temporary Traffic Restriction Order, but are necessary to complete the Infraco Works within the TTRO area) shall be dealt with.

Proposals for maintaining reasonable access to premises at all times and what measures The Infraco might employ when access is denied taking into account the requirements of the Disability Discrimination Act 1995.

Details of how it is proposed to liaise with all potentially affected third parties, and an assessment of the likely identities of such parties.

12.7 Network Rail Interface Plan

The Infraco shall submit and maintain a plan describing the approach to managing the ongoing interface requirements with Network Rail. The plan should identify the critical activities and the key risks associated with this interface and proposals to mitigate these risks. Notwithstanding the Infraco's responsibility of complying with the Agreement (including compliance with the Third Party Agreement and the Asset Protection Agreement) the Plan should address the following issues.

- A description of procedures for gaining access to Network Rail's infrastructure both in terms of the approval process and the physical access proposals;
- Confirmation, in terms of safety and in terms of undertaking the Infraco Works, the personnel utilised shall be appropriately qualified, skilled, experienced and adequate in quantity;
- The proposed Possession Strategy for works on or adjacent to Network Rail infrastructure, to include identification of Possessions & Isolations on Programme taking cognisance of lead time;
- Summary of the required method statements for principal construction activities associated with Works adjacent to Network Rail infrastructure;
- The proposals which allow access for Network Rail to maintain their infrastructure;
- Details as to how the Railway Group & Network Rail Line standards shall be complied with;
- Specific details of how Network Rail's infrastructure and rail vehicles shall be protected from injury/damage arising from the works activities;
- Details of how staff and any third parties shall be protected from injury from Network Rail's infrastructure or vehicles using it;
- The strategy for Red & Green Zone working;

- Proposals for competencies, making specific reference to management of the certification of personnel and operatives in accordance with the National Competency Control Agency "Sentinel" systems and procedures;

- A specific accident/incident procedure with regard to Network Rail infrastructure which details action to be taken, including the communications regime;

- Proposals for security and prevention of trespass onto site, especially onto adjacent Network Rail property;

- Proposals with regard to work in and around First Scotrail's Haymarket Depot and its associated stabling & sidings. There shall be a requirement to highlight proposals for ensuring access to Haymarket Depot is maintained for staff; road and rail vehicles, especially if rail vehicles require access/egress to the depot by road. There shall be a requirement to identify how First ScotRail operations shall not be restricted.

12.8 Quality Management

The Infraco shall undertake the Works fully in compliance with quality management processes and procedures referenced in ISO 9001 and ISO 9004.

The Infraco shall develop and maintain a Quality Plan to meet the requirements of ISO 10005 - 1995, and which fully defines all quality aspects of the Works. The Quality Plan shall be submitted in accordance with the Review Procedure. The Quality Plan shall demonstrate an integrated quality management system relating to the design, construction, testing and commissioning of the system and shall show how Infraco and its Sub-Contractors shall comply with the requirements of the Quality Plan.

The Infraco shall have all associated documentation readily available for internal review and review by tie. Regular internal audits shall be undertaken by the Infraco to ensure full compliance with ISO 9001 and ISO 9004 in accordance with Clause 5.1 of the Code of Construction Practice. The Infraco shall prepare and submit in accordance with the Review Procedure a "Schedule of Internal Audits" for agreement with tie. This shall define the planned nature and timing of the internal audits. Furthermore tie reserve the right to undertake external audits in accordance with paragraph 5.2 of the Code of Construction Practice and Code of Maintenance Practice.

The Infraco shall ensure that their management system for the Infraco Works is developed to ensure that it aligns with the requirements of the Tram Project Quality policy Statement (DEL.HSQE.103).

Quality control including materials and works on Site shall also be undertaken in accordance with the requirements of paragraph 3.2 of the Code of Construction Practice. The Infraco shall be required to comply with these Employer's Requirements including the completion of forms and other systems in order to assist tie in complying with tie's own safety and quality management systems.

12.8.1 Document Standards and Control

All Deliverables that are shared with, or issued to, tie shall be posted and reside within tie's document management system. The official version of any project document shall be the version that exists within tie's document management system. Access shall be granted to tie's document management system on a named basis, and access levels shall be determined by tie. The Infraco also agrees to abide by tie's document management procedure as notified to Infraco from time-to-time.

Documents from external parties should be uploaded to the project extranet for processing by document control. The extranet will also be the official conduit for issuing project information. In exceptional circumstances where documents must be exchanged by email, only the Document Control team will receive and issue this information. They will then handle all appropriate processing and distribution.

Deliverables shall conform to the following standards:

Acceptable File Types

- MS Office Suite 2003;
- MS Project 2003;
- MS Visio 2003;
- Portable Document Format (PDF) – Fully-searchable (OCR) Acrobat Reader v7 compatible;
- Compressed Files/Folders – WinZip v10 compatible;
- Graphics – GIF, TIFF, JPG, JPEG, or BMP;
- Audio – Audio files should be saved in MP3 format;
- Video – WMV or MPEG format with WMV preferred;

- Drawings – DWG (inclusive of used templates) and DCF.

Acceptable File Sizes

In general, all files should be optimised to keep their size to a minimum. For email correspondence the maximum allowable attachment size is 10MB. Individual files in excess of 50MB are only acceptable with prior agreement from **tie**.

Project Applications

- Collaboration – SharePoint 2007 (hosted by **tie**);
- Project Planning – Primavera v6;
- Risk Management – Active Risk Manager (hosted by **tie**);
- Deliverables. In addition to Deliverables conforming to the above, they should specifically be supplied in complete, self-contained and fully editable formats.

Typical examples include;

- Drawing Deliverables should be supplied as complete DWG files (inclusive of used templates) as well as the DCF print snapshot;
- Documents should be in Word 2003 (or previous) format;
- Spreadsheets should be in Excel 2003 (or previous) format and include the associated macros, equations, and functions.

Illegal Characters

As a matter of best practice the following characters should not be used in filenames to minimise the risk of error in software applications:

&	¦	$
~	¬	£
*	^	?
%	; (semi-colon)	!
#	, (comma)	@
\	‘ (apostrophe)	=
/	` (single quote)	
<	“	
>	. (dot)	
{	: (colon)	
}		

12.9 Infraco Performance Measurement

As part of the overall project reporting regime, a four weekly report incorporating performance against Key Performance Indicators (KPI) shall be required from the Infraco. These shall be project, as opposed to company, specific.

A fundamental consideration is that the KPIs agreed must be measurable and without dispute, thus they shall be fact based. The outputs shall be compared on a four weekly basis against both four weekly and rolling targets. A colour coded "traffic light" visual warning shall be used.

The KPIs agreed are split into a number of different areas. The following provides the breakdown of components within each of the areas. Deductions against the failure to achieve the agreed KPIs are set out in Schedule 45.

Table 26 – Table showing indication of Safety KPIs

Safety
Accident Frequency Rate (AFR)
Equivalent Fatality Rate (EFR)
Lost Time Accidents (LTA)
RIDDOR
Road Traffic Injuries
Road Traffic Damage (caused by Infraco actions)
Accident Investigations (late receipt)
HSE inspections, observations, improvement notices and prohibitions
Working at height
PPE – not using/not using correctly
Review of Accident Book entries
Possible 3rd Party specific (e.g. Network Rail)
NCRs
CARs (non-completion/late response or action)
Procedure compliance
Test failures (to include concrete and welding)
Safety Tours
Safety Inspections
Security
Achievement of programme
Snagging correction

Method Statements/Risk Assessments – failure to operate in compliance therewith
Late Possessions / Overruns
Reporting
Spills
Working hours contraventions
Complaints
Pollution – water courses; noise; light; dust; others
Trespass
COSHH contraventions
Signage and warning signage
Specific parameters may need to be devised relating to programme, performance, reporting and other specific issues that are important to tie.

The Infraco shall submit samples, manufacturers' literature, documentation and other such materials to demonstrate compliance with the Employer's Requirements, from time to time, for review by tie, in advance of the associated materials or equipment being procured. The Infraco shall prepare a Schedule of Procurement Proposals to identify all such proposed submissions and their timing for approval by tie.

12.10 Cost Management and Reporting

The Infraco shall carry out a pro-active role in cost management and reporting. A cost report shall be submitted by the Infraco to tie no later than 3 Business Days before each cost review meetings / or at a 4 weekly period, to be agreed with tie. In addition cost summary information shall be provided for inclusion in the Progress Reports.

The Infraco cost reports shall contain comprehensive information and shall be structured in a manner that is commensurate with tie's own reporting structure. The cost reports shall be required to provide information, including the following:

- Executive summary and narrative on significant changes from the previous report;
- Actual / Planned / Forecast Spend Tables / Curves to match the achievement of major deliverables and activities within the Work Breakdown Structure;
- Change Control Schedule and background information;
- Schedule of Compensation Events and background information;
- Value management estimates / analysis;
- Schedule of status of completion of Construction Milestones and Critical Milestones;
- Copy of the progress statements included in Monthly Progress Monitor.

The Infraco shall also be required to provide value engineering estimates and reports. These reports shall be provided by Infraco from time to time, as proposed by the Infraco or as required by tie, for the purpose of achieving better value.

12.11 Risk Management

12.11.1 Project Objectives

tie is dedicated to ensuring that a consistent approach to risk management is adopted across the ETN, which shall enable an informed view of risk to be taken.

ETN project risk management's mission is "to successfully manage all risks to and opportunities for the project thus ensuring that a supported and fully functioning operational service is delivered within budget and on time.

The key drivers within this mission are to:

- Promote and support proactive management of risk and opportunity;
- Integrate risk awareness / management, and not risk aversion, into the project culture;
- Manage risk in accordance with best practice;
- Reduce risk exposure to acceptable levels;
- Capitalise on opportunities;
- Ensure that all identified risks are owned and managed by the party best able to manage them;
- Provide assurance and enhanced information to managers and stakeholders.

tie maintains a project risk management plan and risk register covering the strategic, project management and commercial aspects of the ETN and shall continue to do so throughout the Term and operation. **tie** seeks to have all service providers, including the Infraco, contributing towards this risk register.

12.11.2 Risk Deliverables

The Infraco shall provide various Deliverables, as described in this section, to assist tie in meeting tie's risk management obligations associated with strategic, project management and commercial aspects of the ETN. The required procedures for managing hazards and risks associated with obligations associated with safety are not covered in this section.

The Infraco shall be responsible for the production, management, development, regular maintenance and necessary updating and distribution of the documentation included within the table below. The documentation shall be held by the Infraco in electronic format with hard and soft copies being made available as required.

Risk Documentation shall be submitted to tie, in paper copy and electronically, for their approval in accordance with the Review Procedure and the required dates and frequencies are included in the table below.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall provide assurance that they shall manage design and construction risk to the satisfaction of tie and in order to fulfil the objectives described in12.11.1. As part of this obligation the Infraco shall b e responsible for the production, development and maintenance of a Infraco Risk Management Plan ("IRMP") for the management of all risk aspects of the Edinburgh Tram Network throughout the Term. The IRMP shall focus on the risk factors related to the Infraco managed activities related to the Infraco Works for the delivery of the Edinburgh Tram Network including the risk deliverables noted below. The IRMP shall identify individuals and their responsibility in relation to risk.	Agree format and delivery date for the IRMP with tie's designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRMP throughout the Term. The Infraco shall issue an update to the IRMP at least bi-annually throughout the Term.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
The Infraco shall be responsible for the development and maintenance of an Infraco Risk Register ("IRR"), to best present all capex, opex, lifecycle, programme and quality risks to the Edinburgh Tram Network. The IRR shall also detail the proposed and completed mitigation of such risks. The platform used shall include the ability to generate reports, highlight risks to tie, key programme and cost impacts. The Infraco shall be responsible for the identification of commercial risks associated with all interfaces related to the works and shall facilitate and coordinate the inputs from stakeholders and other parties requested by tie from time to time. The IRR shall include analysis of each risk in terms of 'likelihood' and 'impact' providing detail on the inherent risk significance and current residual risk significance. Each risk shall have a designated responsible owner and the Infraco shall provide dashboard type graphical summaries of the risk profile and management actions being taken to mitigate. The risks to be addressed should include technical, operational, infrastructure, interface, economic, legal and regulatory, organisational and environmental risks. The Infraco should review the IRR on a four weekly basis to ensure that it is current. The Infraco shall meet with tie on a four weekly basis in line with the tram period calendar to discuss the control of key risks by the Infraco.	Agree format assessment criteria, platform and delivery date with tie's designated risk manager within one month of the Commencement Date. The Infraco shall update and maintain the IRR as required on a four weekly basis and shall distribute the IRR to tie on a four weekly basis throughout the Term. Assessment criteria must be compatible with tie's own risk register and assessment criteria.

Required Action from the Infraco	Timing/Frequency applicable to the Infraco
It is recognised that the identification, monitoring and progress of risk shall be discussed at regular workshops. The Infraco shall provide to **tie** a schedule of and undertake workshops, regarding risk matters to assist **tie** in ensuring the effective management of risk in relation to the Edinburgh Tram Network, **tie**, the Operator and/or relevant suppliers should receive timely notification of these in order to be able to attend. It is noted that **tie** may routinely request to attend workshops in order to be able to evaluate Infraco's approach to and performance in relation to risk. Infraco shall also attend meetings and workshops with **tie**'s project and risk management team and other ETN suppliers, the Operator and service providers as instructed by **tie** to take part in update of existing project risk and identification of new risks. The representatives attending such workshops shall be qualified and shall have sufficient knowledge of the ETN project to be able to contribute pertinent information within these workshops.	Provide and agree workshop schedule for the coming 6 months within the risk progress report to **tie**'s designated risk manager within 2 months of the Commencement Date.