

Edinburgh Tram (Line Two) Committee

Response to letter of 26 October in relation to the review of the Preliminary Financial Case by ArupScotland

EXECUTIVE SUMMARY

- 1 **tie** welcomes the opportunity to respond to the detailed matters set out in Arup's report on the Line 2 Preliminary Financial Case ("PFC"). This executive summary provides an overview of tie's response on the matters where clarification was requested by Arup. Each of the sections in the report provides a brief digest of the main points, followed by more detailed technical material.
- 2 We are pleased to note Arup's conclusion that the Preliminary Financial Case is reasonable and robust for a project at this stage of procurement. The following extracts from the Executive Summary of the Arup report also provide a useful flavour of the standing of the PFC :
 - i) "The process leading up to key decisions which have been taken to date, are clearly set out and reasonable alternatives have been considered and assessed."
 - ii) "Relevant guidance for assessing projects, including Green Book, has been considered and applied."
 - iii) "The risk analysis and risk management appears to be well developed"
 - iv) Although the overall estimate of both the capital and operating costs would appear to have been correctly prepared and applied we consider that further clarification is required on a number of points" [the clarifications are provided in this response].
 - v) "On the whole the overall modelling framework appears sound"
- 3 **tie** recognises that the application of a robust approach to developing the PFC does not of itself resolve the challenges faced in delivering a complex and long-term project such as this. However, **tie** believes we are moving forward from a solid platform.
- 4 A summary of **tie**'s response to issues raised in the principal areas addressed in the Arup report is set out below.

Risk of under-estimation of capital costs

- 5 **tie** notes that Arup have concluded that "the overall estimate of the capital cost seems to have been rigorously and thoroughly prepared using a database of costs and comparison to other UK Light Rail Schemes, and is a sound basis for the build-up of capital cost".

- 6 The report does however suggest that an additional contingency should be applied. **tie** does not agree with the basis for increasing the contingency element in these estimates. Firstly, the cost base used by **tie** already reflects a significant contingency. In addition, **tie** has allowed fully for lifecycle refurbishment costs in assessing net cash flow surpluses, although Arup may not have been aware of the treatment of this. Finally, the additional contingency applied in the report to reflect revenue risk transfer does not apply because this risk is not being transferred.
- 7 It is also relevant to point out that certain newspaper reports of a “£220m funding shortfall”, allegedly arising from the Arup report, reflects the full amount of the additional contingency which **tie** does not believe is required for the reasons set out above. The sum quoted of £220m also double-counts over £50m of cost attaching to the section of tram route which will be shared by both lines 1 and 2. When these factors are excluded, the figures previously reported by **tie** remain the best estimate of the likely future costs and there is no additional “£220m shortfall”.
- 8 Finally, it is very important to recall that the final capital costs will be determined only after a competitive market tender. In the event that bids were unacceptably large compared to the current estimates, there is no commitment by the Council or the Scottish Executive to proceed with the project. The contract structure will prevent any open-ended commitment of funding, as has been a problem on other public projects such as the Holyrood building.

Risk of over-estimation of tram farebox revenue

- 9 We agree with Arup’s view that this area has been a major problem on other UK tram schemes. There is inherent uncertainty in forecasting up to 30 years ahead on any project, but **tie** has done a number of things to mitigate these risks. **tie** has engaged modelling and transport demand experts to develop the demand models. The model used by **tie**’s advisors has been confirmed by Arup as sound. The model used has evolved over a long period of time, with constant validation and refreshment of the information database.
- 10 Accordingly, although some source information was established some time ago, the level of updating means this is regarded as up to date and fully fit for purpose. The process of refreshing the data will continue as the business case is developed. **tie** has also sought to learn from the estimation errors encountered in other schemes and avoid a repetition.
- 11 The relatively high demand and growth rates demonstrated by the Edinburgh model relates to a number of factors, including the relatively high public transport usage already demonstrated in the Edinburgh area, the expected growth in the patronage to major locations on Line 2 such as the airport, Royal Bank of Scotland site, Edinburgh Park and (in relation to Line 1) the North Edinburgh waterfront area which is one of the largest urban development sites in Scotland.

- 12 We also agree fully with the importance which the report attaches to bus service integration, without which there is a considerable risk to the tram revenues as has been demonstrated in other UK schemes. For this reason, tie has developed an innovative structure to bring together the transport operators and to seek a comprehensive approach to integration, for the benefit of travellers using all modes in Edinburgh and South East Scotland. This work is at an early stage but is one of the critical workstreams over the months and years ahead.

Risk of a funding shortfall

- 13 The PFC sets out the avenues being followed by tie and the Council to support the funding of the project. It is not possible to quantify most of these at this early stage in a definitive way but the opportunities include :

Property Development : Council Owned land development, Developer Contributions, Specific Large Scale Development and small scale (tram stop and interchange) development.

Commercial Income : Advertising and other additional revenues from the tram business.

- 14 More details are provided in the PFC and quantification will be established in mid-2005 when an Outline Business Case will be submitted in support of the tram procurement process.

Risk that PFI may be too prudently assessed

- 15 tie considers its approach on the modelling of the PFI and Hybrid to be appropriate at this point in the project. It should be stressed that at this stage, tie has not carried out a Value for Money Assessment of the alternative funding options. This would involve a number of adjustments to the models to reflect the risk premium and risk transfer costs and this will be addressed as part of the Outline Business Case.

Conclusions

- 16 tie has noted the positive comments made in the Arups report about the robustness of the Preliminary Financial Case and has taken careful note of the specific areas of concern highlighted. There is no complacency on tie's part about the key areas – tie recognises fully the need to ensure that the capital costs are monitored and presented fairly as the more detailed design stages of the project develop. In financial terms, the risk of capital cost overrun is mitigated by the fact that no commitment will be made to construction until robust contractual arrangements are in place and the affordability of the project is agreed. The specific points on revenue forecasting have been addressed in this report and work will continue on refining these forecasts, in particular to develop the beneficial effect of bus and tram service integration.

DETAILED RESPONSE

- 1 The following areas are addressed in the order presented in the Arups Report for ease of cross-reference :
 - **Patronage and Revenue Model Development**
 - **Overview of Passenger and Revenue Forecasts**
 - **Economic evaluation**
 - **Sensitivity testing**
 - **Operating and capital costs**
 - **Financial modelling and funding mechanisms**
 - **Risk analysis**

- 2 **Patronage and Revenue Model Development**
 - The model is highly complex but has been refreshed regularly with the latest and best available data and has been regularly validated by independent consultants to confirm robustness

- 3 The City of Edinburgh Land Use Transport Interaction Model (LUTI) was developed using procedures that conform to current best practice and conforms to guidance set out in the Highway Agency's Design Manual for Roads and Bridges (DMRB).

- 4 The hierarchical model consists of 3 components: a land use model (DELTA); a traffic restraint analysis model (TRAM); and a detailed assignment , model (DAM). Each model consists of a number of sub-models which were calibrated and validated prior to the entire model being serially validated.

- 5 The initial model development was based on the validated and calibrated 2001 Central Scotland Transport Model 3 (current version is CSTM3A) which has been regularly updated and audited by consultants, on behalf of the Scottish Executive. The CSTM model was originally developed on the basis of an extensive dataset that included data that was up to 15 years old. However, the model has subsequently been rebased and revalidated using more recent data on a number of occasions, leading to improved levels of detail, disaggregation and geographical area.

- 6 The functionality of the LUTI model is significantly greater than that of the CSTM model in order to forecast factors influencing mode choice and trip making within Edinburgh. The model is highly segmented to enable the detailed simulation of changes in travel demand in response to network and service changes, changes in the price and supply of car parking, congestion charging etc.

- 7 The LUTI (TRAM and DELTA) model was calibrated and validated to 2001 by MVA and David Simmonds Consultancy. It was based on new survey data (traffic, public transport and household) as well as the most up-to-date information available elsewhere, including Scottish Household survey data

base, traffic and public transport survey data, inner and outer cordon and screenline crossing data, etc. The 2001 census was not used as the information was not available at the time of the development of the model. At the strategic level, the model forecasts have been controlled by economic factors, car ownership and planning data (all within the DELTA model). The forecasts were audited in 2002 by independent consultants against the Highways Agency national databases and forecasts (such as NTEM and TEMPRO) and the model deemed satisfactory.

- 8 A more recent review of the model undertaken by Professor Roger Vickerman in 2003 concluded that the model development had followed current practise and may provided slightly conservative forecasts in some areas.
- 9 Local planning data based on approved Local Structure Plans have also been taken into account within the LUTI model. The location of the development within designated areas is controlled by changes within the model forecasts. For Line 2 major mixed use developments and infrastructure improvements are planned, amongst other areas, at Edinburgh Airport and RBoS. The model adjusts the forecast level of development take-up until the forecast changes in accessibility have been optimised against competing levels of development.
- 10 Model noise is associated with variations within the iterative model assignment routine, forecasting small changes that are unlikely to exist in reality. In some cases these variations can be greater than the variations arising due to the impact of the scheme. Model noise can relate to specific locations or general instability within the model. A number of modelling techniques exist for minimising the residual model noise to enable variations in the model assignments to be attributed to the scheme interventions:
 - It is important that the overall level of the model convergence is good and that the level of change in the assignment of trips between iterations is low. This minimises the tendency for routing in the model to oscillate between model iterations due to imperceptible changes in cost.
 - Sensitivity tests can be used to ensure that the model responds in a realistic manner to changes within the network.
 - The area of the network simulated within the model should be minimised, so that it covers only the area likely to be affected by the impacts of the scheme, plus sufficient 'buffer area' for trips to assign through the network realistically and respond to changes in travel conditions.
- 11 It should be noted that the effects of tram are sometimes broader than might initially be expected. This is because the LUTI model includes land use change effects, so allows for relocation of residents and employment from areas not served by tram. These in turn have secondary impacts on local traffic levels and congestion. Filtering out all but changes close to the tram

line was considered, but this was felt to ignore legitimate impacts away from the main corridor. Therefore, changes on trips wholly external to Edinburgh and Newbridge were excluded, but otherwise the overall impact on the city was included in the assessment. It is true that the forecasts for some individual highway links or individual Origin Destination pairs will be less accurate than others. But the overall assessment of economic benefits, accidents, and environmental impacts have been collated from the overall model. So any noise will be insignificant in relation to the overall totals.

- 12 The LUTI model is based on the Central Scotland Transport Model (CSTM) that was developed and audited by consultants on behalf of the Scottish Executive in 2001. The LUTI model development report that describes the full development of the model including the model calibration and validation data is available for reference.
- 13 The second tier within the City of Edinburgh hierarchical modelling suite, the Detailed Assignment Models (DAM) for the highway and public transport networks, were also based on the CSTM model. The wide area CSTM DAM models were restricted to the area of study and immediate surrounding area, encompassing Edinburgh, Fife and Lothian. The model was based on 1997 calibration and validation that was updated to 2001. In 2003 the local area model was re-validated along the tramline corridor on the basis of a series of traffic surveys. This indicated that the model was under forecasting observed flows by 10% and the model forecasts were adjusted accordingly.
- 14 **Overview of Passenger and Revenue for Forecasts**
 - Growth in tram patronage is driven by a model in which the assumptions have been scrutinised in detail
 - The overall shape of the projections is consistent with known or reasonably predictable economic factors
 - Tie recognises critical importance of revenue forecasting and continues to devote considerable effort toward assessing the projections
 - Bus and tram service integration is recognised as critical and this will be a main workstream as the business case is further developed
 - The forecast demand for Line 2 in relation to Airport, Ingliston Park & Ride and Royal Bank of Scotland is robust.
 - Impact of Edinburgh Airport Rail Link (EARL) has been examined and understood. Assuming a premium fare regime is adopted for EARL, the impact on Line 2 would not be particularly dramatic given the quality of the tram offer and its different route and stop configuration.
- 15 The growth in patronage using Line 2 from the airport was identified within the Arup report as appearing low when compared with the airport growth factors. The growth in patronage is mainly related to the type of development within each of the locations discussed below:

Airport

Between 2011 and 2026, the LUTI/DAM model is predicting 27% growth in trips to and from the airport, but only 6% growth in public transport. This compares with a 20% growth in total trips across the model, and only 5% growth in public transport trips. The relatively low growth in Public Transport (PT) trips will be driven by increasing car ownership.

Much of the forecast airport growth is due to expansion of the airport to serve Scotland as a whole, leading to a substantial proportion of the growth in trips occurring from areas external to Edinburgh and not served by tram. This is particularly relevant to the impact of the airport rail link project.

Royal Bank of Scotland (RBoS) Growth

This is a major development on the West side of the City which could generate up to 80,000 tram trips annually dependent upon the Green Travel Plan. The model assumes a prudent estimate of this demand.

Edinburgh Park

There has been significant growth in employment in Edinburgh Park in recent years and there will be significant growth to 2011. The model is showing 46% growth between 2011 and 2026 in annual boardings and alightings at the three tram stops in the vicinity of Edinburgh Park, namely: The Gyle; Edinburgh Park and Edinburgh Park Station.

- 16 The proposed heavy rail link to Edinburgh Airport is being developed. This would provide direct links from the Airport to a range of destinations on the Scottish railway network. Line 2 is primarily designed to cater for trips in the West Edinburgh corridor, including park and ride trips from the West, while EARL has a regional and national role. They would be largely complementary, with Line 2 providing a feeder/distributor service to heavy rail stations at Haymarket, Edinburgh Park and the airport as well as catering for other corridor trips.
- 17 Both EARL and tram would provide links to Haymarket and Waverley and some EARL services would also stop at Edinburgh Park. There would therefore be some overlap in the market for the two services. EARL will have a journey time advantage to key locations in the City Centre and thus relative fares will be a key factor in choice between the two services.
- 18 EARL's pricing strategy has not yet been decided, but the fare may be set at a premium to reflect the faster journey time that would be offered. For the purpose of sensitivity testing two fare regimes have been modelled.

- 19 The first assumes that EARL charges the same fare as bus and tram, i.e. £2.50 for trips to the city. This is still a premium fare compared to standard rail and bus fares. The second scenario assumes a premium fare of £7.50.
- 20 In the base fare scenario, Line 2 revenues are reduced by 24% in 2011 with that reduction falling to 14% in 2026. In the premium fare scenario, Line 2 revenues are reduced by 9% in 2011 with that reduction falling to 3% in 2026.
- 21 Work remains to be done on the EARL scheme to assess the capacity of the rail services to accommodate these new trips, what premium fare is required and how much revenue contribution is required in the economic evaluation. However, this assessment suggests that even with a modest premium fare, the remaining tram patronage would generate sufficient revenue to cover the operating costs.
- 22 Addition of Line 1 or deferral of the Newbridge spur would improve the economic and financial case. Other sensitivity tests examining the impact of alternative service levels and fares parity with buses have demonstrated that the economic case is robust.
- 23 This assessment excludes the potential for transfers between Line 2 and EARL at the airport. This would improve accessibility between the regional and national rail network and the job opportunities along the Line 2 corridor.
- 24 Even in the event of both EARL and congestion charging, an EARL fare regime can be envisaged where Line 2 remains a viable and an attractive addition to the City's public transport system.
- 24 The 'Generated Trips' quoted to Arup is an estimate of what proportion of tram trips are trips that would not be made by PT or car in the non-tram scenario. The model predicts the patterns of travel that would exist with the tram and in a Do Minimum scenario without it. As the model predicts a complex series of impacts resulting from land use changes, resident migration, trip rate changes, redistribution of trips and car/PT mode split, it is only possible to provide an estimate of the transfer from car and bus. The model is forecasting generated trips for bus, heavy rail and car, as well as tram.
- 26 The LUTI model predicts a more comprehensive set of travel changes than is usually the case. Where only change of mode is modelled an external estimate of generated trips needs to be made. The 15% figure quoted by Arup is a common, deliberately conservative, rule of thumb. However larger changes have been observed in a number of other transport projects.
- 27 It is relevant to note that the proportion of generated trips is higher in 2026 than 2011. This is what would be expected as longer term impacts on land use and trip patterns take effect.

- 28 The main impact of the introduction of tram in 2011 is to take a proportion of existing car and public transport trips. Hence the loss of bus trips in 2011. In the following model years, improved PT accessibility leads to economic generative effects in the land use part of the LUTI model which generates additional trips, not all of which are in the tram corridor. In the peaks, tram has a major advantage over bus speeds, but less so in the off peak. The result is that bus loses trips to tram in the peaks, but is a net gainer in the off peak. Note that some of the trips generated in the tram scenario will use a combined tram and bus journey. Bus and tram do not always act in competition.
- 29 The level of demand reflects the nature of the development and demand along the tram line corridor. The Airport and Ingliston Park & Ride are two significant trip generators. It should be noted that these generators are each served by only one stop, while Edinburgh Park demand is split between 3 stops (The Gyle, Edinburgh Park and Edinburgh Park station). However, we accept that the estimates of demand from Edinburgh Park may be conservative.
- 30 The Arups Report raised concerns about the forecast patterns of loadings and these are now addressed below:

i. Concern about level of Park and Ride usage.

None of the well-established UK light rail systems have a major park and ride site serving the major access to a city from the motorway network. The nearest equivalents are Nottingham, which has only recently opened, and the Eccles Line Of Manchester Metrolink, which is slow compared to the competing motorway/dual carriageway link to the city centre. It is therefore not surprising that Tram Line 2 attracts a high proportion of usage from Ingliston P&R.

It should be noted that car trips from all the other principal population centres in Scotland to Edinburgh would pass close to the site.

Tram usage from Ingliston Park & Ride is constrained by the 1000 space capacity of the site, and unconstrained demand for parking spaces is predicted to exceed these levels. If this proves to be the case in practice, there are opportunities to increase the number of spaces on the site.

ii. Definition of “M8 External” Zone and potential over-estimate of Usage

The zone referred to as M8 External West of Whitburn represents all highway trips on the M8 where it enters the modelled area. The boundary of the model at this point is in near Whitburn. Most of these trips will ultimately be to or from Glasgow conurbation.

While it has been noted that the model may have over estimated P&R trips via the airport, it was also pointed out that any spare parking capacity currently used by this estimate would become free for park and ride trips from other locations.

iii. Possible Competition from other P and R Sites

The only park and ride sites assumed on the A8 corridor is at Ingliston, which is consistent with the City's plans.

Other park and ride sites are included in the model and the forecasts take account of their impact on the tram scheme.

- 31 The Arup report sought clarification on the application of a crowding function. Such a function is used in LUTI to limit over-crowding on bus, rail and tram and therefore the PT and highway demand matrices take account of crowding. The detailed PT assignment model does not use a crowding function. Therefore the influence of crowding on the PT sub-mode split is not modelled. How the bus, train and tram operators will respond to crowding is open to question. More frequent services or, in the case of rail, more carriages would not only meet this demand but also improve the service provided. However, the operators will off-set the advantages of a better service and increased demand against the cost of operating more vehicles. In the case of bus, more bus vehicles may increase congestion.
- 32 A neutral position was taken in the modelling, neither penalising the attractiveness of travel due to crowding nor increasing attractiveness of travel due to more frequent services.
- 33 There are 3 reasons why the average fare on tram Line 2 is higher than on other systems in the UK:
1. Firstly, the average trip length on Edinburgh Tram Line 2 is relatively long and this leads to relatively high fares because these are related to trip distance. It is interesting to note that the average fare per kilometre on existing systems ranges from 9p/kilometre to 24p/kilometre. The fare yield for Tram Line 2 would be 15p/kilometre.
 2. Secondly, it is proposed to charge a premium fare for most trips, set at 33% above the equivalent bus fares. This reflects the higher quality offered by the tram.
 3. Thirdly, an additional premium would be charged for trips to and from the airport. The fare for airport trips has been set at £2.50. This is the same fare as charged on the existing, well-used, Airlink bus service. The success of Airlink shows that airport users are prepared to pay fares at this level.

34 **Economic Evaluation**

- The economic evaluation for Line 2 is sound, and the impact of EARL reduces but does not negate the economic or financial case.
 - There is room for optimising the trams per hour to improve the base case.
- 35 Asymmetric public transport benefits are forecast for some movements and these are driven by highway speeds which govern bus speeds. There are some significant directional changes in speeds and junction delays within the model that give rise to asymmetrical benefits between sectors. These can have much larger impact on buses than highway, because the bus routes are constrained to follow their routes regardless of localised delays.
- 36 The highway benefits for sector 10 are greatest in the non-peak direction. This is because there are some congestion problems near the centre of the city in the peak direction which counteract the overall benefits of tram. The AM peak benefits are roughly balanced by the transpose of the PM peak benefits.
- 37 The main asymmetry is in the off peak. The largest imbalance in off peak trips to and from sector 10 is in the movement between Sector 10 and Sector 1. There are more highway trips and greater congestion, so that there are disbenefits and the disbenefits are asymmetric. There are limited routes between these sectors and a lot of trips are funnelled through Haymarket. The change in delays at the junctions in this area are not symmetrical.
- 38 Asymmetry tends to occur at junctions or a corridor of junctions, where capacity is restricted on a particular arm due to space restraints. Asymmetry also occurs where there are significant turning movement. In one direction this will be a right turn, generally across opposing traffic while in the other direction it will be an unopposed left turn. Therefore where there is significant differences in delays or available spare capacity by direction. A uniform change in demand in the two directions will often lead to a very different result in terms of change in junction delays.
- 39 While the effect is most pronounced at junctions, there are also limits on link capacity. With some roads having two lanes in one direction and a single lane in the other, these also can have asymmetry in terms of spare capacity and in the size of impact of a change in traffic flows.
- 40 The benefits from sector 9 and 10 are very similar in the AM peak. The benefits from sector 10 are much higher than from sector 9, in the PM peak as might be expected. However, in the off peak, there are positive benefits from sector 9. This is largely due to fewer highway trips as trips have redistributed to the Line 2 corridor. As noted above, there are negative benefits from sector 10, due in part to this redistribution.

41 The Arup report mentions that there a potentially more attractive tram frequency than the base case of 6, ideally, the best possible case would have been presented for Line 2 in STAG. However, time constraints dictated that the scheme design was frozen, so that consistent assumptions could be used for costing, revenue, patronage, environmental assessment, economic assessment.

42 When the design freeze was imposed, it was not clear that the cost of more frequent trams, in terms of capital costs and operating costs would be fully off set by increased revenue. It only became apparent in more detail sensitivity tests that this improvement would pay for itself. At this point, it was too late to redefine the base case and the tram frequency was 6 rather than 8..

43 In practice the benefits of greater frequency are positive and lead to: more attractive tram service; more tram passengers; increased tram revenue; and more diversion from car. The key downside is higher costs, but these are more than off set by higher revenue. Therefore, we believe the case put for tram is a conservative one and that a more positive case could be put. To do this would require revisiting the costs, the environmental assessment and the economic assessment.

44 **Operating and Capital Costs**

- There are good justifications for the inclusion or exclusion of certain costs in the capital cost base questioned by Arups and **tie** believes its approach is justified.
- Tie does not agree that additional contingency – both related to the HM Treasury Optimism Bias concept and to more general factors – is justified over and above the contingencies already reflected

45 Arups suggest that additional sums should be included in capital costs to cover Renewals and Revenue Risk Premium. For the reasons set out below, tie believes its costs are already fairly stated :

- i) **Renewals** - this cost is fully provided for in the modelling based on the assessment of the technical advisors.
- ii) **Revenue Risk Premium** - the revenue forecasts have been rigorously assessed and benchmarked to provide confidence that they are deliverable. Additionally the early involvement of Transdev will further improve the accuracy of these estimates. The independent setting of revenue targets and the joint delivery of the target revenue and gain/pain share should ensure that there are proper incentives to maximise revenue in the context of an integrated service environment with appropriate risk transfer. More fundamentally, the revenue risk is not being passed to the private sector construction consortium under the contract structure being planned by tie. Accordingly, the revenue risk is unlikely to affect capital cost.

- 46 It was also highlighted that no specific mention was made of enhanced paving costs. **tie** can confirm that the cost of complying with the Council's aesthetic requirements as detailed in the design manual has been allowed for within the tram costing's for the track and related infrastructure including stops.
- 47 Arup requested information as to why an additional £400k was included in the PFI and Hybrid modelling. The sum was included based on an estimated overhead cost associated with the special purpose company that would be set up to oversee the additional processing, reporting and administration activities that are likely to be required to oversee the PFI and Hybrid approaches.
- 48 The inclusion of such a cost reflects best practice, but the figure of £400k is by necessity an estimate at this stage.

49 **Financial Modelling and Funding Mechanisms**

- There is evidence that additional funding sources needed are deliverable.
 - The approach to financial modelling of PFI and Hybrid is conservative.
 - HM Treasury Guidance applied consistently.
- 50 The PFC sets out the avenues being followed by **tie** and the Council to support the funding of the project. It is not possible to quantify most of these at this early stage in a definitive way but the opportunities include :

Property Development : Council Owned land development, Developer Contributions, Specific Large Scale Development and small scale (tram stop and interchange) development.

Commercial Income : Advertising and other additional revenues from the tram business.

- 51 More details are provided in the PFC and quantification will be established in mid-2005 when an Outline Business Case will be submitted in support of the tram procurement process.
- 52 The work carried out to date highlights that there is good evidence that such sums are realistically deliverable based on the advice of relevant professional advisors and the experience of Transdev. As the project progresses **tie** will continue to address new opportunities as they arise.
- 53 **tie** considers its approach on the modelling of the PFI and Hybrid to be appropriate at this point in the project, as highlighted in the Arup report. It should be stressed that at this stage, **tie** has not carried out a Value for Money Assessment of the alternative funding options. This would involve a number of adjustments to the models to reflect the risk premium and risk transfer costs and this will be fully addressed as part of the Outline Business Case.

- 54 As part of the report Arup has re-run the cost estimates through an alternative model and arrived at a different answer. It is difficult to assess the alternative approach without substantial further discussions with Operis. The PFI approach that **tie** used in the PFC is a simple affordability and shadow bid model (Which has been tested against a more detailed model). The **tie** model does reflect current market assumptions with a degree of “buffer” to allow for fluctuations in rates. A more complex shadow bid model will be developed as part of the Outline Business Case should PFI or a Hybrid continue to be an option. This decision will be based on a full Value for Money assessment, to be carried out in conjunction with the Scottish Executive
- 55 The indexation approach used by Operis, full indexation, is a perfectly viable option and should have the effect suggested. However **tie** has opted for a more conservative assumption of 1% at this stage as it is more likely to arrive at a larger fixed element with a smaller indexation given the nature of the scheme and past funder issues. The scenario modelled reflects a market position which would be sustainable and deliverable.
- 56 The Minister stated when announcing the grant award in March 2003 that the award was intended to secure at least the Line 1 route, dependent upon a robust final business case being prepared. A decision on the commitment of funding will not be made until mid 2006, based on the present programme, by which time the affordability of a network comprising Lines 1 and 2 will have been thoroughly assessed. **tie** would anticipate that Ministers will take into account all aspects of the proposed network in assessing the basis for financial commitment.
- 57 The report appeared to use the operating costs for Line 2 from the STAG, **tie** can confirm that the operating cost that are detailed in the PFC are correct and are contractually agreed as part of the recent DPOFA.
- 58 As part of the work to date the assessment of Line 2 has recognised that there are additional sensitivities that we have tested to ensure that there is a viable option in ‘Best case’ and ‘Worst case’ scenarios. Clearly the financial performance in these scenarios will be different but in both they are sustainable.
- 59 Finally Operis raised a minor issue on the 30 year point and the reduction of the rates from 3.5% to 3%. The guidance was, as pointed out by Arup, somewhat of a moving feast through the modelling process, however the Treasury guidance was applied in our view correctly. The step down to 3% happens at the start of the 31st year of operation, this has been applied from the start of the concession period.

60 **Risk Analysis**

- HM Treasury Guidance has been correctly applied as appropriate in the estimation of Optimism Bias within the economic analysis as required by the Scottish Executive.
- The current scope of the risk matrix is robust and has the potential to expand to cover additional areas.
- The **tie** approach to risk management is appropriate.
- **tie's** approach to risk prioritisation is effective.

61 In several areas **tie's** treatment of Optimism Bias was discussed, **tie** can confirm that they are fully aware of the recent report "Procedures for Dealing with Optimism Bias in Transport Planning", published in July 2004, reporting on studies by Bent Flyvbjerg in association with COWI on behalf of the Department for Transport.

62 **tie** and their advisor's recommend caution in adopting higher Optimism Bias values (as potentially inferred by the **Arup** study) as a matter of course and have considered Optimism Bias in association with the base costs.

63 **tie** have discussed the approach to estimation of Optimism Bias, including the recent Bent Flyvbjerg report, with the Scottish Executive and confirmed that HM Treasury guidance is to be applied.

64 The calculation of Optimism Bias is a necessary judgement based on an assessment of a number of a range of factors. On a large scale complex infrastructure project it has to be recognised that there are major risks associated with capital cost estimates. **tie** continue to follow best practice in assessing and monitoring all risks.

65 **tie** agree with **Arup's** suggestion that the risk register could be further 'disaggregated' and potentially extended to include wider funding and interface management risks. **tie** anticipated undertaking these further development during the next stages of project evolution and recognise that there will be a need for ongoing maintenance of the risk register. In development of **tie's** procurement strategy, risk has been a primary consideration including **tie's** and other abilities to manage interface risk.

66 **tie** have and will continue to examine emerging risks through the infrastructure procurement strategy in development for those risks retained, shared or transferred to the private sector. This will include review of the role of the System Integrator.

- 67 **tie** continue to develop the overall funding case for the scheme and will examine these issues as part of the developing Outline Business Case for the scheme.
- 68 In addition to emerging issues, **tie** and their advisors have accounted for lessons learnt and reported within the National Audit Office (NAO) report “**Improving public transport in England through light rail**”, published in April 2004. The Council and **tie**’s comments on this report can be found on the Parliamentary Bill website as follows:-
- <http://www.scottish.parliament.uk/business/committees/tram-two-bill/documents.htm>
- 69 **tie** has reviewed the Audit Scotland (AS) report “**Management of the Holyrood building project**” published in June 2004. This report highlighted a number of observations, features and lessons that are appropriate to all major capital schemes, in its key findings. **tie** has summarised the report observations and recommended lessons for **tie** and appended it to this response.
- 70 **tie** consider that appropriate scrutiny has been and will be given to the areas suggested by **Arup** during the ongoing development of the scheme. Inputs to the risk register have been provided by **tie**’s advisors including Transdev and will be extended and further disaggregated as further development takes place. In the meantime, **tie** is continuing to develop the funding case for the scheme.
- 71 **tie**’s advisors have developed robust cost estimates that account for the risks associated with interface issues pertaining to the scheme.
- 72 The Arup report sought more detail as to why **tie** had not performed a Quantitative Risk Assessment. Some risk management plans focus on qualitative analysis, some on quantitative analysis, and some use both. We argue for both, with use varying at different stages in the project lifecycle. What is important for present purposes is that an effective approach is adopted to ensure that ‘identifying and structuring’ process is adopted through qualitative techniques. **tie**’s current motive is to ensure key corporate learning is achieved. It is planned that this is supplemented at later stages with a more quantitative ‘choosing and evaluating’ process at the next stage of the project development in consideration with procurement issues regarding risk allocation.
- 73 **tie** recognise that a Monte Carlo simulation can be one of a number of useful techniques to support the risk management process and for combining probability distributions where a quantitative risk analysis is required.
- 74 Whilst primarily used in investigating the sensitivity of risk models there were a number of factors that **tie** and their advisors have considered in not undertaking this type of assessment, as follows.

- Not a mandatory part of STAG analysis and therefore not required as an output at this stage;
- Needs resolution of detailed design issues (to ensure accurate input data) to allow a detailed consideration of disaggregated capital cost contingencies;
- As outlined above, **tie**'s strategy is to use this technique in the scheme development in conjunction with evolving scheme Outline Business Case to assist financial modelling (being built into the financial and technical advisor remits for the next wave of implementation procurements);
- Risk of incorrectly detracting from Optimism Bias estimate if the source data is insufficiently developed due to early stage of scheme development and incorrect assumptions;
- Benchmarking of costs has supported overall robustness of approach; and
- Technique is potentially subject to sampling error (particularly with relatively small data sets) that if reduced can bias results (due to insufficient design development).

75 At the early phases of the project **tie** developed processes and structures to control the identified issues. **tie** captured this thinking within a Risk Management Policy and Risk Management Plan for the scheme. Our Plan identified our prime objectives in risk management, as follows.

- All identified risks mitigated to a 'medium' significance or less;
- All identified risks passed to the best parties capable of managing the risk;
- A culture of risk awareness (not risk averse) and management is created;
- Schemes are delivered within budget and on time;
- Schemes provide a fully functioning operational service; and
- Schemes are supported by all key stakeholders.

76 As stated above, we clearly set a 'tolerance' level for risks that impact the projects in terms of their significance. This tolerance level establishes a boundary for those risks that are acceptable and unacceptable to **tie** (risks above this tolerance are shown RED). **tie**'s approach effectively allows **tie** to prioritise mitigations over three grades, in accordance with industry best practice. In addition, it is noted that summarised graphically to five grades of severity (very low to very high) as defined on the risk register.

77 **tie** prioritise response plans to identified risks according to risk severity (taking into account effects and secondary issues) in accordance with industry best practice. It is recognised that further refinement to adopt a five-colour system as proposed by **Arup** may be of some assistance. Our risk categorisation allows further prioritisation in a number of ways including degree of likelihood and scope, timing and severity of impact to the scheme.

78 **tie** and their advisors regularly update and amend priorities of risks taking into account progress in stakeholder management. The outcomes of this process

are reflected in monthly risk report to **tie** Board to ensure key risks are discussed. The Board are also informed of progress with stakeholders to determine appropriate prioritisation.

79 **tie** accept **Arup**'s assertion that there could be benefits in further disaggregation of risks to allow a more refined prioritisation of individual stakeholders. In the course, of further development of the scheme and risk register **tie** propose to further disaggregate risk associated with stakeholders.

80 It is noted that the risk register does not represent the full extent of stakeholder management underway or planned. **tie** recognise that the perception of and predisposition to risk varies between each stakeholder. A system is in place to manage stakeholder relationships which has the following objectives

- Promote understanding of the Tram Proposals;
- Counter misinformation;
- Maximise support for the Tram;
- Minimise the amount of opposition/objections;
- Minimise potential risks; and
- Promote proactive and interactive flow of information;

81 All stakeholders who have objected to the Bills have the right to be treated equally and consistently. In recognition of this, a system has been established for governing negotiations with objectors which ensures fair treatment.

82 As a general principle, **tie** is concentrating first on parties who have actually lodged an objection to the Bill. However, there are exceptions to this which are reviewed on a case by case basis. **tie** and their advisors consider that their response planning for stakeholders is appropriately tailored and understood.

83 In the report Arup discuss the impact of procurement risk and how this impacts on the capital cost, **tie** and their advisors have identified a total of 10 procurement related risks that could lead to a capital cost (and 23 risks that could delay the programme) including the following two specific risks identified in [Section 7.16] which could lead to dispute and claims with consequential cost and programme impacts.

Ref.	Risk Description
71	DPOFA Procurement delayed due to consequence of termination
115	Force majeure event, as defined in the contract

84 **tie** considers that each of the risks identified could lead to Optimism Bias on the anticipated costs and that suitable mitigations are required to minimise or obviate the likelihood and impact of all risks occurring. **tie**'s philosophy is to identify, analyse and mitigate all risks that could lead to a cost or programme impact (and other impacts as shown) for the following Optimism Bias areas in

relation to procurement. These risk areas have also been considered in the development of **tie**'s emerging procurement strategy.

- Complexity of Contract;
- Late Contractor Involvement Design;
- Poor Contractor Capabilities;
- Government Guidelines;
- Dispute & Claims Occurred;
- Information Management; and
- Other Procurement Areas.

- 85 In this sense, **tie** and their advisors have adopted a robust approach and not constrained their analysis of Optimism Bias to a limited number of areas, in order to determine a low Optimism Bias estimate. In addition, **tie** have not ignored 'known' risks that are recognised as having a contribution to Optimism Bias (contrary to guidance that shows these risks have not previously led to cost or programme delays for the sample projects reviewed).
- 86 **tie** and their advisors therefore do not accept **Arup**'s assertion that the Optimism Bias uplifts have been underestimated. The soundness of **tie**'s approach has been reflected in the relative higher cost estimates of the Edinburgh system compared with other previous and planned schemes in the UK.
- 87 For all risks **tie** and their advisors guard against drawing unnecessary and subjective judgements and uncertain assumptions (leading to greater risk exposure) into the process. This is reinforced in terms of the approach taken in the determination of Optimism Bias (reasons for which are well documented) that has established the reasons for not doing a risk-by-risk bottom up analysis to evaluate likely risk impact and also apply to the evaluation of the mitigation cost.
- 88 This approximately £2m allowance is probably best understood in terms of 'global' viewpoint, as equates to an approximately 10% increase in Project Costs and represents 200 to 250 man months of input. To place this allowance into further context, it is noted that it would also equate to approximately half of the development costs for the scheme to date.
- 89 **tie** and their advisors consider that the 1% allowance for the cost of mitigation is pragmatic and reasonable.
- 90 The Arup review highlighted the possibility of some confusion over the numbering of risks in different document versions, by way of explanation **tie** have employed a revision control system during the development of the risk register for the scheme to ensure that an audit trail of risks identified has been maintained. **tie** have periodically re-numbered risks in order to assist in sorting and prioritising risks due to changes in severity. **tie** agree with **Arup**'s suggestion that the a sequential numbering of risks (that is maintained for the duration of the project) would assist in further traceability.

Appendix A

Lessons from the Management of the Holyrood Building Project

Ref.	Audit Scotland Observation	Lesson for tie
1.	The complexity difficulties encountered have resulted in substantial cost and programme over-runs.	Identify areas of potential design complexity and ensure original estimates are robust and adequate contingencies (capital expenditure and programme) are made.
2.	The 'construction management' procurement strategy is the primary reason for problems encountered, where the majority of risks are retained by the public sector.	Ensure an appropriate procurement strategy is adopted that transfers and shares the appropriate risks with the private sector
3.	The management and control processes have been undertaken by a number of organisations, groups and bodies.	<p>Ensure clear roles and responsibilities are defined for all parties.</p> <p>Ensure a single point of control and leadership, with explicit authority and responsibility given to the person in charge.</p>
4.	The design team included a partnership arrangement between Edinburgh and Barcelona based architects.	Ensure definition of requirements is provided to all advisors and clear roles and responsibilities are defined for each member of the design team and especially those embarking on partnership or Joint Venture basis.
5.	<p>The main cause of 20-month delay to the project since September 2000 was the following.</p> <ul style="list-style-type: none"> • Production of detailed design variations; and • Late supply of information during construction process. 	<p>Ensure that detailed design is initiated at the earliest opportunity to avoid variations.</p> <p>Ensure clear lines of communication are adopted with programme indicating dates for supply of information to each party.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' to InfraCo.</p> <p>Ensure adequate allowance is given to time spent at the planning stage to address the following.</p> <ul style="list-style-type: none"> • Clear definition of Client's requirements • Sequence of construction • Assessing and managing project risks • Using value management
6.	Difficulties encountered in very	Ensure construction programme

Ref.	Audit Scotland Observation	Lesson for tie
	complex, densely developed non-standard building against very tight deadlines.	<p>allows 'early' and 'adequate' construction period for areas of complex construction.</p> <p>Ensure construction work is undertaken in a 'phased manner' to avoid density issues coming to the fore.</p> <p>Ensure agreed project budget is established and a set of key performance indicators established to measure during the life of the project</p>
7.	In some cases trade contractors were responsible for design in addition to the design team.	Ensure that a clear 'single point' of focus is kept on design responsibility through lead designers.
8.	Both the architects and some trade contractors did not deliver on time some critical elements of the design work.	<p>Identify the critical elements of the design work within a detailed design programme.</p> <p>Select a procurement strategy that allows the ability to seek Liquidated Damages at key milestones.</p> <p>Select designer on ability and resources to meet the programme.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' to InfraCo.</p>
9.	Project management required a very demanding timetable for completion and was realistically 'unachievable'.	<p>Ensure expectations are managed for delivery of the project.</p> <p>Ensure the development and maintenance of the project delivery programme. Seek independent experience on ability to deliver the scheme.</p> <p>Ensure that forecast to completion of project is maintained during design and construction phases.</p>
10	Project management should have 'done more' to address the 'root causes' of problems.	Ensure that the project team communicate issues and problems to achieving the delivery dates and a 'partnering' relationship is fostered to ensure individuals feel free to express reservations.

Ref.	Audit Scotland Observation	Lesson for tie
11	<p>The construction programme was predicated and flawed due to the following.</p> <ul style="list-style-type: none"> • Inappropriate assumptions; and • Unachievable commitments by the design team and contractors 	<p>Examine the basis of all critical project assumptions that could delay the scheme.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p> <p>Ensure that the project team and InfraCo communicate issues and problems to achieving the delivery dates and a 'partnering' relationship is fostered to ensure individuals feel free to express reservations.</p>
12	<p>Under the construction management contract the public sector ultimately bears the majority of 'construction risk'.</p>	<p>Select a procurement strategy that optimises the transfer of 'construction risk' to InfraCo.</p>
13	<p>Project management did not test the designers, construction manager or trade supply contractors' commitment or ability to resource to meet revised programmes.</p>	<p>Develop a realistic design and construction programme.</p> <p>Ensure that resource availability is tested for all parties contracted including sub-consultants and sub-contractors.</p> <p>Ensure that the commitment of parties is there to meet revised programmes (which may include acceleration).</p>
14	<p>Project management was unable to manage risks associated with programme delays effectively.</p>	<p>Ensure that all parties contribute to a consistent framework for risk management including ability to contribute to definition of mitigation to overcome programme delays.</p>
15	<p>The cost of the scheme increased after 2000 (post significant design freeze) due to ongoing design development and construction delays.</p>	<p>Ensure that detailed design is initiated at the earliest opportunity to avoid variations.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>
16	<p>Cost increases due to design development related entirely to the following.</p> <ul style="list-style-type: none"> • Realising the detail design; • Defining the quality of finish; and 	<p>Ensure that detailed design is initiated at the earliest opportunity to avoid variations.</p> <p>Develop clear specification requirements for the scheme including clear indicators of quality and material</p>

Ref.	Audit Scotland Observation	Lesson for tie
	<ul style="list-style-type: none"> • Selecting the palette of materials. 	<p>selection prior to going to market to minimise design development e.g. through development of Design Manual.</p> <p>Monitor detail design progress.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>
17	Construction costs rose from £140M to £311m (an increase of 220%).	Identify areas of potential design complexity and ensure original estimates are robust and adequate contingencies (capital expenditure and programme) are made.
18	<p>Construction management involved a significant amount of design development to continue over the following stages, resulting in an increase of £80m to the scheme.</p> <ul style="list-style-type: none"> • Tendering of contractors • Appointment of contractors • Commencement of building work 	<p>Ensure that detailed design is initiated at the earliest opportunity to avoid variations.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>
19	Design development carries a risk of cost increases that should have adequate allowance in the scheme cost plan.	<p>Ensure that detailed design is initiated at the earliest opportunity to avoid variations and make adequate contingency to account for design development risk.</p> <p>Ensure that the Client retains management responsibility for design development appropriate to the form of contract.</p>
20	Risks associated with design development should be managed.	<p>Develop a governance model that ensures responsibility for scheme costs and emerging design development.</p> <p>Ensure that the all parties contribute to a consistent framework for risk management including ability to contribute to definition of mitigation to overcome design development cost impacts.</p> <p>Review the ability to absorb cost</p>

Ref.	Audit Scotland Observation	Lesson for tie
		increases or alternative solutions to accommodate design development.
21	Design development became a process for costing approval as opposed to delivery within cost limit.	<p>Ensure that design development is challenged throughout and clear understanding of project affordability is understood.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>
22	<p>Uncertainty regarding the scope of work for packages led to the following.</p> <ul style="list-style-type: none"> • Difficulty to achieve good (interest and price) competition (13No. out of 20No. main contracts had three or fewer tenderers); • Deliver Value for Money (11No. out of 20No. main contracts had uncertain VfM); and • Increased negotiation from normal requirements 	<p>Maintain market interest in scheme through promotion of the scheme to ensure tenderers interest in scheme.</p> <p>Ensure clear scope of works are defined for all works proposed Contracts and clear value for money tests are established prior to placement.</p> <p>Ensure that negotiators with suitable experience are engaged.</p>
23	<p>Decisions to award contracts with a large degree of uncertainty due to programme constraints resulted in the following.</p> <ul style="list-style-type: none"> • Weaker negotiating position for subsequent claims for extra time related costs; and • Little opportunity to attribute blame due to poor performance. 	<p>Ensure that decision to award contracts is taken following clear understanding of elements remaining to be clarified and clear obligations.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>
24	<p>Uncompetitive process resulted in contractors claims to £86m to construction costs due to the following with no improvement to the scheme.</p> <ul style="list-style-type: none"> • Prologation • Disruption • Delay 	<p>Ensure that the construction works are fully pre-planned with clear programmes, methodologies, constraints and dependencies known at the outset.</p> <p>Establish clear grounds for claim through the Contract with a procurement strategy that allows the ability to transfer 'design risk' and 'construction risk' to InfraCo.</p>

Ref.	Audit Scotland Observation	Lesson for tie
		Define and monitor claims under contract with appropriate governance requirements
25	The same quality objectives could have been achieved for less cost if the whole design and construction process had been better executed.	Ensure adequate consideration of the procurement options available and select the preferred option on basis of ability to deliver quality, cost and programme objectives.
26	Those delivering the project have had clear quality and programme objectives but unclear cost objectives.	Ensure that all those responsible for the delivery of the scheme have a clear understanding with regard to the project objectives of quality, cost and programme.
27	<p>The Holyrood project lacked a single point of leadership and control where appropriate decisions could be made resulting in the following.</p> <ul style="list-style-type: none"> • No focus to decision making; • Lack of accountability; • Unclear allocation of responsibility for time, cost and quality; and • Leadership and control was not clearly established. 	Ensure that governance model empowers single point of leadership and support to Project Director.
28	The parties involved did not agree a cost plan resulting in costs being 'indicative' rather than 'reliable'	<p>Ensure that a cost plan is developed for the scheme that has sign-off from all parties and a sound basis for proceeding between key milestones.</p> <p>Ensure monthly updates are prepared including 3-month forecasts for all advisors, suppliers and contractors.</p>
29	Project management did not use 'normal' budgetary control procedures.	Ensure that appropriate budgetary control measures are in place.
30	Project management did not have clear definition of overall budget or approved cost ceiling at every stage of the project lifecycle resulting in focus on only given to quality and time objectives.	<p>Ensure that a clear definition of anticipated outturn cost is made and all parties work toward delivering the scheme within this ceiling.</p> <p>Ensure that the governance model provides sign-off responsibilities for 'approved cost ceiling' and appropriate change control procedures.</p>

Ref.	Audit Scotland Observation	Lesson for tie
		<p>Ensure that measures of quality, cost and time are regularly reviewed during project lifecycle.</p> <p>Consider the use of project reviews to provide assurance that it may move to the next stage of development.</p>
31	There was a need for better cost reporting and financial control.	Ensure adequate resources and appropriate financial control systems are adopted by all parties.
32	The cost reporting and financial control was not always comprehensive or systematic.	Ensure regular 'comprehensive' reporting of current spend and forecasts are provided on a 'systematic' basis.
33	Risk management for the Holyrood project was not good practice.	<p>Ensure that clear risk management procedures are adopted and all parties are engaged in the process.</p> <p>Ensure that mitigation strategies are developed for each risk.</p>
34	Accounting for risk was insufficient.	Ensure adequate contingencies are made for expected programme delays and cost increases that may influence the project.
35	Contrary to good practice, there was no quantified allowance for the major risks facing the project.	Ensure adequate contingencies are made for expected programme delays and cost increases that may influence the project, for all 'major' risks
36	Project management introduced risk management to quantify risks and conducted risk reviews late in the process.	Ensure that clear risk management procedures are adopted and all parties are engaged in the process throughout the project lifecycle.
37	Culture adopted acceptance of cost increases as risk materialised.	<p>Ensure that an appropriate culture to challenge cost increases is adopted by the delivery team with clear definition of anticipated outturn cost is made and all parties work toward delivering the scheme within this ceiling.</p> <p>Ensure that the governance model provides sign-off responsibilities for 'approved cost ceiling' and appropriate change control procedures.</p>
38	Overspend on consultants to £50m (comprising 19% of the approved construction costs).	Ensure a tight rein is placed on expenditure on consultants.
39	Project management did not explore, prior to appointment, alternative fee arrangements	Ensure that the procurement routes examine alternative fee arrangements to ensure value for money.

Ref.	Audit Scotland Observation	Lesson for tie
	including financial incentives to deliver value for money.	Ensure care is taken in development of the payment regime to incentivise contractors against performance against clear quality, time and cost targets.
40	Percentage fees do not align with the Client's cost objectives.	Ensure that incentives adopted do not include scaleable fees related to the capital expenditure of the scheme
41	Corporate Body did not place cap on spend on consultants until very late in the programme and did not provide a timely incentive to consultants to control costs and programme	<p>Ensure a limit to exposure of consultant fees in known at the outset.</p> <p>Ensure a tight rein is placed on expenditure on consultants.</p> <p>Select a procurement strategy that allows the ability to transfer 'design risk' to InfraCo.</p>
42	Project management did not seek to convert it's construction managers fee to a fixed lump sum until late in the process and missed earlier opportunities to do this.	<p>Review options to cap, fix and agree fees for construction management at the earliest appropriate opportunity.</p> <p>Select a procurement strategy that allows the ability to transfer 'construction management' to InfraCo.</p>
43	Project management did not apply a systematic method of assessing the performance of consultants.	Ensure the application of performance measurement of all consultants.
44	Project management did not use the opportunity of performance measurement to demonstrate areas of 'underperformance' or examine areas whereby additional costs could be recovered.	<p>Ensure the application of performance measurement of all consultants.</p> <p>Establish criteria for unacceptable performance and ability to recover additional costs for poor performance</p>
45	The construction management method of procurement is 'unusual' and has not been used before in Scotland.	<p>Ensure that procurement method is appropriate for the complexity of the scheme.</p> <p>Ensure that care is taken in the choice of form of contract to be employed with a sound understanding of the risks and benefits of each option.</p>
46	There was inadequate experience of the construction management method of procurement at the early stages of the scheme within the Client	<p>Ensure adequate and experienced resources are employed in the project delivery team.</p> <p>Engage professionals who are</p>

Ref.	Audit Scotland Observation	Lesson for tie
	team and project management team.	experienced in the construction methods to be employed.

Glossary

AS	Audit Scotland
BCR	Benefit Cost Ratio
CETM	Central Edinburgh Traffic Management
CSTM	2001 Central Scotland Transport Model
DAM	Detailed Assignment Model
DPOFA	Development Partner Operating Franchise Agreement
DBRM	Highway Agency's Design Manual for Roads and Bridges
DELTA	Delta Land Use Model
DfT	Department for Transport
EARL	Edinburgh Airport Rail Link
ECCS	Edinburgh Congestion Charging Scheme
LUTI	Land Use Transport Model
MAWG	Modelling and Appraisal Working Group
NAO	National Audit Office
PFC	Preliminary Financial Case
PFI	Private Finance Initiative
P&R	Park and Ride Site
PT	Public Transport
RBoS	Royal Bank of Scotland
STAG	Scottish Transport Appraisal Guidance
TRAM	Traffic Restraint Analysis Model
TUBA	Transport User Benefits Appraisal