

# **Light Rail Transit Association**

## **Submission to Edinburgh Tram Inquiry**

### **Introduction:**

The Light Rail Transit Association (LRTA) was established in 1937 - as the Light Railway Transport League - initially to campaign against the closure of the London tram network, but is now one of the world's leading organisations advocating better public transport through modern light rail and tramway systems in urban areas.

The LRTA is a membership organisation, based in the UK but represented in many other countries, particularly in mainland Europe and North America. Membership of the Association is open equally to professional organisations, transport planners and individuals with a particular interest in trams and light rail, and the LRTA publishes *Tramways & Urban Transit*, the international light rail journal. Officers of the Association – many with transport industry experience – form part of an extensive network of light rail and tramway information sources and the Association acts through its network of local branches, which campaign for better transport in their areas, to seek improvements in sustainable public transport provision and innovation in infrastructure, vehicles and management of systems.

The Association is also a sponsor of the annual Light Rail Conference and the international Light Rail Awards. In addition, the LRTA is a sponsor of the All Party Parliamentary Light Rail Group and is a member of the industry body UKTram, which is assuming responsibility for tramway guidance and standards from the Office of Rail & Road (Her Majesty's Railway Inspectorate).

During the initial project planning for the Edinburgh tramway, the LRTA's Light Rail Scotland sub-group gave considerable advice and information to TIE/CEC particularly on continental practice.

The Association is keen to make some general observations to the Inquiry on the history of the project but more positively to suggest a range of improved practices that might be adopted for future extensions.

Above all, we think it is most important for the Inquiry to clearly identify what went wrong in Edinburgh as there is a danger that the cost overrun, construction fiasco and catastrophic delay to the entire project might impinge upon other, much-needed tram and light rail developments elsewhere in the UK.

This submission takes the form of a series of responses to the list of twelve issues for comment tabled on the Inquiry's website. We would be delighted to give verbal evidence to the Inquiry if required.



## **1 Initial Proposals:**

The initial proposals were well thought out and should have resulted in a successful project but the all of the cost estimates were produced and accepted before the design was complete and contractors appointed. This was before the Gogar depot site was chosen and this predated the foreshortening of the route by several years. The Leith site became more valuable to Forth Ports during the property boom and the developing design need for a combination of more and longer trams made it unsuitable.

The decision to change the depot location from Leith to Gogar caused a great deal of design wastage and resulted in some difficulty once the height issue was dictated by Edinburgh Airport to meet the requirement for emergency landing on the not normally used second cross runway. The new site also required particular drainage measures due to its low-lying position. The initial tramway alignment required more detail in terms of the precise location of utilities - especially beneath pavements.

In planning the project more direct supervision should have been specified for the utility movements and related requirements. The change of depot location and the failure to properly oversee utilities relocation considerably added to the project costs.

## **2 Procurement:**

It is our opinion that the procurement strategy should have looked at where the risks lay and who was best-placed to manage them. There was also a clear need to get the incentives right between the parties and to ensure that there was a single system integrator for the whole project to work. This would lead us to suggest a couple of likely strategies.

1: A consortium of infrastructure contractor, vehicle builder, designer, operator and financier who would be contracted on a DFBO basis for a set concession period with a bespoke contract.

2: A vehicle supply contract to include additionally the depot construction and maintenance of the vehicles over a set period. A Design & Build contract for the infrastructure including system integration - probably best on an NEC target cost basis.

The client sponsor would need to have specified the output requirements for the tramway and have undertaken an outline design for "powers" purposes. The contractor (1 or 2 above) would take the outline design and turn it into a detailed design for construction. The contractor is best suited to dealing with the utilities, but the location thereof would be required for the "powers" stage.

From our observation of other light rail contracts we note that it is essential that the sponsor/client understands all of the risks and how they are allocated, and perhaps even more importantly what the cost implications are of changing them or moving them about.

We know each successive Second Generation UK Tramway has adopted a different approach largely to try and avoid the previous failures. Edinburgh made it very complicated. The knowledge of ultimate novation probably did influence the pre-contractor appointment design. This should have been appreciated far more by TIE. It also allowed project creep in all sorts of ways by CEC with at that stage no restraint from the contractor. We think that if you want a contractor to take real responsibility for a design (technical and cost) then you have to have them involved from an early stage if not the beginning. However, you will not get a final fixed price to begin with. CEC was constrained to some extent by the "cash limit"



approach of the Holyrood Government. Be clear on one thing though: CEC got the contract it wanted; it was not a TIE- or consultant-led approach.

In principle, we are concerned as to the competence of CEC to take forward the contracting aspects of the project and find it alarming that Transport Scotland - as the devolved Scottish Government's centre of expertise in these matters - was not in overall charge.

### **3 Design:**

The process of design was incomplete and was being novated with unfinished elements. Companies were therefore receiving designs which were unfinished, or which had sections which were not covered in the MUDFA contract. This meant that there had to be redesign with added risk and increase in design costs. The design should have been fully completed for the whole project and then locked down before novation to a sole principal contractor.

It is clear that the design was incomplete at October 2006 when the then three pre-qualified infrastructure consortia were asked to submit bids. In practice, Amec Spie dropped out so there were only two. These bids arrived in January 2007. Discussions/negotiations then followed which resulted in final bids being received in August 2007.

Obviously the design was still incomplete. Partially because of a long list of CEC planning/technical approval issues at various places along the 1a and 1b alignments (ironically 1b was further advanced than 1a!). However it was also incomplete because it could not be finalised until the M&EE suppliers were identified which was a consortium issue. Finally, the tram design was also being developed. These issues also impacted on the civils design.

In practice, the Preferred Bidder was declared in October 2007. There then followed many months of negotiation. That included major changes to the embedded track form, the depot layout, and OLE.

BBS were finally appointed around May 2008. It was a fairly open secret that PB (SDS) did not want to be novated and the Siemens part of the Consortium did not see what they could contribute.

Within a year it was obvious that relations were at best severely strained between BBS and their now designer SDS.

All of these issues could only have led to increases in the overall project cost and construction delays.

### **4 Utilities:**

Utility Diversions are often undertaken as an "enabling" contract. In this case some early contractor involvement would have helped. It would have been better if the service diversions were managed by the final construction contractor, if necessary as an advance contract.

Looking back, MUDFA seemed a very attractive suggestion. But the principle of moving everything within a generous envelope early and then it is done and out of the way was



severely compromised by the need to dig much of the road up a second time to install the tramway. In practice, if you do not have a clear design you either move too much, or too little, but certainly not what is required in the event either because it is physically in the way or in limited cases for an electro-magnetic compatibility (EMC)-related issue.

Utility companies generally have extremely poor knowledge of the exact location of their assets and must also meet the requirements of their relevant regulator. They also suffer from limited in-house engineering expertise.

The only sensible approach is to micro-manage each and every move, ideally with the buy-in of both the trackwork contractor and the M&EE supplier. Enabling contracts should, of course, be used where the end result is clear but the two key areas where MUDFA came unstuck were in the street drainage design and the discovery of redundant apparatus still in the ground; not an issue to the utility but a major problem if it is uncovered during construction work.

The real problem with MUDFA was that getting all the works completed before main contractor award became essential to obtaining a fixed price. That heavily influenced the quality of the work and in the event proved to be disastrous for timing and cost of the overall project.

The separate MUDFA agreement was a major error and the utility investigations caused delays and resulted in trenching beneath 400mm with examples of inspection pits being dug, filled and then opened up again. The Inquiry will note that the depth that the Office of Rail & Road recommends for diversion of utilities in tramway construction is 400mm. The delays and obfuscation of utility providers meant that sub-contractors who had been mobilised by Bilfinger in the construction phase, having been assured the MUDFA was on schedule, had to be paid as they were ready to march into their sites. Thus their planned programme of works had been compromised. This meant patchy construction works were undertaken and the street disruption in term of unfinished works increased. The utility works should have been better-coordinated with the overall construction programme.

## **5 Infrastructure:**

After the Infrastructure Contract was placed there was a major change to TIE personnel. This destroyed any continuity. TIE then saw itself as in charge of construction management rather than technical specification. Observing the progress of the project, we believe the control format allowed relationships and the practical resolution of issues of all descriptions to deteriorate to situations where construction work essentially stopped reconciliation until T&T became the new CEC Project Manager.

The infraco contract became a cumbersome risk-prone document due to its separation from the MUDFA contract, with the speed of construction constrained by the extended lines of communication between TIE and the utility contractors and the other companies involved. This was further frustrated by incomplete design works, which significantly hindered progress. The contract therefore became any easy source for establishing a route for argument and litigation.



## **6 Tram vehicles:**

The tram contract ran very well and the vehicles were essentially built before the infrastructure contract reached the stand-off position and the foreshortened solution budget.

The number of trams should be seen as an investment and commitment by the Council to complete the original scheme. The CAF vehicles were completed on time and on budget. The agreements surrounding the maintenance contracts for the vehicles also appear to be working well.

The Siemens part of the BBS consortium were responsible for the systems integration, which worked very well as the present tramway operations demonstrate.

## **7 Management:**

The arrangement of separate contracts meant that managing them was similar to keeping a series of spinning plates up in the air running at different speeds. It is hard to understand why a conventional NEC D&B type contract probably with a target price was not chosen.

In our opinion it is better to hand a contractor an outline design with the output requirements embedded therein and let the contractor undertake the detailed design. If you novate a full design to the contractor they will just spend more time changing it to suit their methods and equipment. Best to do it only once. However, it does mean controlling or even restricting the individual CEC departments as the design moves from outline to detail. That has been an issue elsewhere earlier (Nottingham Stage 1) and was certainly a major issue for SDS (at one stage there was a CEC spreadsheet with a 1000+ "non-compliance" issues on SDS design). It is a mentality issue and there is no easy solution, although observing from the outside Manchester latterly seem to have managed it.

The contracting structure would need to be collaborative and resilient to variations encountered on the ground, hence the suggestion of the NEC format. With a range of different contracts in operation and disputes arising it would be virtually impossible to keep abreast of cost estimates and monitor progress singularly in contracts and overall in general progress.

The SDS contract placed by TIE should have produced a civil engineering design, which could have been accurately priced and then completed at the detail level post infrastructure contract. It should also have produced sufficient detail to allow a competent M&EE supplier to install their particular equipment (which is in fact what the SDS contract said originally). In observing the practice, the civil engineering was behind and the M&EE possibly too detailed or specific. SDS expected to be fully paid for all changes and wished responsibility transferred to those requesting the change. That in itself was a major source of disputes and delay. For example, SDS did all their original design work on the basis of a 40m long tram which was one element of a "reference tram". This was on instruction from TIE as obviously they had to make some initial assumptions. Along comes the successful CAF tram at 42.3m and a different DKE. SDS immediately called foul. There was a significant argument as to the extent to which the reference tram was definitive or a guide. SDS wanted a six-figure sum to review and alter all their existing design. The same then happened when full catenary was installed off-street thus changing and reducing pole



positions and eliminating ducting, etc. Neither were ever redone properly the worst being that the platforms are not really long enough. Again this will always be the case to some extent, if for no other reason than to future proof the design has to be flexible.

It would appear that the fact that the project costs were in trouble was known and properly reported to TIE well before it became public, and post-reconciliation T&T were then appointed but there is little doubt that it was Siemens' specialist resources and project management skills that delivered the project.

## **8 Local governance:**

The Council had set up a cumbersome, over-complicated monitoring programme. The tortuous amount of monitoring reporting meant nobody cut across disputes to resolve them quickly. The addition of local politics into the decision-making surrounding reports etc., on monitoring did not help. This programme meant that there were delays in reporting back each crisis and dispute and consequently delays in reaching solutions.

There is little doubt that CEC lacked competence in the preparation of complex contracts (and their ongoing management) for a major tram project and it should have sought more advice on the subject rather than leave TIE to buy in the necessary expertise which, in terms of procurement they did at considerable expense.

In our opinion, it would have been sensible to have Transport Scotland take charge of the project from the start, closely involving CEC in the decision-making and subsequent monitoring processes.

The review process did include some oversight from Audit Scotland but it appears that Transport Scotland was initially involved and then disappeared. This was, no doubt, a result of the changing political situation. Such a "hands off" approach by the Scottish Government was fundamentally unhelpful and will have contributed to all aspects of the problems with the project.

## **9 National governance:**

Transport Scotland has proved to be a good organisation for sponsoring transport projects. The question was whether this was a Scottish Project or an Edinburgh Project. The decision by the Scottish Government to encourage Transport Scotland to take a less pro-active role in the management of the project was a serious mistake, but the continuing presence of a Transport Scotland official in the monitoring oversight also confused many as it implied that Transport Scotland was still involved.

The Project was treated by Transport Scotland as a "hands-off" local issue on the instructions of the then Transport Minister and the posturing of the SNP at both national and local levels immensely damaged the credibility of the project. When the SNP minority government took over in 2007, a vote in parliament resulted in a majority in favour of proceeding with the tram project but the new Finance Minister stated "not a penny more" than the £500 million to which the cost had already risen. It was at this point that Transport Scotland's involvement in the Tram project was reduced and, in essence, withdrawn.

The City of Edinburgh Council elections then resulted in Labour being replaced by a



LibDem/SNP coalition. The council's representation on the TIE board was a series of LibDem councillors and the SNP abstained on all tram-related votes, the three other parties having pushed for them. At the next council election a Labour/SNP coalition took power, and in due course Sue Bruce became Chief Executive. The council began to work very well together, as both parties in power had generally the same agenda. The government became less hostile when [REDACTED] replaced [REDACTED] as Transport Minister though the "not a penny more" mantra was still in place.

The way in which [REDACTED], as CEC Transport Convenor, and [REDACTED] worked together to ensure delivery of the project - albeit significantly over budget and very late - is to be commended but, in principle, the approach of most politicians to the re-introduction of trams in Edinburgh was entirely unprofessional and caused considerable damage to the city's credibility.

## **10 Costs:**

The way the contracts had been structured meant that the costs contained large elements of priced risk as incomplete packages were handed to others who then put their design perspective on them. National construction costs had become inflated before and during the year long dispute and continued to rise once work resumed, having a significant influence on overall costs. As the project marked time while the dispute was being resolved, costs continued to rise due to contractors having to be paid as a result of the construction programme failing to meet the mobilisation dates they had planned to start works.

There may have been misplaced faith in the power of fixed-price contracts. The construction got bogged down in disputes between the contractor and TIE, which ended up in court cases which went, in the main, in favour of the contractor.

Fixed price is hard to implement when there really are unforeseen elements that genuinely change the contractor's (and client's) cost assumptions. That appears to have been the case here. Underestimating the risks and lacking certainty in terms of utility relocation costs, etc., in any major construction programme can lead to false confidence in the initial robustness of the contract.

Once things start to go wrong, the contract manager has a difficult decision. Take an aggressive stance with the contractor, and hope this will drive better performance? Or approach matters in more of a partnership manner? Here, it appears that the aggressive approach was taken but, in the end, it didn't pay off.

Audit Scotland produced an interim report in 2010 and identified – amongst many other issues – that the contract management organisation (TIE) was having problems retaining staff with the necessary skills and experience. That was clearly a problem and a warning sign for any major programme.

## **11 Consequences:**

Public relations were less than optimal during the construction phase. While on the continent new tramway construction is accompanied by discussion of how bus routes will be altered to become feeders to new tramlines, Edinburgh citizens were left in the dark about any changes - mainly because there were not really any useful plans. The present number of bus services on Princes Street seriously impinges upon the regulation of the tram service.



There are at present no plans to change that.

The conclusion among the citizens was that the trams were just to run a parallel or replacement service for a bus route, such as a "very expensive route 22". There was thus no positive feeling generated for a project seen only in the context of the disruption it caused in the city centre. In fact, the whole management, cost, disruption, lack of perceived benefit, the "good" bus service, and general white elephant status portrayed by the media, resulted in very few citizens being prepared to even contemplate anything positive about the trams.

It is our view that both tram and bus patronage would probably have increased significantly more than it has if there had been a more co-ordinated approach to integration of the tramway in the city's overall public transport provision. That said, we very much welcome the creation of a single organisation, Transport for Edinburgh, to run a multi-modal transport system and this is a good move towards integrated public transport for the city region.

## **12: Alternatives:**

The table setting out the issues for the Inquiry suggests these are mainly concerned with financial and legal matters and there is no doubt that most of the setbacks, cost and time overruns of the project have been due to contractual and legal problems. It is, however, the view of the Light Rail Transit Association that any evaluation of such an important infrastructure project must go well beyond the narrow financial and cost-benefit issues, especially as the EU has for some years now been very actively pursuing a policy of countering air pollution, and it is now widely understood that the general economy suffers severely through traffic congestion. In addition, there are serious contributory issues to public health through pollution reduction; hence cost reductions for the NHS come into play when trams are introduced. Quality of life and cost of living are impacted by traffic congestion too, increasing still further the importance of sustainable, environment-friendly public transport for our cities.

In terms of the contractual arrangements, we would make the following observations:-

1: There are many up to date technologies available and it should be for the contractor to determine how the ground investigation and utility identification should be carried out. The menace is redundant equipment which nobody will recognise or take responsibility for.

2: That, and more, was done by MUDFA but the problem was then using the information effectively and within regulatory constraints such as the ORR and the physical concerns of EMC. In practice it is not a black art but is bedevilled by scaremongering from those who should know better (or worse stand to benefit from the resulting anxiety). Again, Siemens handled it very well but in the process almost ended up fighting everybody. It is also worth adding that one of the restraints of MUDFA was existing arrangements by individual utilities for repairs and renewals. These had to be accommodated in the works to varying extents depending on the contractual arrangements.



3: The contractor should be competent, and that would include experience in constructing tram tracks. The track form supplied and construction by the Siemens part of the consortium was very effective. Indeed, we would suggest that the CAF and Siemens parts of the consortium operated very well. They employed a fully competent continental contractor laying proven continental track systems. TSS supported that with top UK expertise. The proof is in the quality of the ride and that there are no issues with wheel-rail interface. Difficulties arose with the support system which followed UK practice of liberally reinforced concrete. Had Siemens been responsible for the complete system we think that more attention would have been given to site preparation with less concrete. In the UK there is a tendency to pour too much concrete in track foundations - probably because no party is willing to take responsibility for it not being there!

4: Suitable contracts based on the NEC suite that address risk allocation and incentives should be used, and the utilities diversion or removal from the tramway path should follow the advice on construction of tramways by the ORR (now given by UKTram). The successful contractor should have total control in moving utilities in the tramway path. The utility movements should be undertaken in a progressive manner. Similarly, track construction should be undertaken in a progressive rolling programme. This was substantially hindered by traffic management orders imposed by CEC and by working hours restrictions. Construction working should be programmed to ameliorate the problems of traffic and residential/shop disruption to an agreed "Considerate Contractor's Scheme". The major disbenefits of the tramway to residents and businesses were the long periods of inactivity, indiscriminate utility pits being dug and then left for periods of time by a range of sub-contractors (only in some cases to be re-dug later!).

5: Transport Scotland could have been an integral part of a simplified reporting committee, giving regular updates to the Council and the Transport Minister. The reporting framework should be kept as simple as possible and involve those who are directly responsible for day-to-day progress. Transport Scotland have a reputation of successful management of rail and road projects.

6: A series of Scottish Government Gateway reviews (OGC/MPA style) should have been undertaken for an investment of this value and risk. The experience with these reviews elsewhere has shown how they can highlight problems and make pertinent recommendations to assist in the project delivery.

In summary, there were many aspects of the project which could and should have been handled better. Our over-riding concern, however, is the extent to which both national and local politics were a hindrance to the development, governance and eventual construction of the tramway and there must be a range of important lessons for the future to be learnt from the Inquiry's review of that aspect.

There can be no doubt that modern trams contribute substantially to urban areas - better connectivity, improved environment, lower car use, reduced congestion and enhanced accessibility for older, disabled and encumbered passengers, and they encourage inward investment leading to more jobs and a vibrant local economy. Edinburgh needed trams and other Scottish cities do too.