Edinburgh Tram Network

Final Business Case Version 2

7th December 2007

Trams for Edinburgh

..connecting our Capital

Contents

1. Executive summary

Introduction and principal recommendation

1.1 In December 2006, the City of Edinburgh Council (CEC) approved the Draft Final Business Case (DFBC) for the project to construct the Edinburgh Tram Network (ETN). The DFBC presented the strong case in favour of trams. It concluded that a) the proposed scheme is economically and financially viable; b) Phase 1a, the primary tram line from Edinburgh Airport to Newhaven, was affordable within current sources of funding; and c) that Phase 1b has significant benefits for the economic development in Edinburgh. It also demonstrated the operational sustainability of the future integrated tram and bus network.

1.2 Since approval of the DFBC, considerable progress has been made on all important aspects of the project. This Final Business Case (version 2) (FBCv2) takes full account of the progress made to date and is a key part of the documentation which supports the commitment to the principal contracts for construction of the system and supply of the tram vehicles.

1.3 Two main aspects of the Business Case have progressed close to a conclusion since the DFBC was approved:

a. The procurement of the principal contracts has reached a stage where all material terms are agreed, including the capital, operational and maintenance costs; and
b. The principal terms of the funding available to support the delivery of the ETN have been agreed by CEC and the Scottish Government.

This FBCv2 explains in detail the important consequences arising from the finalisation of these two critical areas.

1.4 After an intensive and lengthy competitive procurement process, the capital and maintenance costs of the scheme have now been finalised at a level slightly below the DFBC estimate. Based on firm rates and prices received from the bidders for system construction, vehicle supply and maintenance, the capital cost for Phase 1a, the tram line from Edinburgh Airport to Newhaven, is forecast at £498m. The capital cost to deliver Phase 1b (the tram line from Roseburn to Granton) is now forecast at £87m. The contractual arrangements permit CEC to commit to Phase 1b on fixed cost terms at any time until March 2009. However, concurrent construction of Phase 1b with Phase 1a would offer significant benefits of scale.

1.5 The Scottish Government and CEC have confirmed their commitment to funding contributions of up to £500m and £45m respectively. These commitments will be structured in such a way that the final aggregate funding for Phase 1a reflects equivalent pro-rata contributions, with a cap of £500m on the Government contribution.

1.6 The primary economic viability test is known as the Benefit Cost Ratio (BCR). Further analysis has concluded that the BCR for Phase 1a is 1.77 which indicates a return of £1.77 in economic benefit for every £1 of cost. This ratio reflects the decision not to proceed with the project known as the Edinburgh Airport Rail Link (EARL). It does not yet take into account the option of a future interchange with heavy rail at Gogar, which is an option under consideration by the Scottish Government and may have a beneficial impact on the tram BCR. The BCR for Phase 1 including both Phases 1a and 1b is 2.31, which reflects the strong economic case for Phase 1b.

1.7 The principal recommendation of this FBCv2 is that Phase 1a should proceed, with funding of up to £545m committed to its delivery. The FBCv2 sets out the full supporting analysis which leads to this recommendation. The FBCv2 also provides the analysis which supports the implementation of Phase 1b, but acknowledges that additional sources of funding are needed before it may proceed. This matter is under review and it is recommended that a decision on Phase 1b should be taken during 2008.

1.8 The phased approach was anticipated in the DFBC and now forms the basis on which the project will proceed. Most of the material that was produced at considerable effort and cost for the DFBC remains valid and intact. However, there has been some editing to update figures and to clearly define the initial Phase 1a approach.

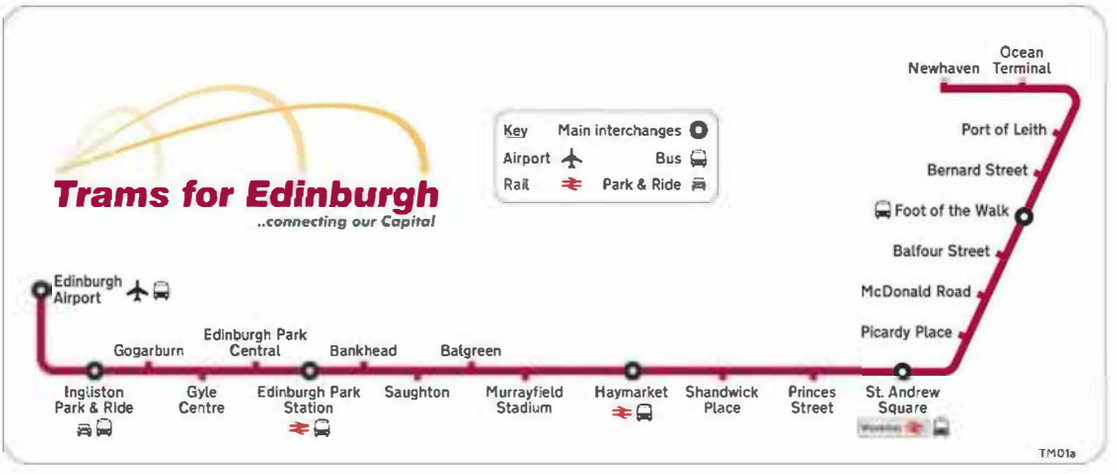
1.9 It is a fact that many tram schemes implemented in the UK and in Ireland in recent years have subsequently been extended once their successful operation has been demonstrated. Accordingly, a section has been included in this document describing the wider network options which may bear further examination in the future.

1.10 The Government has recently announced its intention to develop a new rail station at Gogar and to create an interchange with the tram project. The tram project costs in the FBCv2 do not reflect the effect of this proposed project, which will be subject to appropriate assessment in due course and which will require to be funded under separate consideration. As is normal in transport project assessment, the influence of a new project on existing transport infrastructure, benefits and costs will require to be taken into account in the assessment of the new project. The proposal that a new interchange be created is likely to have a net beneficial effect on future tram revenues, and possibly BCR. However, no detailed work has been done to date in view of the relatively recent announcement of the Gogar project.

Phase 1a

1.11 The route for Phase 1a is as depicted in Figure 1.1 below.

Figure 1.0. Tram route for Phase 1a.



Facts for Phase 1a

Trams	**Route**	**Service**
27 trams	18km	5 min intervals between trams
250 passengers	22 stops	Integrated bus and tram ticketing
100% low floor	Single depot at Gogar	Inspectors on all trams

Background

1.12 Substantial road traffic growth across the Edinburgh area, combined with forecast increases in population and employment, will lead to significant growth in road congestion and demand for transport solutions. CEC has identified an integrated tram and bus network as the preferred way to provide the backbone for a comprehensive, higher quality public transport system to support the local economy and to help to create sustainable development. The ETN ("the tram") has been central to transport policy and planning and the wider economic development aspirations of the city for more than seven years. The scheme has had in-

principle funding support from the Scottish Government (now represented by Transport Scotland (TS)) since 2003.

1.13 Early 2006 saw the tram scheme reaching an important milestone as it received Parliamentary approval. Both the Edinburgh Tram (Line One) Act and Edinburgh Tram (Line Two) Act came into force following Royal Assent in May and April 2006, respectively.

1.14 Concurrent with the parliamentary process, a careful review of cost estimates was carried out which concluded that, although Line 1 only or Line 2 only had a high degree of deliverability within the constraint of available funding, a complete network of Lines 1 and 2 was unlikely to be affordable in one phase of construction and that a phased approach to procurement and delivery would be implemented.

1.15 The phasing assessment produced a proposal for Phase 1 comprising two sub-phases namely 1a – Newhaven to Edinburgh Airport; and 1b – Roseburn to Granton Square. The core of the network from Newhaven to Edinburgh Airport, via Haymarket and Princes Street, will give a good balance of costs and benefits, is forecast to be financially viable and can be effectively integrated with Lothian Buses (LB) services.

1.16 The proposed phasing also carries the support of Transport Edinburgh Limited (TEL), which is charged by CEC with the delivery and management of an integrated tram and LB network and of Transdev, the future operator of the tram.

1.17 The three core tests examined to assess the continued viability of the scheme are:

- **Economic viability** – The quantified economic benefits and costs of Phase 1a of the tram, as well as the wider benefits relating to urban regeneration; environment; safety; transport and land use policy integration; and accessibility and social inclusion;
- **Financial viability** – The way in which Phase 1a of tram will be integrated with buses under the umbrella of TEL in a manner which preserves and enhances the public transport service in the city and does so in a profitable manner. This is embodied in the TEL Business Plan; and
- **Affordability** – The prospective deliverability of Phase 1a of the tram within the constraints of available funding.

A summary of these core tests is set out below.

Economic viability

1.18 The economic benefits and costs of Phase 1a of the tram have been assessed in accordance with Scottish Transport Appraisal Guidance (STAG) by Steer Davis Gleave. This built upon the previous work submitted to Parliament in 2004 but was updated, where appropriate, to reflect more recent and extensive transport modelling, again led by Steer Davis Gleave. The following are the highlights from the assessment:

Economic regeneration

1.19 Phase 1a of tram is integral to the regeneration of the Newhaven and Leith area. Substantial new residential, commercial, retail and other development is projected progressively between now and 2020, reflecting the growth in Edinburgh's economy and population. Without Phase 1a of the tram it is unlikely this large scale redevelopment would go ahead on the desired scale and timetable.

1.20 Significant new development is also envisaged in West Edinburgh with some 250,000 m^2 of new office space (mostly at Edinburgh Park) and over 200,000 m^2 of other commercial space, again predicted to be progressively developed between now and 2020. Phase 1a of the tram will facilitate and encourage this new development and, crucially, provide improved public transport between the new housing in Leith and the new job opportunities in the west of the city.

1.21 In employment terms, it is anticipated that at least 590 full-time permanent jobs in the city will be generated or brought forward by the development impact of Phase 1a of the tram. These jobs do not displace jobs elsewhere in Scotland. It should also be noted that a substantial proportion of the capital investment will be spent in Scotland, encompassing utility works, land purchase, civil engineering works and professional services.

1.22 The positive relationship between high quality transport capability, specifically light rail, and enhanced economic development is a well-known phenomenon. There is also now little debate about the reverse scenario, the retarding impact on development of poor transport connections. The Edinburgh tram scheme is based on the need for improved transport connections to vital development areas, efficient capacity provision on key corridors and is a critical driver of future economic growth in Edinburgh and Scotland as a whole.

Environment

1.23 Phase 1a of the tram will make a positive contribution towards the objectives of reducing emissions and improving air quality in the city centre and in the transport corridor to the west of the city and the airport. Vehicles within the city account for up to 88% of emissions of nitrogen oxides and trams will provide a large number of journeys through the city centre, improving mobility and accessibility without adding to current levels of pollution. Trams are also a relatively quiet mode of road transport providing a higher quality environment for those living, working and travelling in the area. The tram's contribution to mode shift from private car to public transport (see below) will further progress the objectives set in the Air Quality (Scotland) Amendment Regulations 2002 and to national objectives to reduce emissions of greenhouse gases.

1.24 The construction and operation of Phase 1a of the tram will address potential impacts on the World Heritage Status of Edinburgh by applying the design and mitigation standards set out in the Tram Design Manual, approved by CEC planners. Details of mitigation measures to retain, protect and enhance or replace existing plantings and wildlife habitats on Phase 1a, including badger setts, are prescribed in the Environmental Management Plan and specific elements were approved during the Parliamentary process.

1.25 To the fullest extent reasonably deliverable, disruption during construction will be minimised. Clear and open communications will ensure that the effects of construction are anticipated and the construction planning will ensure that work is restricted to the shortest time period consistent with safe working practice. Schemes to provide financial assistance to local businesses affected by construction have been implemented.

Safety reliability and capacity

1.26 Personal security will improve, reflecting tram design elements (CCTV and help points at all stops and vehicles) and designed access arrangements aimed at enhancing security. The planned use of inspectors on all vehicles will also assist this objective, as experience in other cites has clearly shown.

1.27 Trams will improve the overall reliability of public transport as they generally benefit from greater segregation from general traffic and priority at junctions. They also present an opportunity to significantly reduce the variability of dwell time at stops compared to a bus-only public transport service. In the absence of trams, a significantly increased number of bus vehicles would be required on the main Phase 1a corridor on Princes Street and Leith Walk to cope with forecast increased demand. Despite continuing implementation of a wide range of bus priority measures, buses remain vulnerable to the effects of increasing congestion across the city.

Accessibility and social inclusion

1.28 In areas around Leith Walk and Saughton and Balgreen in the west socio economic status is considerably lower than surrounding areas and employment, income levels and car ownership tend to be comparatively low. Opportunities for people living in these areas will be improved by direct connection via tram to the city centre and other employment areas, including the new development in Leith and the west of the city at Edinburgh Park and the airport.

1.29 Trams and tram stops will be fully accessible by people with mobility impairments, those travelling with small children and the elderly. These travellers will benefit from the design specification, ride-quality and reliable accessibility of trams. Where the distance between tram stops presents a challenge to accessibility, the service integration patterns with buses have been designed to maximise the continuing and improving accessibility of LB.

Transport and land use integration

1.30 The tram will be particularly vital in responding to the expected growth in travel demand arising from the new development in the north of Edinburgh at Leith. Phase 1a of the tram will help ensure this new development can be delivered without exacerbating city wide congestion by ensuring that land use and transport policies are integrated. Any displacement of new development to greenfield and greenbelt sites would have planning implications and could result in a settlement pattern that would be more difficult to serve by public transport.

1.31 Carefully considered bus-tram service integration plans and common ticketing arrangements will enhance the opportunity to make journeys on the public transport network. Effective interchange facilities will be provided at Ocean Terminal, the Foot of Leith Walk, St Andrew Bus Station, and the Gyle Shopping Centre. The tram route will integrate with Ingliston Park and Ride, already operating successfully and planned for expansion, and with other park and ride sites under active consideration. Phase 1a of the tram also provides an opportunity to significantly improve integration with other transport modes, particularly at Haymarket and Edinburgh Park railway stations and Edinburgh Airport. These interlinking services, along with the proposed frequency of the service, means tram will afford easier access to employment, retail and leisure locations.

Patronage and transport mode shift

1.32 Extensive work has been undertaken to build new demand forecasting models to predict use of the tram and the impact upon the use of other forms of transport (bus, rail and car). The modelling deployed to support the Edinburgh tram scheme is recognised by the professionals involved as among the most sophisticated ever prepared in support of a large-scale transport scheme.

1.33 Annual demand for Phase 1a is predicted to be 11m tram passengers in 2011 and to rise to 25.5m by 2031. This growth is predicated on a forecast of substantial growth in the total travel market, as well as the additional predicted commercial and housing development as a result of the scheme. Between 2005 and 2031, demand for journeys by public transport is forecast to increase by 61% (1.8% p.a.). In the context of economic growth in Edinburgh and actual experience of patronage growth by LB, this is a conservative estimate with actual growth in bus patronage in 2006 of around 5% p.a. The tram provides the capacity to meet a large proportion of this increased demand which could otherwise be met only by cars or considerably more buses on increasingly congested roads.

1.34 Modal shift from car is a key objective of the Local and Regional Transport Strategies (LTS and RTS) and is fundamental to achieving the environmental, sustainability, health and traffic aspirations of the tram. Phase 1 (Phase 1a and Phase 1b) of the tram project are forecast to generate 3m additional public transport trips in 2011, increasing to over 6m additional trips in 2031. These are mostly in areas directly served by the tram where the change from car to

public transport will be up to 10%. It is estimated Phase 1a will produce approximately 2.5m of these trips by 2011, rising to 4.2m by 2031.

1.35 In 2011, about 17% of tram patronage will be new to public transport, rising to 20% in 2031. The balance of the increase will predominantly be those who would otherwise travel by bus and other modes of public transport. Congestion is characterised by the disproportionate effect that marginal increases in car use have on the total system. Therefore, it is very important to maintain downward pressure on additional road use and the proportion of tram patronage new to the public transport market is therefore significant. It is also in keeping with results achieved on successful tram schemes elsewhere such as Croydon Tramlink, Nottingham, and Dublin.

Benefits and costs to Government

1.36 The benefits and costs of Phase 1a of tram calculated in accordance with STAG requirements are summarised in the Table 1.1. The FBCv2 has been prepared on the basis that will not proceed as per the advice received from the Scottish Government. The resulting BCR for Phase 1a of 1.77 represents an excellent return and reflects significant increased decongestion benefits to other road users (including cars). In the with EARL evaluation a proportion of these benefits were not accrued to the tram project due to the pre-existence of EARL already achieving some decongestion within the model.

Table 1.1. Value of the ETN benefits and costs for Phase 1a and resultant BCR (£m Present Value, 2002 prices).

£m Present Value, 2002 prices	Phase 1a	
	Without EARL	With EARL
Value of scheme benefits	592	373
Value of scheme costs	335	340
Net benefits	**257**	**34**
Benefit Cost Ratio to Government	**1.77**	**1.10**

Financial viability (the TEL Business Plan)

Background to TEL

1.37 TEL was established by CEC to build on the success of the current LB services through the delivery and management of an integrated tram and bus business. CEC requires TEL to achieve profitable operations, to meet its investment obligations and to continue payment of dividends broadly at the level currently received by CEC from LB.

1.38 Transdev are one of the world's largest tram operators and were awarded the development and operating contract in 2004. Using their wealth of experience, it will be their role to establish the tram operating system, reporting directly to TEL.

1.39 However TEL, like LB, will also target the delivery of a 'social dividend' by maintaining realistic and affordable fares and a more comprehensive level of service provision than would normally be the case for a private sector transport operator. TEL's objectives are also aligned to the delivery of the wider economic benefits of the tram. The measure of success for TEL will be the overall performance in commercial, social, customer and financial terms of the integrated bus and tram network. The summary presented here focuses on the drivers of the forecast financial results of TEL.

1.40 Section 9 provides a detailed analysis of the financial viability as it is presented in TEL's full Business Plan, a copy of which is included at Appendix I.

Financial forecast highlights

1.41 Table 1.2 provides a summary of the financial highlights from the forecast of TEL's profitability operating with bus and tram.

Table 1.2. TEL profitability operating with bus and Phase 1a tram.

Tram in service	Pre-tram						
Tram service pattern (see below for explanation)	**n/a**	**n/a**	**6/12**	**6/12**	**8/16**	**8/16**	**8/16**
Year	**2006**	**2010**	**2011**	**2012**	**2016**	**2021**	**2031**
Patronage (m Pax)							
Bus	**108**	**117**	**113**	**115**	**125**	**133**	**150**
Tram	**-**	**-**	**11**	**13**	**19**	**21**	**25**
Total TEL Patronage	**108**	**117**	**124**	**128**	**144**	**154**	**175**
Revenues and costs (£m)							
TEL Revenues	**88**	**109**	**119**	**128**	**167**	**216**	**356**
TEL operating costs			**120**	**126**	**156**	**194**	**312**
Pre-tax operating profit / (loss)			**(1)**	**2**	**11**	**22**	**44**
Tram lifecycle costs			**-**	**-**	**1**	**2**	**2**
Notional taxation			**-**	**1**	**3**	**6**	**12**
Dividend payment			**-**	**-**	**3**	**3**	**5**
Net TEL cash surplus / (deficit)			**(1)**	**1**	**4**	**10**	**25**

NB All £ figures inflated

1.42 The forecast represented in Table 1.2 has been developed using the patronage and revenue forecasts produced for the DFBC for both tram and bus using the transport model described above and validated by TEL, **tie** and Transdev. The forecast reflects that TEL is prospectively both a cash positive and profitable business. As explained above, the model is based on economic growth assumptions, which, in light of the actual experience of patronage growth to date, are considered conservative.

1.43 The patronage and revenue forecast for tram in 2011 to 2014 have been conservatively reduced to take account of a ramp-up period, as new services have, on occasion, taken time to be fully adopted by users. The forecast reflects that TEL's operational cash flow profile will be positive once the tram and bus patronage has stabilised after the first year of the ramp-up period in 2012.

1.44 For the DFBC, sensitivity testing was undertaken to assess the impact of EARL on TEL's patronage and revenue forecasts. These had confirmed the premises that EARL and tram would serve different patronage markets and that, although tram without EARL would gain some small market share, overall TEL revenues would be net neutral as the absence of EARL results in a marginally smaller overall public transport market within Edinburgh. It should be noted that the alternative option under consideration of linking heavy rail at Gogar with the tram line serving the airport will further improve the tram viability.

1.45 It is assumed that the policy of maintaining the current level of LB dividend to CEC will be applied prudently and that the annual dividend might be reduced or foregone for short periods in response to lower profits or short term demands on TEL's cash-flows. In such circumstances, the dividends for future periods would be adjusted upwards to ensure the shareholders receive the target dividend on a cumulative basis.

1.46 The projected operating costs for TEL include provisions for:

- The purchase of new buses to renew and / or expand the existing bus fleet; and
- The required expenditure on the tram infrastructure and vehicles necessary to ensure effective performance of the tram assets during their useful lives, including half-life refurbishment of the trams after 15 years (note: The TEL Business Plan does not specifically provide for the major replacement expenditure which will be required after 30 years).

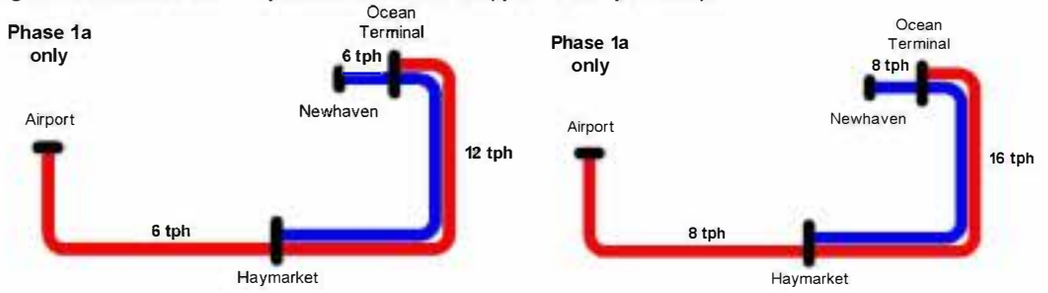
1.47 Updated information received from the bidders confirms the costs included in the DFBC for this are conservative.

1.48 Taxation is provided at the currently prevailing rate on forecast net profits, applied consistently with that of the DFBC. TEL, **tie** and CEC have begun to engage in the examination of tax mitigation opportunities in the same way as other commercial entities. As a result, the notional taxation applied in the table may be considered to be conservative.

Integrated service patterns

1.49 Using the geographical analysis of where forecast demand is likely to originate / terminate, TEL has developed a service integration plan reflecting planned tram services and bus services after the introduction of tram. The service patterns for tram must provide sufficient and reliable capacity to meet the demand and ensure overcrowding does not dissuade passengers from using public transport. The planned service patterns for opening of Phase 1a of the tram are depicted below (Figure 1.2).

Figure 1.2. Planned service patterns for Phase 1a (tph = trams per hour).



1.50 The forecast of demand indicates that, after the initial five years of growth, the '6 / 12' trams per hour service depicted above will require to be increased to provide sufficient capacity to serve demand on the Newhaven to Haymarket section. The TEL Business Plan assumes that from 2016, the service will be increased to an '8 / 16' trams per hour pattern. A further increase in services is likely to be required after the year 2027 to provide sufficient capacity to serve demand on the Haymarket to Edinburgh Park section of the tram network.

1.51 Where the tram runs parallel or close to an existing bus route amendments to bus service patterns are envisaged to prevent unnecessary overlap of services. The principle of any amendments will be that bus service reductions are only applied where the tram offers an acceptable alternative mode of travel. This approach will allow TEL to match the most effective mode of transport to levels of demand while the travelling public will continue to benefit from high quality public transport provision.

1.52 TEL's service integration plan aims to offer as near seamless a journey through the network as possible. The inconvenience of interchange is minimised by eliminating it where possible. The service integration plan seeks to achieve optimal alignment of service frequencies at interchanges, thus making interchanging as simple as possible and minimising the risk of loss of patronage. Key bus and tram interchange locations addressed by the service integration plan are Ocean Terminal, the Foot of Leith Walk, St Andrew Bus Station, and the Gyle Shopping Centre.

3rd party responses

1.53 Good relations with 3rd party operators are considered essential, not least due to the opportunities which enhanced integration with those operators may offer and the benefits of being part of the wider provision of public transport within Scotland. Dialogue is underway to develop appropriate service plans with these operators, including common and through-ticketing arrangements.

Fares and ticketing strategy

1.54 The TEL fare structure will be a single, fully integrated, flat fare for bus and tram, regardless of the distance travelled. The only exceptions will be, as now, night services and journeys to and from the airport. It is a fundamental assumption that TEL's tram operations will participate in the national concessionary ticketing scheme in a manner equivalent to that of bus operations, in order to ensure parity across modes and sustain effective integration. Under the terms of the scheme, operators receive payment of 73.6% of the price of an adult single for each journey by concessionary travel holders and this currently applies to c20% of LB patronage. This level of recompense is assumed to continue.

1.55 The assumption is that the average fares yield for TEL will be increased at the rate of the Retail Price Index (RPI) +1% growth per annum. This is in line with historical increases in fares by LB, meets political and stakeholder expectations and supports TEL's aim to provide transport services at an affordable price.

1.56 Tram tickets are to be purchased off-board with ticket machines provided at all tram stops and a number of bus stops. The only tickets to be sold on-tram are to be adult and child single tickets, which will be priced at a premium above the price available from off-tram ticket vending machines. TEL will continue to develop LB's current strategy to encourage wider use of pre-paid and / or multi-journey types of tickets by offering discounts to the standard fare.

Revenue protection

1.57 Fare evasion and fraud on the existing LB bus network has been limited. Trams, with multi-door boarding, require active processes in place to limit the opportunity for fare evasion and fraud in general, as well as the particular need to enforce the premium airport fare. TEL's revenue protection regime for trams is a combination of placing inspectors on each tram and providing ticket machines at all tram stops, with a significant price incentive to buy a ticket off-tram. The presence of inspectors has also been shown to promote a sense of security for passengers and be an effective deterrent to anti-social behaviour.

Other income opportunities

1.58 TEL, with its combined bus / tram network, offers attractive opportunities to generate additional revenues from advertising, small-scale commercial development and marketing and tourism driven revenues. The TEL Business Plan includes a prudent assessment of the income which might be earned from these additional sources, based primarily upon the existing experience of LB.

Operating costs

1.59 TEL's bus operating cost projections are based on the current experience of LB for buses. Tram operating costs were validated by Transdev, and subjected to a thorough review and benchmarking process. They are based upon the planned service patterns and required number of tram vehicles. Effective control over all aspects of operating costs is essential for TEL to achieve its profit objectives. However, the public's perception of the quality of services translates directly to patronage and revenue generation. Therefore, TEL must balance opportunities for cost savings against the impact this may have on the quality of services provided.

1.60 Maintenance services are being procured separately. A significant proportion of the maintenance fees accruing will be based on key performance indicators (kpi's) including punctuality, availability and presentational standards.

1.61 TEL's success in realising the benefits expected from the integrated bus and tram business will be measured using a number of developed kpi's. These have been incorporated into the relevant contracts and operating agreements with service providers to TEL including the operator of the trams, Transdev, and the maintenance providers for the tram system.

New development and economic growth risk to patronage and revenue forecasts

1.62 Phase 1a of the tram will encourage and facilitate the new development planned in North and West Edinburgh and stimulate economic growth in the city. However, the forecast future TEL patronage and revenues, both for bus and tram, is in turn highly sensitive to the level and timing of new development and the underlying level of economic growth. Sensitivity tests indicate that with new development delayed by five years in other areas, overall TEL revenue would be reduced by 3% in 2011 (12% in 2031).

1.63 In the event of slower than expected development or a general economic downturn, TEL would plan and implement services to match the reduced demand. On the Phase 1a corridor, where there is already a high level of demand, the opportunities to implement revised integrated service patterns for buses and tram, with commensurate savings in operating costs, would significantly mitigate the risk of failure to meet annual operating profit targets. In 2011, approximately 30% of forecast demand between Leith and Haymarket and 50% of demand between Haymarket and the airport will be directly dependent on new development.

Affordability

1.64 The summaries above demonstrate that Phase 1a on its own can deliver significant economic benefits in return for the proposed investment. Here we consider the affordability of Phase 1a of the tram in the context of visible funding and the risks being borne by the principle funders, with a particular emphasis on the risks retained by CEC. Section 10 contains the detailed analysis.

Cost estimates

1.65 Building on the detailed cost estimates prepared in November 2006, and incorporating the firm rates and prices received from bidders in 2007, the updated project cost estimates reflect the agreed scope for Phase 1a and a programme for delivery of Phase 1a by the first quarter 2011. If the option for Phase 1b was exercised within the window of opportunity to March 2009, it could commence revenue service in 2012.

	Concurrent construction	Sequential construction
Phase 1a	**£498m**	**£498m**
Phase 1b	**£ 82m**	**£ 87m**
Phase 1 in total	**£580m**	**£585m**

1.66 There is a high level of confidence in these estimates. Approximately 99.9% of the costs included are based on the rates and prices for firm bids received for the main contracts (infrastructure, tram vehicle supply, utility diversions and design), the remainder of the costs are based on known rates and prices for personnel and, in the case of land, from the Valuation Office Agency (District Valuer's) assessments. The overall level of confidence is reinforced by benchmarking against other tram schemes and the provisions for risk included in the estimate, as explained below.

1.67 It should be noted that a sum of approximately £3m has been incurred in relation of the design development for Phase 1b, and is included in the capital cost estimates for Phase 1b throughout this Business Case.

1.68 The updated estimates comprise base costs and an allowance for risk and uncertainty. A rigorous Quantitative Risk Analysis (QRA) has been applied to identify project risks to derive a risk allowance to deliver a very high level of confidence (statistically at a 90% confidence level, meaning that there is a 90% chance that costs will come in below the risk-adjusted level). The level of risk allowance so calculated and included in the updated estimate represents 15% of the underlying base cost estimates for future Phase 1a costs at Contract Award. This prudent allowance for cost uncertainty reflects the evolution of design and the increasing level of certainty and confidence in the costs of Phase 1a as procurement has progressed through 2006 / 2007 and fixed priced bids for the infrastructure and tram vehicle supply contracts have been received.

1.69 **tie** and CEC will continue to analyse, quantify and mitigate risks during the period through to final negotiation and award of the tram vehicles (Tramco) and infrastructure (Infraco) contracts and during construction with the objective of reducing or eliminating the impact of individual quantified risks and thereby the element of the allowance for risk which crystallises into actual costs.

1.70 The principal elements of the base cost estimates are:

- **Utility diversions** – The Multi Utility Diversion Framework Agreement (MUDFA) was awarded in October 2006 and rates, prices and allowances in the contract have been reflected in the updated estimate;
- **Tram vehicles** – Tenders were received for Tramco in October 2006 and the updated estimate reflects those of the anticipated Preferred Bidder;
- **Infrastructure** – Tenders were issued for Infraco in October 2006 and the updated estimate reflects those of the recommended Preferred Bidder. The cost estimates have been benchmarked against other comparable tram schemes;
- **Land compensation costs** – Estimates have been provided by the District Valuer (DV) and are subject to regular review. Reviews performed in spring 2007 confirmed the adequacy of the estimates; and
- **Internal costs** – Comprises mainly the firm price SDS design costs, as contracted, plus the costs of project management team and overhead, legal costs related to procurement and support of approval processes and the support of the operator. ,All of these costs have been estimated using a detailed resourcing plan to which staff costs and rates agreed with service providers have been applied.

1.71 The Infraco and Tramco contract cost and the MUDFA contract rates are fixed at outturn price levels. The base estimate costs for remaining items, principally internal costs, are based on fully inflated cost estimates supplied by service providers and on industry standards for salary cost inflation.

1.72 In summary, the cost estimate reflects substantial external validation from the procurement process for the major contracts and contains a sensible level of risk contingency.

Measuring affordability

1.73 On 27th June the Scottish Government confirmed support for up to £500m funding for the Edinburgh Tram scheme. In January 2006, CEC made an in-principle commitment to make a contribution of £45m towards the capital cost of Phase 1, to be deployed initially on Phase 1a. Therefore, the benchmark total funding package is currently £545m. The updated cost estimates above reflect that Phase 1a, at a cost of £498m, is affordable within this level of funding, with 14% headroom over and above the 15% risk allowance provided for in the cost estimate.

Application of available funding

1.74 Payment for capital costs will be made by **tie**, in accordance with principles of the contractual payment mechanisms for each contract. A detailed table showing the profile of planned expenditure is included in Section 10. Funding from the Scottish Government and CEC is for capital expenditure only. All operating and lifecycle costs in relation to the tram will be borne by TEL. This means that CEC, in its capacity as sole shareholder of TEL, is explicitly bearing the risks in relation to revenues, operating costs and the long-term maintenance of the tram insofar as these risks are not wholly, or partly, passed contractually to the private sector.

1.75 CEC must balance its desire to support the project with its fiduciary responsibility and limited resources. Therefore, CEC's contribution, comprises only such amounts as could reasonably be expected to be funded from future tram-related development income and receipts, rather than from general funds or from Council Tax. The anticipated sources of such receipts include land contributions by CEC, anticipated development gains accruing to the Council on Council-owned sites, Section 75 planning agreements already negotiated and anticipated future agreements, third party developments around the tram route and anticipated capital receipts from tram related Council owned sites.

1.76 Transport Scotland and CEC have agreed to work together to regularly review and revise (as necessary) the contribution schedule, as required by the Grant process.

Procurement strategy and risk allocation

1.77 The Procurement Strategy followed by **tie** responds to feedback from the National Audit Office (NAO) in 2004 on the effectiveness of light rail schemes. The objectives of the Procurement Strategy are summarised as follows:

- Transfer the design, construction and maintenance performance risks to the private sector;
- Minimise the risk premium (and / or exclusions of liability) that bidders for a design, construct and maintain contract normally include. Usually at tender stage bidders would not have a design with key consents proven to meet the contract performance obligations and, hence, they would usually add risk premiums for this;
- Mitigation of utilities diversion risk (i.e. potential impact of delays to utilities diversion programme on Infraco works); and
- Gain the early involvement of the operator to mitigate the risk relating to the future operation of the tram.

1.78 To date, **tie** has entered into four key contracts:

- **Development Partnering and Operating Franchise Agreement (DPOFA)**
  Awarded to Transdev in 2004;
- **System Design Services (SDS)**
  Awarded to Parsons Brinkerhoff in September 2005;
- **Joint Revenue Committee (JRC)**
  Awarded to Steer Davis Gleave in September 2005; and
- **Multi Utilities Diversion Framework Agreement (MUDFA)**
  Awarded to Alfred McAlpine in October 2006.

1.79 This leaves the two main contracts to be placed, namely:

- **Infrastructure provider and maintenance (Infraco)** – The tender process is close to conclusion with the contract to be awarded in January 2008 on conclusion of final negotiations and completion of design due diligence. BBS, a consortium comprising Bilfinger Berger and Siemens Group, has now been recommended by **tie** as the preferred bidder for this contract.
- **Vehicle Supply and maintenance (Tramco)** – The tender process is close to conclusion with the contract to be awarded in January 2008 on conclusion of final negotiations and completion of design due diligence. Spanish firm CAF has now been recommended by **tie** as the preferred bidder for this contract.

1.80 The Infraco will act as a "holding contract", with the intention that the design and vehicle provision (including maintenance contract) will be novated to the Infraco at the point of award. The entire strategy has been developed to help facilitate the speedy implementation and completion of the construction phase of the project and to remove uncertainty and, therefore, cost from bidders' proposals i.e. to deliver value for money.

1.81 In summary, the key attributes of the strategy are:

- The separation of system delivery and operations – To focus organisations on their strengths and to minimise mark-ups and risk premiums;
- Early introduction of the operator – To ensure effectiveness of design, construction and commissioning ready for operation;
- Early commencement of design by the SDS contractor – To reduce scope and pricing risk in Infraco and Tramco bids and to reduce the overall project programme;
- Separate procurement of the tram vehicles – To enable the selection of the optimum combination of tram vehicle and infrastructure suppliers;
- Re-aggregation of the supply chain at the point of award – By novation of the SDS and Tramco contracts to Infraco, thereby creating single point responsibility for design, construction, commissioning and subsequent maintenance of the tram system, with consequential transfer of performance risk to the private sector;
- Maintenance of the tram vehicles and infrastructure for up to 15 years post commencement of operations by Tramco and Infraco – To incentivise selection of components with 'whole-life' costs in mind and to incentivise Infraco to mitigate the risk of latent defects arising during the operational phase;
- Separate procurement of utilities works under MUDFA – To enable completion of the utilities diversions before commencement of infrastructure works, thus reducing risk during the construction phase and avoiding the risk premiums that would otherwise be included if this work was included with the Infraco package;
- Validation of the SDS designs by a Technical Support Services (TSS) consultant – To provide comfort that the designs produced will deliver the required performance;
- Incentivise delivery in accordance with programme – By adopting a milestone payment mechanism in the SDS, Tramco and Infraco contracts, with a significant element of the price withheld pending completion of system reliability tests; and
- Bonds and Warranties in the SDS, Tramco and Infraco contracts – To provide recourse in the event of failure.

1.82 These arrangements provide early involvement of the tram system operator, risk transfer to the private sector at an affordable level, a shorter overall programme and a single point of responsibility for the delivery of the operating tram system and subsequent maintenance.

1.83 Section 7 provides a detailed analysis of the Procurement Strategy and Section 11 describes the approach to risk management in all aspects of the project.

Risks retained by the public sector

1.84 The Procurement Strategy, when fully implemented, will be effective in transferring a very significant number of risks to the private sector. However, as explained above, the strategy is also predicated on delivering value for money, and certain risks are retained in the public sector where they can be effectively managed. **tie** maintains a comprehensive register of all identified risks in relation to the project and has an active management and mitigation plan for each risk. Where these risks can be quantified they have be assessed and included in the risk allowance in the capital cost estimates.

1.85 As the project moves towards physical construction, the following are the most significant risks which could impact on the delivery of the project on time and within the capital cost estimates (including risk allowances):

- **Utility diversions – tie** will manage the interface between utility diversions and the follow-on works by Infraco. A significant delay in the hand over of worksites to the Infraco

could result in significant financial penalties to the extent these are not met by the MUDFA contractor's liability limits. For this reason, a prompt start to these works was made in 2007, including advance works at the Gogar depot site. This allowed some of the delay, caused by the review of the project following the May election, to be absorbed. The current programme is fully aligned with the preferred Infraco bidder's programme of works and progress to date has been excellent with no major issues encountered so far;

- **Changes to scope or specification** – A great deal of care has been taken in defining the scope and specification of the tram project throughout the Parliamentary process and during design development, with input from TEL and Transdev and extensive consultation with CEC and TS. However, significant unforeseen changes to scope and specification could have a very significant impact on the deliverability of the project. Similarly, any changes introduced by stakeholders that are over and above the approved scope will increase the project estimate. Effective management of the consideration of changes through the Governance processes implemented for the project will be vital to mitigate this risk; and
- **Obtaining consents and approvals –** Responsibility for the preparation and application for most necessary consents and approvals has been passed to the SDS provider and this risk will pass to the Infraco at the point of novation. However, **tie** and the other stakeholders must continue to ensure there are clear strategies and effective processes to deliver all consents and approvals including planning approvals and Traffic Regulation Orders (TROs).

Implementation

1.86 **tie** has developed a number of key strategies and management plans to ensure the successful implementation of the construction phase of the project. They cover land acquisition, obtaining the required approvals and consents, compliance with statutory requirements and side agreements with 3rd parties, as well as traffic management plans and a people strategy. These are based on the policies developed through either public consultation or testing and consideration during the parliamentary process. They set out **tie**'s approach to mitigate the likely impacts of both the construction and operation of the tram.

1.87 Extensive work has been undertaken to establish the impact of tram on the wider traffic flows in Edinburgh and the finalisation of traffic modelling will include any necessary changes to the traffic arrangements that are indicated to be beneficial to the public.

1.88 In conjunction with development of the TEL Business Plan, the tram operating and maintenance contracts have been developed with a coordinated performance regime, safety management organisations and implementation plans. The contracts are aligned to achieve the integrated mobilisation, testing and commissioning of the tram and delivery of service.

1.89 A staged approach has been developed to allow passenger services to commence at a lower level of intensity, building with patronage growth and experience of revised road traffic flows through the city. Review and optimisation of traffic signal phasing will be performed in conjunction with CEC both before and after service commencement, to achieve effective traffic management.

Programme

1.90 The table below (Table 1.3) summarises, in chronological order, the key milestones achieved since the approval of the DFBC in December 2006 and the next stages of the project up to commencement of revenue service of Phase 1a. The detailed programme from which these dates have been extracted is described in Section 12 and has been prepared on the basis that contracts for Infraco and Tramco will be awarded in January 2008, with construction commencing in February 2008. The immediate start of construction is predicated on some limited mobilisation in late 2007.

Table 1.3. Milestone programme – Key dates

Milestones	Date
Approval of DFBC by CEC.	21 Dec 06*
Approval by Government of continuing funding including utility diversions based on the DFBC.	16 Mar 07*
TRO process commences.	28 May 07*
Tramco – Complete initial evaluation / negotiation.	07 Mar 07*
MUDFA – Completion of pre-construction period of MUDFA contract.	30 Mar 07*
MUDFA – Commencement of utility diversions.	09 July 07*
Infraco – Return of stage 2 bids.	08 May 07*
Tramco – Recommendation of Preferred Bidder.	19 Sep 07*
Infraco – Completion of evaluation / negotiation of bid.	09 Oct 07*
Infraco – Recommendation of Preferred Bidder.	15 Oct 07*
Tramco / Infraco – Final facilitation of novation negotiation complete.	16 Nov 07*
Tramco / Infraco – Final negotiation and appointment.	12 Dec 07
Infraco – Negotiation of Phase 1b complete.	12 Dec 07
Approval of FBC by CEC approval and funding for Infraco / Tramco and all related works to completion of project.	20 Dec 07
Tramco / Infraco – Award following CEC / TS approval and cooling off period.	28 Jan 08
Construction commences Phase 1a.	01 Feb 08
TRO process complete.	17 Nov 09
Commencement of test running Phase 1a.	27 Aug 10
Operations commence Phase 1a.	Q1 2011

*completed

The Business Case for Phase 1b

1.91 Phase 1 b (Roseburn to Granton Square) has a strong economic Business Case, but in the context of the £500m capped funding from the Scottish Government, the project funding position and risk appetite at this time, a Phase 1a only approach is recommended. It will be possible to progress with Phase 1b, with a limited financial penalty for this staggered approach, as long as commitment is made by 31 March 2009, following which, there could be substantial additional cost.

Economic viability

1.92 The strong incremental economic benefit of augmenting the network with the Roseburn to Granton tram line is a striking factor. There is a close relationship between this assessment and the scope and timing of new development at Granton, which carries both risk and opportunity. The economic benefits, alignment to planning objectives and financial implications that are specific to Phase 1b are summarised below.

1.93 The tram is integral to the regeneration of the brownfield area in the north of Edinburgh at Granton Waterfront. Some 7,800 new residential units and nearly 244,000 m^2 of new office, retail and other commercial development is projected to be built in Granton, progressively between now and 2020, reflecting the growth in Edinburgh's economy and population. The absence of Phase 1b of the tram is likely to have a substantial adverse effect on the scale and timetable for this redevelopment.

1.94 The forecasts reflect that by 2015 more than 4,500 residential units and 64,500 m^2 of employment related development in Granton will be not be built in the absence of Phase 1b of the tram. Beyond 2015, the predicted level of new development in Granton in the absence of tram recovers, but ultimately it is predicted that 3,800 residential units and 43,800 m^2 of new commercial development may not be built without Phase 1b of the tram.

1.95 In employment terms, it is anticipated that more than 930 full-time permanent jobs in the city will be generated, of which circa 340 can be attributed to Phase 1b. These jobs do not displace jobs elsewhere in Scotland.

1.96 On Phase 1b, Granton and Pilton to the north are areas where socio-economic status is considerably less affluent than surrounding areas and where employment, income levels and car ownership tend to be comparatively low. Opportunities for people living in these areas will be improved by direct connection via tram to the city centre and other development areas.

Benefits and costs to Government of a composite Phase 1a and 1b

1.97 The benefits and costs of Phase 1 of tram calculated in accordance with STAG requirements are summarised in the table below. The appraisal assumes that EARL, as discussed previously, will not proceed. Table 1.4 assumes that construction of Phase 1b would be commissioned prior to the end of March 2009, if not there will be a substantial penalty cost.

Table 1.4. Value of the ETN Benefits and costs for Phase 1, Phase 1a and incremental Phase 1b (£m Present Value, 2002 prices).

£m Present Value, 2002 prices	Phase 1	Phase1 a	Incremental Phase 1b
Value of scheme benefits	980	592	388
Value of scheme costs	424	335	89
Net benefits	**556**	**257**	
Benefit Cost Ratio to Government	**2.31**	**1.77**	

Note: Phase 1b is only operationally viable as part of the wider network of Phase 1. Therefore, no separate assessment of the NPV and benefits per £1 cost is performed.

Financial highlights – Phase 1b included

1.98 Table 1.5 provides a summary of the financial highlights from the forecast of TEL's profitability operating with bus and tram. This is based on a Phase 1a and Phase 1b approach and remains valid until March 2009, providing 1b is commissioned by that date.

Table 1.5. TEL profitability operating with bus and Phase 1a and Phase 1a and 1b tram.

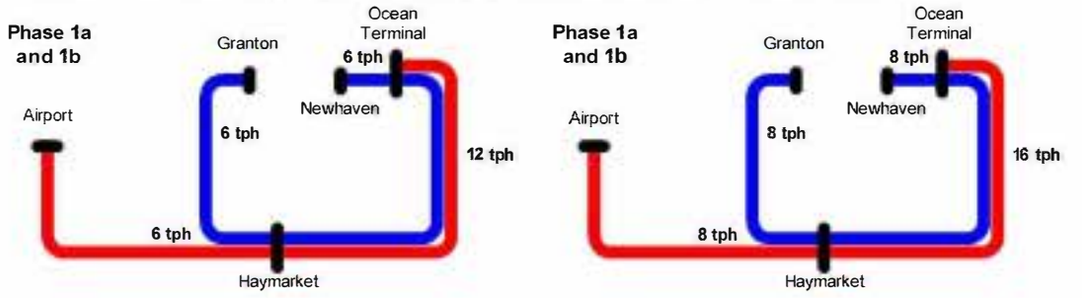
Tram in service	Pre-tram		Ph1a Only	Phase 1a plus 1b			
Tram service pattern (see below for explanation)	n/a	n/a	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2012	2016	2021	2031
Patronage (m Pax)							
Bus	108	117	113	112	121	128	143
Tram	-	-	11	16	24	28	34
Total TEL Patronage	108	117	124	128	145	156	177
Revenues and costs (£m)							
TEL Revenues	88	109	119	128	168	216	357
TEL operating costs			120	127	157	195	312
Pre-tax operating profit / (loss)			(1)	1	11	21	45
Tram lifecycle costs			-	-	1	2	2
Notional taxation			-	-	3	6	13
Dividend payment			-	-	3	3	5
Net TEL cash surplus / (deficit)			(1)	1	4	10	25

NB All £ figures inflated

Integrated service patterns

1.99 TEL's strategic operational plan fully incorporates Phase 1b as an option. The planned service patterns for opening of Phase 1b, representing the completion of the combined Phase 1 (Phase 1a and Phase1b), are shown in Figure 1.3.

Figure 1.3. Planned service patterns for Phase 1a and 1b combined (tph = trams per hour).



1.100 The operational assumptions and strategies that apply to an integrated bus and tram network including Phase 1b are the same as for Phase 1a alone (in terms of service integration, ticketing and operating costs). The financial highlights above show that TEL is potentially a very viable and profitable business. However, there is a higher level of uncertainty attached to the forecasts for patronage and revenue on Phase 1b. Although forecast patronage on Phase 1b in 2011 amounts to approximately 30% of total tram passengers, nearly 70% of that demand will be directly dependent on the new development at Granton waterfront. In context, this represents a relatively small proportion of TEL's total revenue.

1.101 Compared to Phase 1a, the opportunities to mitigate the impact on operating profits of short-term lower demand are less on Phase 1b, since a greater proportion of the patronage will be carried by the tram on 1a. However, opportunities will exist to reduce the planned level of tram services to mitigate any negative impact.

Affordability

1.102 There is no doubt that pursuing Phase 1b in tandem with Phase 1a, with either concurrent or staggered construction, further enhances the Business Case. However, it is recognised that, within current funding constraints alternative sources of funding will be required. Nevertheless, there is a reasonable period, during which the opportunities for funding can be investigated. This will also give time for risks currently pertinent on Phase 1a to crystallise / disappear during this period and this may give impetus to the possibility of undertaking and completing Phase 1b in an overlapped timeframe with 1a.

Funding requirements

1.103 To date, TS and CEC have approved funding which should be sufficient to meet forecast expenditure commitments up to Financial Close, scheduled for January 2008. This includes funding for compensation under a General Vesting Declaration (GVD) process to secure land required for the construction of Phase 1a and for the design, development and commencement of utility diversions.

1.104 Upon approval of this FBC, **tie** will require approval and immediate release of the remaining funding committed to the project, as per the milestone drawdown schedule under discussion between CEC and TS.

Summary of specific approvals arising from this Business Case

1.105 To approve the recommendation that the Edinburgh Tram Project Phase 1a proceeds at an estimated cost of £498m.

1.106 To approve the selection of the chosen preferred bidder for the Infraco and Tramco contracts.

1.107 To approve the request to **tie** Limited, with CEC officials, to examine the means of funding Phase 1b, with a view to potential commitment in 2008.

Conclusion

1.108 The Edinburgh Tram Project has now been under assessment for more than seven years. During that period, the underlying rationale for the project, support to the growth of the Edinburgh economy by providing high quality transport connectivity, has been reinforced by events. The city's economy and population continue to grow and the prospects are that this will continue. The Scottish economy as a whole is strongly influenced by the success of Edinburgh.

1.109 The Business Case seeks to set out in an objective and clear manner the advantages and disadvantages of the proposed scheme as a means of providing the enhancement to transport provision which the city will require if its growth ambitions are to be realised. The documentation reflects the scale and complexity of the scheme and the need for rigorous, professional analysis of the proposal. In its entirety, the document should represent a "balanced scorecard" assessing all the key aspects of the proposal. The document also sets out the means by which the project may be implemented in a risk-controlled manner, should the Business Case be approved.

1.110 The responsibility for delivering this document was given to the Tram Project Board by CEC through TEL. It is these organisations who now have the responsibility of concluding on the way forward for the project, based on the evidence presented in this Business Case.

2. Introduction

FBCv2 structure

The following summarises the content of the remaining sections of the Final Business Case:

3 – Project Development and Phasing: Details the historical development of the project up to the end of the Parliamentary process and describes the adoption of Phase 1a as the first phase of tram implementation.

4 – Project Justification: Summarises the findings of the STAG2 on Phase 1 and Phase 1a of the tram which is included in full at Appendix II.

5 – Project Scope: The functional specification for Phase 1a of the tram.

6 – Governance: The Governance structure which summarises the roles of CEC, TEL, **tie** and the Tram Project Board as well as the interests of the Scottish Government and Transport Scotland.

7 – Procurement: Details the contractual structures for the implementation of the project and the way risks are allocated between the public and private sector in a way which delivers value for money for the Public Sector.

8 – Implementation: Details the plans to manage the construction, testing and commissioning phases and outlines the strategies to reduce construction impacts as balanced against cost and programme impacts.

9 – Operational plan: Summarises the TEL Business Plan as included in full at Appendix I incorporating an assessment of the prospective profitability of TEL operating as an integrated bus and tram business.

10 – Financial Analysis: Gives details of the process by which capital costs for Phase 1 and Phase 1a of the project were estimated, assesses the affordability of the project in light of available funding and examines the benefits of maintaining flexibility and managing risk through a staged construction of Phase 1a and Phase 1b.

11 – Risk Management: Explains the type of risk the project faces and the management processes by which they are identified, quantified where possible and managed / mitigated.

12 – Programme Summary: Summarises the key milestones in the programme for delivery of the project which is in turn based upon Phase 1a opening in Quarter 1 of 2011. Detailed Gantt charts are provided at Appendix V.

13 – The case for Phase 1b: Summarises the economic case for Phase 1b, the options for construction included in the Infraco / Tramco contracts and potential funding opportunities.

14 – Future expansion: Considers developments in relation to tram schemes elsewhere in the UK and Dublin and what conclusions can be drawn for future expansion of the ETN.

3. Project development and phasing

History of project development

3.1 Substantial road traffic growth across the Edinburgh area, combined with forecast population and employment increases, will lead to significant growth in road congestion and demand for transport solutions. To support the local economy, the City of Edinburgh Council (CEC) identified trams as the preferred way to provide the backbone for a comprehensive, high quality public transport network to support the local economy and to help to create sustainable development. The key milestones in the development of the project to date are summarised in Table 3.1 and detailed in the text that follows. Progress to date on the procurement and implementation of the project is detailed in sections 7 and 8.

Table 3.1. Key development milestones to date.

1998	• **White paper – "Scotland's Transport Future".**
1999	• **City of Edinburgh Council (CEC) Integrated Transport Initiative (ITI) – Inception.** • **CEC Local Transport Strategy (LTS) – Interim.**
2000	• **CEC LTS 2000 – Published.** • **Waterfront Edinburgh Limited (a Joint venture between City of Edinburgh Council and Scottish Enterprise Edinburgh and Lothian) commissions the 'Feasibility Study for a North Edinburgh Transit Solution'.**
2001	• **Feasibility Study for a North Edinburgh Transit Solution – Published.** • **CEC commissions the 'Edinburgh LRT Masterplan Feasibility Study'.**
2002	• **Transport Initiatives Edinburgh Limited (now tie) incorporated** • **Scottish Executive 'Approval in Principle' of the City of Edinburgh Council's ITI.** • **Scottish Executive funding grant awarded to support the introduction two Bills into Parliament - Tram Line 1 and Tram Line 2.**
2003	• **Edinburgh LRT Masterplan Feasibility Study – Published.** • **Transport Minister announces £375million 'available in principle' for the Edinburgh Tram'.**
2004	• **Tram Line 1 and Tram Line 2 Bills submitted to parliament.** • **CEC LTS 2004 – Published.**
2005	• **Tram Line 1 and Tram Line 2 Bills preliminary reports heard by parliament and proceed to consideration stage.**
2006	• **Both bills passed by parliament following final stage debate and receive Royal Assent** • **Draft Final Business Case – Published.** • **Scottish Executive National Transport Strategy – Published.**
2007	• **CEC LTS 2007 – Published.** • **SESTRAN Regional Transport Strategy 2007 – Published.**

3.2 The tram scheme was first considered in the white paper entitled "Scotland's Transport Future" which was published in 1998. In line with the aspirations of the white paper, CEC included the development of a rapid transit network in its Local Transport Strategy (LTS) Interim Report published in 1999. This was followed in 1999 by CEC's New Transport Initiative (now known as the Integrated Transport Initiative or ITI). The ITI was aimed at making a significant contribution to meeting national, regional and local transport objectives and supporting long term economic prospects and quality of life offered by the south east of Scotland through the introduction of a congestion charging scheme with a supporting package of major transport investment.

3.3 In 2000 CEC's LTS was published which confirmed that the development of a tram network was central to its transport policy. In addition, Waterfront Edinburgh Limited commissioned a

feasibility study for a North Edinburgh Rapid Transit Solution (RTS). This study, which was published in 2001, examined the technical and economic case for a rapid transit system serving North Edinburgh and concluded that a loop which connected North Edinburgh with Haymarket and the city centre using light rapid transit (LRT) or tram based technology offered the best potential. Further details of the findings of this study are provided below (3.30).

3.4 In October 2001, CEC approached the Scottish Ministers with an "Application in Principal for an Integrated Transport Initiative for Edinburgh and South East Scotland" (the Application) setting out the underlying rationale for their ITI. Before reaching a final ministerial decision on the Application, the Minister for Enterprise, Transport and Lifelong Learning proposed that an arm's length company should be established to further review and develop the Application and the scope of the ITI and to deliver the ITI.

3.5 On 30 April 2002, Transport Initiatives Edinburgh Limited (now **tie** limited) was incorporated. Thereafter, on 18 December 2002, the Application was approved by the Scottish Ministers. As a result, the Scottish Executive (SE) awarded a funding grant to support the introduction of the Edinburgh Tram (Line 1) Bill and the Edinburgh Tram (Line 2) Bill to the Scottish Parliament.

3.6 The case for the tram was further considered in the Edinburgh LRT Masterplan Feasibility Study commissioned by CEC in 2001 / 2002 and produced and published by Arup in 2003 (the Arup report). It confirmed that the northern loop should receive the highest priority followed by the western and south-eastern lines. The Arup report also concluded that LRT or tram was the appropriate choice for a city of Edinburgh's size. Further details of the findings of the Arup Report are provided below (3.36).

3.7 The recommendations in the 'Feasibility Study for a North Edinburgh Rapid Transit Solution', the 'Edinburgh LRT Masterplan Feasibility Study', CEC's LTS and the CEC ITI culminated in funding support in June 2002 from the Scottish Executive to develop the North Edinburgh Loop (Line 1) and the Western Route (Line 2) for Parliamentary submission.

3.8 In March 2003 the Transport Minister announced that there was £375 million 'available in principle' for the Edinburgh Tram.

3.9 In respect of Line 1, the option development process was revisited in 2002 and 2003 through the work carried out by Mott Macdonald in the Work Package One Report. The preferred option was broadly confirmed, subject to potential alignment variants at George Street / Princes Street and Telford Road / Roseburn Railway Corridor. These options were taken forward to public consultation.

3.10 As for Line 2, the starting point was to examine and select the preferred route corridor through west Edinburgh. Over thirty route options were defined and three basis corridors identified. The preferred route corridor was carried forward to public consultation as were various sub-options – George Street / Princes Street; Roseburn to Carrick Knowe section; Gogar Roundabout and the alignment at the airport.

3.11 Public consultation took place on the preferred route alignments for both lines during May – July 2003 and as a result of the consultation responses and comments, a single preferred route alignment for each line was identified and the necessary Private Bill and accompanying documents developed.

Parliamentary approval

3.12 On 23 December 2003 the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill were submitted to the Scottish Parliament. CEC approved its LTS 2004 – 2007 on 22 January 2004 which reconfirmed that the development of a tram network was central to their transport strategy. Thereafter, both Bills were formally introduced to the Scottish Parliament on 29 January 2004.

3.13 The Bills, as drafted, proposed two lines which could be operated as part of a network.

- Line 1: a loop from St Andrew Square along Leith Walk to Leith, west to Granton, south to Haymarket via the Roseburn Railway Corridor and back to St Andrew Square via Princes Street. The overall route length is 15.6km with tramstops at 22 locations.
- Line 2 follows a western direction from St Andrew Square via Princes Street, Haymarket, Murrayfield and South Gyle to Edinburgh Airport and with a shuttle extension from the Airport to Newbridge. In total, the line covers 17.8km and has tramstops situated at 18 locations.

3.14 The section of tramway between St Andrew Square and Roseburn is common to both Line 1 and Line 2.

3.15 Both bills were considered by separate committees. The Edinburgh Tram (Line 1) Bill Committee published its preliminary stage report on 16 February 2005, which was debated by the Scottish Parliament on 2 March 2005. The Edinburgh Tram (Line 1) Bill Committee published its preliminary stage report on 9 February 2005 and it was debated on 23 February 2005. Both Bills received unanimous, but qualified, support to proceed to the consideration stage.

3.16 During the consideration stage, the promoter (CEC) sought to amend the route alignment of both bills. In relation to Line 1, there was a small amendment at Leith. In relation to Line 2, there was an amendment at the Gyle to pull in the limits of deviation so that the alignment runs along the edge of, rather than through, the Gyle car park. In relation to the common section, there was an amendment at Haymarket which moved the alignment from between Citypoint and Elgin House to a line in front of Elgin House along the reserved public transport corridor. These changes were assessed using the STAG appraisal guidance and supplementary accompanying documents were submitted with the proposed amendments to the bills.

3.17 The Edinburgh Tram (Line 1) Bill Committee published its consideration stage report on 1 March 2006 and this included a recommendation that the route be amended as sought by the promoter. The Edinburgh Tram (Line 2) Bill Committee published its consideration stage report on 21 December 2005. Again this included a recommendation that the route be amended as sought.

3.18 The final stage debate for the Edinburgh Tram (Line 1) Bill took place on 29 March at which time the bill was passed. It subsequently received Royal Assent on 8 May 2006. The Final Stage debate for the Edinburgh Tram (Line 2) Bill took place on 22 March at which time the bill was passed. It subsequently received Royal Assent on 27 April 2006.

National transport policy

3.19 National planning policy is shaped by the National Planning Framework. This document supports the integrated planning of land-use and transport as exemplified by the Edinburgh and the Lothians Structure Plan.

3.20 National transport policy is set out in the White Paper "Scotland's Transport Future." This sets out the overall aim of promoting economic growth, social inclusion, health and protection of the environment through a safe, integrated, effective and efficient transport system. It sees the principal challenges in achieving this are changing attitudes to transport choices, stabilising road traffic volumes at 2001 levels by 2021, facilitating the development of new transport links and delivering value for money. Linked to this is maximising the opportunities presented by the rapid pace of technological change and ensuring the right governance arrangements are in place to deliver.

3.21 In terms of delivering the vision, the white paper specifically states

> *"We [the Scottish Executive] are supporting City of Edinburgh Council's proposals to introduce a modem tram network to Edinburgh, to tackle congestion and link communities with areas of economic growth. Trams will provide fast, efficient, mass transport and provide a real alternative to travel by private car."*

National, Regional and Local Transport Strategies

3.22 In December 2006, the Scottish Executive published the National Transport Strategy (NTS) which sets out, for the first time, the long term vision for transport, together with objectives, priorities and plans. The NTS states three 'strategic outcomes':

- Improve journey times and connections – making it quicker, easier and more reliable for passengers to travel between our towns and cities and across our global markets;
- Reduce emissions – making sure that Scotland takes a lead in the future of sustainable transport; and
- Improve quality, accessibility and affordability – ensuring everyone across Scotland has high quality public transport choices.

3.23 SESTRAN (south east of Scotland transport partnership) is one of seven regional transport partnerships in Scotland. Within the SESTRAN area there is a huge diversity of transportation issues from urban congestion to rural public transport and from ferry ports to airports. SESTRAN aims to address these issues and work towards a more sustainable and efficient transport network. Under the Transport (Scotland) Act 2005, SESTRAN has a statutory obligation to prepare a Regional Transport Strategy (RTS). A Draft RTS was published for consultation in November 2006, and the final document was published in March 2007 The SESTRANS RTS has been developed with close links to the NTS. The following vision statement describes the overarching direction of the RTS:

> *"South east Scotland is a dynamic and growing area which aspires to become on of northern Europe's leading economic regions. Essential to this is the development of a transport system which enables businesses to function effectively, allows all groups in society to share in the region's success through high quality access to services and opportunities, respects the environment, and contributes to better health."*

3.24 The purpose of this RTS is to set out a clear framework for the future direction of investment in, and management of, transport in the SESTRAN area for the next 10-15 years. Two main aspects form the basis of the RTS – the sustainable development of the area in a less car-dependent manner and the widening of access for all areas and groups. The RTS strongly supports the tram and states that SESTRAN will strive to see expansions of the tram network in the future.

3.25 CEC resolved in October 1998 to prepare its Local Transport Strategy (LTS), and this was published in 2000. Updates of the LTS were approved by CEC in January 2004 and March 2007. It sets out a vision for transport in Edinburgh as follows:

> *"Edinburgh aspires to be a city with a transport system which is accessible to all and serves all. The transport system should support a sustainable and prosperous economy. It should contribute to better health, safety and quality of life of all Edinburgh's citizens and visitors, particularly children, the elderly and disabled people."*
>
> *"The Council will seek to maximise people's ability to meet their day to day needs within short distances that can easily be undertaken without having to rely on a car. The city should develop and grow in a form that reduces the need to travel long distances." Choice should be available for all journeys within the city.*

3.26 The aims of the LTS are to support a sustainable and growing local and regional economy; improve safety for all road and transport users; reduce the environmental impacts of travel; support the local economy; promote better health and fitness; and reduce social exclusion. The LTS also sets out a number of more specific objectives, including "implementing the tram project by 2011 as the core of a modern transport system for the city".

3.27 The LTS included identifying and implementing a series of measures including the ITI, which was presented to CEC's Transportation Committee in May 1999. The committee authorised implementation of Phase 1 of the strategy, which was to identify major improvements needed to the city's transport system. The measures that were identified were a congestion charging scheme, together with a package of improvements to public and private transport.

3.28 In May 2000, CEC considered the results of Phase 1 of the ITI and agreed to embark on Phase 2, an examination of the ways of achieving the measures that had been identified. The CEC Executive considered Phase 2 in September 2001. The package of suggested improvements to public and private transport was divided into five areas: rail, tram and guided bus; integrated transport including park and ride; bus improvements; road maintenance; and quality of life and environmental improvements.

3.29 The report concluded that the best way to deliver the improvements was to set up a wholly-owned subsidiary to implement such elements of the ITI. CEC established **tie** as a wholly-owned subsidiary company in 2002 with the role of project management, procurement and implementation. **tie** was established with its own staff, a majority of private sector board members, and the remit to develop the ITI and to take forward the development of three tram line projects. CEC retained the transport strategy function and once agreed projects move to the detailed development and procurement stage, **tie** takes responsibility for them.

Feasibility Study for a North Edinburgh Rapid Transit Solution

3.30 In support of the development of CEC's LTS, a potential RTS for linking the Waterfront development in the north of Edinburgh to the city centre was commissioned. This work was performed by a partnership of Andersen, Steer Davies Gleave and Mott MacDonald and published in July 2001.

3.31 The 'Waterfront Report' as it came to be known, examined potential technical solutions for a RTS. The options considered were initially:

- Bus based - Quality bus, alternative fuel;
- Guided bus based - Kerb guided and electronic guided;
- Light rapid transit - Light rail; and
- Automated guideway - Monorail, people mover and maglev.

3.32 After initial assessment of the relative merits and demerits of each transport mode they were judged against four key questions:

- Will the technology work in the available corridor?
- Does it achieve the overall quality desired of the system?
- Does the technology match the scale and form of network proposed, including future developments? and
- Will the technology attract the anticipated patronage or have adequate capacity?

3.33 Leading on from the above assessment the following options, as discussed in the 'Waterfront Report', were discounted:

- Transitional bus;
- Monorail;
- Guideways;
- Magnetic levitation; and
- People movers.

3.34 Two remaining options - guided bus and light rail, were taken forward for detailed assessment against the criteria in Table 3.2 below:

Table 3.2. "Waterfront Report" – Assessment of guided bus and light rail transit options.

Criterion	Guided bus	Light rail transit
Alignment.	If segregated, similar issues to LRT, otherwise easier to design.	Dedicated alignment design required whether segregated or not.
Public utilities impacts.	If segregated similar issues to LRT, otherwise no relocation required.	All longitudinal services beneath swept path must be relocated.
Traffic impact.	Will need to contend with existing bus service on street.	Greater priority afforded, thus reduced impact if properly policed.
Modal interchange.	No major benefit over existing bus services.	Benefit of incorporating new mode of transport at interchange.
Journey time.	Guided bus will not receive any greater priority than normal buses if un-segregated.	Greater priority afforded to LRT on un-segregated sections thus reducing journey times.
Patronage.	Not perceived as significantly different from conventional bus thus reduced patronage.	Reduced journey times, improved reliability and comfort will result in increased patronage.
Carrying capacity.	Would require additional vehicles for the same peak capacity.	Increased carrying capacity with peak capacity of 2,500 people per hour.
Depot site.	No dedicated infrastructure required.	Dedicated infrastructure required.
Capital cost.	Reduced capital costs.	Increased capital costs.
Operating costs.	Comparable to LRT but increased lifecycle replacement costs.	Comparable to guided bus but fewer lifecycle replacement costs.
Revenue.	Less revenue.	More revenue.
Construction programme.	Programme contracted due to works extent being significantly reduced.	Programme lengthened due to works extent being significantly increased.
Accessibility.	More difficult access for disabled persons, push chairs etc.	Greater accessibility for all including disabled persons with level access.
Comfort / ride quality.	Inferior comfort levels due to irregularity of road surface.	Superior comfort levels with light rail vehicles (LRV's) fitted with resilient wheels and high specification suspension on rails.
Frequency / reliability.	More frequent but not as reliable due to reduced priority traffic impacts.	Improved frequency / reliability mainly due to given priority.
Image.	Perceived by public as normal bus.	Improved public image over buses.
Safety.	Reactionary operation therefore path not as easily perceived.	Improved safety due to fixed path easily perceived (pedestrian / driver).
Air quality / noise impacts.	Increased air quality and noise impacts due to the bus vehicles generally being diesel powered. These impacts can be reduced by adopting dual powered buses.	Reduced impact as LRV's being electronically powered do not discharge noxious emissions and equipped with resilient wheels and skirting, as well as, using continuously welded rail, means noise is minimised.

* Highlighted cells denote which option is better against each criteria.

3.35 Following this detailed analysis, tram was selected as the preferred transport solution. Three route options were derived from a long list of 26 configurations. Following the detailed assessment and consultation the preferred solution of a light rail system was identified and the route configuration now known as the North Edinburgh Loop was proposed. This proposal

was submitted to full City of Edinburgh Council and has been incorporated in the LTS 2000, 2004 and 2007.

Edinburgh LRT Masterplan Feasibility Study

3.36 This report was commissioned by CEC (December 2001) to build on the initial work proposed under the 'Waterfront Report'. The specific remit for Ove Arup and Partners was to develop:

- A "viable network" of LRT routes which, in conjunction with other modes, will best meet the LTS and other project specific objectives;
- An outline of capital costs, revenue and operating costs for the LRT lines;
- Sufficient data on LRT routes for use in overall assessment and prioritisation of scheme with the ITI; and
- Inputs to the development of the road user charging scheme business case and to support applications to the government for approval and funding of the ITI.

3.37 The approach taken was in two phases. Phase 1 comprised a comparison of the nine identified transport corridors and their appraisal against preliminary criteria based on Scottish Transport Appraisal Guidance (STAG) 1. This comparison led to the recommendation of seven schemes (see table below) for a more detailed assessment at Phase 2, which formed the basis of the recommendation on priorities for LRT implementation.

Table 3.3. Edinburgh LRT Masterplan Feasibility Study – Ranking of possible LRT corridor options.

Corridor	Scores	Ranking
Queensferry	+9	4
North Edinburgh Loop	+22	2
West Edinburgh	+24	1
South Edinburgh	+6	5
South East Edinburgh	+17	3
South Suburban	+4	7
South Orbital	+5	6

3.38 Following the detailed appraisal, it was recommended the top three were taken forward for further detailed consideration. This further analysis resulted in the conclusion that the North Edinburgh Loop (Line 1) be accorded the highest priority among the corridors tested and that the Masterplan should include both the West (Line 2) and South East (Line 3) lines as high priority schemes. This proposal was submitted to CEC and was incorporated in the LTS 2000, 2004 and 2007.

Establishment of Transport Edinburgh Limited (TEL)

3.39 CEC has established TEL as the single economic entity under which both the Tram and Lothian Buses will operate in an actively planned and managed integrated transport network. TEL is taking full advantage of the continuing engagement of Transdev as the intended operator of the Tram network who bring to bear their experience and expertise in the design and operation of tram and other public transport system systems.

3.40 TEL has developed its presence with the appointment of its Board of Directors, including two independent non-executives. The Chief Executive of Lothian Buses has been appointed as Chief Executive of TEL. The governance structure of the Tram project has been amended, such that TEL has clear accountability for planning and implementing the integrated transport business, with **tie** (advised by Transdev), charged with delivery of the tram project. This structure has been implemented such that clear and full accountability to the Council as promoter of the Tram project, and majority owner of Lothian Buses, is sustained. The governance structure is further considered in section 6.

3.41 TEL played a leading role in the preparation of the DFBC, approved in December 2006, and this FBCv2, with particular contributions in the following areas:

- Development of the adopted phasing strategy as described below (3.42);
- Development of future integrated service patterns for tram and buses working together;
- Validation of the prospective economic benefits delivered by the introduction of tram as summarised in section 4; and
- Validation of modelled patronage and revenue forecasts for tram and for TEL as a combined tram and bus business and incorporation of same into a 'TEL Business Plan' which encapsulates the operational plans for the tram as detailed in section 9.

Project phasing

3.42 During 2005 the key funding and affordability issues were addressed with respect to the funding of the Project, in the context of a SE grant of £375m, and the financial risks which will have to be borne by either CEC or SE. Four possible configurations of the Tram network were addressed as follows:

a) Line 1 only
b) Line 2 only
c) Line 1 and 2
d) Line 1 and 2 less the Newbridge Shuttle

3.43 A great deal of work was carried out to ensure that the capital cost estimates available at the time were as accurate as possible and they were benchmarked against outturn costs on completed tram projects and other third party comparators. It was recognised that on a project of this scale and complexity, there will remain a degree of uncertainty (including that relating to construction market prices generally) up to the point where tender prices are negotiated. Therefore, it is important to achieve as much certainty as possible on the likely costs before procuring the major contracts for the tram infrastructure and vehicles.

3.44 The conclusion reached was that although Line 1 only or Line 2 only had a high degree of deliverability, within the constraint of a fixed SE grant of £375m, a complete network of Lines 1 and 2, with or without the Newbridge Shuttle, was unlikely to be affordable in one phase of construction and that a phased approach to procurement and delivery would be implemented.

3.45 CEC's identification of a phased approach was welcomed and discussions with officials of CEC and senior civil servants in TS focused on the capital funding available and which sections of the tram network could realistically be afforded as a first phase of the network. As a result the Transport Minister indicated a willingness to consider indexation of the original £375m grant (i.e. to increasing the amount of the grant to take account of inflation), provided that a substantial capital contribution was made by CEC, and subject to the submission of a FBC demonstrating the benefits and viability of the phased scheme.

3.46 Concurrent with development of the in-principle revised funding contribution from SE and CEC above, the analysis of the phasing options progressed. Taking a prudent view on capital cost estimates and funding sources, an examination was undertaken by a number of parties — **tie**, CEC, TEL, LB and Transdev to assess the optimum construction phasing of a complete network of Lines 1 and 2. This work was validated by SE. The parties determined through reasoned argument and professional judgement which phases within the totality of Lines 1 and 2 would be the best to proceed with.

3.47 Consideration was given to a range of options for first phase network construction and to the pattern of construction of subsequent phases. This work indicated that the core of the network would be the line from Leith Waterfront to Edinburgh Airport via Haymarket and Princes Street (Phase 1a), would give a good balance of costs and benefits and would present a high probability of being financially viable when integrated with LB services. In addition, the first phase of the tram development was extended to include the section from Roseburn to Granton Square (Phase 1b) serving the development area in Granton. The assumed Phase 1 of Leith waterfront to Edinburgh Airport (Phase 1a) and Roseburn to Granton (Phase 1b) has been adopted by all parties.

3.48 Phase 1 would provide the core support for the city economy and would directly link the major growth centres at the airport, Gogarburn, The Gyle, Granton and Leith Waterfront with the city centre. It would provide access to the major housing and commercial developments under construction and planned for the medium to long-term and would underpin the role of these developments in sustaining the Edinburgh's role as a growing successful capital city.

3.49 The link to Leith will serve two thirds of the waterfront development contained in the area that runs across the Leith waterfront between Newhaven and the eastern end of the Victoria dock in Leith. Two thirds of the totality, approaching 20,000 residential units plus retail and commercial development, is within that arc. The tram will serve that area extremely well. Under the latest proposals from Forth Ports, a community the size of Bathgate will be built in Leith docks.

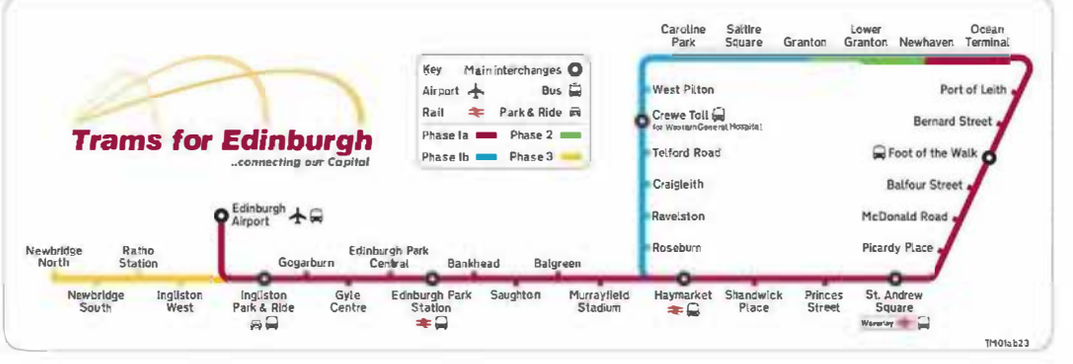
3.50 The advantages to CEC in achieving its vision for the city and in securing transport infrastructure stemming from this first phase of the tram include:

- A world class gateway to the city for visitors arriving at the airport, providing access to all modes of transport;
- Direct access to the major shopping destinations of the Gyle, Ocean Terminal and the city centre and to the Royal Bank of Scotland's (RBS) new international headquarters at Gogarburn;
- Access for existing communities to employment, leisure, shopping and other opportunities;
- A link with existing transport hubs at Edinburgh Park, Haymarket and Waverley Railway Stations and at the bus station in St Andrew Square to give first class interchange for local and long distance trips;
- Serving an expanded Park and Ride at Ingliston increasing the catchment area of the tram and further reducing the demand for car travel in the city;
- Serving Murrayfield, Tynecastle and Easter Road stadia, giving access to international and national sporting and other events; and
- Providing the core infrastructure on which expansion of the network would be built and could include in the future the proposed Line 3 linking the city centre with the new Royal Infirmary and the key development areas in south Edinburgh.

3.51 CEC remains committed to seeking future funding for the subsequent phases which would complete the full network of Lines 1 and 2 as depicted in Figure 3.1. These have been defined as:

- Phase 2 – Granton to Leith section along the waterfront, enabling through running of trams past Ocean Terminal and onto central Leith; and
- Phase 3 – Ingliston to Newbridge section which opens development opportunities in west Edinburgh under the West Edinburgh Planning Framework. Future funding will be closely linked with the continued expansion of the city and the associated opportunities for private sector contributions.

Figure 3.1. Line 1 and Line 2 phasing plan



3.52 In January 2006, following consideration of the phasing proposals, CEC made a commitment to contribute £45m towards the capital cost of Phase 1a of the project, to be structured in a manner which minimises financial risk.

3.53 In February 2006, the Transport Minister made an in principle commitment to increase the grant originally offered in March 2003 in line with inflation, estimated at the time as up to £500m. On 27 June 2007, the Cabinet Secretary for Finance and Sustainable Growth announced that funding would be conditionally provided to continue the delivery of the Edinburgh Tram system, up to a maximum of £500m, with no further indexation for inflation. Additional funding required for the project would need to be provided by CEC or by other parties under the direction of CEC. The detail of these arrangements is explained in Section 10.

Implementation of Phases 1a and 1b

3.54 **tie**'s procurement strategy as described in section 7 is entirely compatible with a phased approach. Since the network scope guidance provided in early 2006, **tie** prioritised its design and other implementation activities toward Phase 1a and, in particular, the most complicated section from Leith to Haymarket.

3.55 The invitations to tender for the infrastructure works and provision of the tram vehicle were based on a core bid, focussing on Phase 1a with an a fixed price option, based on the same principles for Phase 1b, to be exercised by Spring 2009. All bidders have returned compliant bids which reflect this phased approach and final negotiations for the 1b option will be completed prior to Infraco award. Confirmation of the continued economic validity of Phase 1b and details of the option for construction as they will be included in the Infraco contracts are set out in section 13. This includes the relative costs and benefits, as well as the impact of deferring a decision on this phase of the tram project.

3.56 This approach meets the aspirations for development of a core section of the original Lines 1 and 2 as a first phase, which is fully supported by TEL and Transdev. The resulting system is a good fit with the structure and local plans and reflects long term objectives

4. Project justification

STAG appraisal process

4.1 STAG is the official appraisal framework to aid transport planners and decision-makers in the development of transport policies, plans, programmes and projects in Scotland. STAG has two parts:

- **STAG1**: initial appraisal and broad assessment of impacts, designed to decide whether a proposal should proceed, subject to meeting the planning objectives and fitting with relevant policies; and
- **STAG2**: detailed appraisal against the scheme and the Government's objectives.

4.2 As part of the supporting documentation submitted to parliament, full STAG1 and STAG2 appraisals were developed for each of Line 1 and Line 2 by Mott MacDonald and Faber Maunsell, respectively. This detailed work assessed the projects against the key STAG criteria and confirmed that both lines met, or exceeded, the Scottish Executive criteria. The documents were submitted to the CEC Executive for approval and final versions were submitted to parliament in September 2004. A separate, but parallel, network study providing the overarching framework for the development of trams in Edinburgh was developed by Faber Maunsell and reported to the Line 2 committee.

4.3 Following the decision to proceed with Phase 1 of the project, as described in section 3, **tie** commissioned the preparation of an updated report from Steer Davis Gleave setting out the STAG2 appraisal of Phase 1 of the tram, taking into account its constituent parts of Phase 1a and 1b (Appendix II). Given that Phase 1 is essentially a hybrid of Lines 1 and 2, the appraisal built upon the work undertaken on the previous appraisals for these individual lines, with much of the existing material updated and reconfigured for the appraisal of Phase 1. The work also identified Phase 1a as an individual phase for all aspects of the appraisal and this forms the baseline for this FBCv2.

4.4 Where the appraisal was based on the use of transport modelling outputs, such appraisal was reworked from first principles using the transport modelling undertaken under the Joint Revenue Committee (JRC) contract, again led by Steer Davis Gleave, and presents an assessment of the benefits and costs to Government of constructing Phase 1 and Phase 1a only.

4.5 This summary of the justification for Phase 1a of the tram encapsulates the STAG2 report in respect of the planning objectives established by the planner (planning strategy) and the Government's five objectives for transport:

- Environment;
- Safety;
- Economy;
- Integration; and
- Accessibility.

Although this summary focuses on Phase 1a, it is recognised that there are significant benefits and links to planning objectives which could be derived from Phase 1b. Details of the case for Phase 1b are provided in section 13.

Planning objectives

4.6 Development of planning objectives is fundamental to development and appraisal of transport proposals. Planning objectives were developed with reference to the SE's national objectives and incorporate the relevant policies in local planning documents. They were based significantly on the opportunities, problems and constraints in the waterfront – city centre – airport corridors.

4.7 The planning and policy context at national, regional and local levels was used as the basis to develop the following Transport Planning Objectives:

- To support the local economy by improving accessibility;
- To promote sustainability and reduce environmental damage caused by traffic;
- To reduce traffic congestion and encourage mode shift;
- To make the transport system safer and more secure; and
- To promote social benefits.

Economic regeneration

4.8 In the parts of Edinburgh served by tram such as Leith Docks, Sighthill and, potentially, Granton, regeneration is a key priority. Phases 1a and 1b of the tram will connect these core development areas (CDA) across the city and minimises the need for dependence on private car to access employment, residential and retail areas.

4.9 Equivalent to a new town in scale, Edinburgh Waterfront is the largest brownfield development in Scotland. Phase 1 of the tram will support and catalyse this development by providing sustainable transport connections to areas where public transport service could be improved or which are or will experience congestion, particularly at peak times. This can significantly contribute to city regeneration. The major developments at Leith Docks will be more likely to succeed, and do so in a shorter timescale, with Phase 1a of the tram. These developments will bring high quality living, leisure and employment opportunities to the area.

4.10 As part of the demand forecasting and appraisal process of the tram, a thorough and robust review of planning opportunities was undertaken involving CEC planners. This considered the likely range of new development possible at the various sites identified and the potential impact that the tram might have on the overall scale of development. Table 4.1 sets out the most likely considered level of development up to 2020 with Phase 1a of the tram in place. Details of the impact of Phase 1b are provided in Section 13. Given the already dense nature of much of the central area of the city, the opportunities in that area are relatively modest in scale. The biggest development opportunity in Edinburgh is the redevelopment of the Granton and Leith Docks areas. Whilst substantial development has already taken place, notably at Leith, the overall aspirations for these areas are considerable. Nearly 350,000m^2 of other uses complete the development potential. The significant development planned in the West Edinburgh office / business sector would also have a considerable impact on tram patronage levels.

Table 4.1. Most likely new development to 2020 with Phase 1a of the tram in place.

Location	Residential (Units)	Office / Business (m^2)	Retail (m^2)	Hotel (rms)	Commercial (m^2)	Leisure (m^2)	Other (m^2)
City Centre	2,719	141,390	91,705	450	4,800	5,750	5,100
Leith Docks	18,000	30,000	26,000	0	41,500	0	0
West Edinburgh	0	253,350	0	168	50,000	14,300	174,000
Total	**20,719**	**424,740**	**117,705**	**618**	**96,300**	**20,050**	**179,100**

4.11 Without Phase 1a of the tram it is unlikely the large scale redevelopment of Leith Docks could go ahead in the same timescales or to the same extent. The new developments will bring high quality living, leisure and employment opportunities. In addition to opening up brownfield land for redevelopment, it is highly probable that the tram will have a positive impact on the image of the area and hence help to stimulate further inward investment. For certain employers whose workforces may be more than usually reliant on public transport access, the tram should act as a catalyst to encourage them to locate in areas that they would have previously discounted. In addition, by contributing to reducing growth in congestion, the tram will be assisting with maintaining the economic viability of North and West Edinburgh.

4.12 In order to compete in an increasing competitive marketplace, and to further stimulate economic regeneration, it is important to maintain and improve upon the city's wider streetscape. In spite of its historical and cultural importance, parts of Edinburgh's urban environment are of much poorer quality than is desirable. Experience in France has shown that investment in trams has been a catalyst for improvements to the streetscape and environmental amenity in general, bringing both economic and social benefits. In recognition of this important role of tram, the planning authority (CEC) has developed and approved a Tram Design Manual which is supplementary planning guidance that must be taken into account when the necessary prior approvals for the tram are being considered.

Environment

4.13 The tram will need to address the effect on the World Heritage Status of Edinburgh and **tie** is seeking to minimise or eliminate any adverse impact the tram may have, by working closely with the CEC Planning Committee to develop complementary solutions. Design work is targeted on the most sensitive sections of the route, with the aim of facilitating planning solutions in these areas. The topography, layout, numerous ancient monuments and Sites of Special Scientific Interest, have all been evaluated and have shaped the routing of the tram system. **tie** is committed to minimising any adverse impact on these areas. Mitigation is set out in the Tram Design Manual. This provides specimen designs for key areas, including the whole of the World Heritage Site. Specific contract requirements ensure that the final design complies with the Tram Design Manual.

4.14 There are also some areas of contaminated ground along the route, including disused railway land and a former landfill site. Temporary impacts from the construction works will cause minor negative impacts on the land here, but, with effective mitigation, the permanent impacts during the operation of the tram will be minor. There are several protected species present in the corridor including bats, otters and badgers. However, mitigation measures have been implemented to ensure that works undertaken in close proximity to badger setts and foraging habitat comply with the requirements of relevant legislation, in consultation with Scottish Natural Heritage (SNH) and the Scottish Executive's Countryside and Natural Heritage Unit (CANHU). Details of mitigation measures for this and the retention, protection and enhancement of existing plantings and habitats and replacement of those lost as a consequence of the development can be found in the Landscape and Habitat Management Plan (LHMP).

4.15 Assessment of the environmental aspects of Phase 1a show that it can make a positive contribution towards objectives of reducing emissions and improving air quality in the Air Quality Management Area (AQMA) set up by CEC. Phase 1a passes through the heart of the city centre and will specifically contribute to these issues which CEC is addressing through an Air Quality Action Plan (AQAP). Vehicles within the city have been shown to account for up to 88% of emissions of nitrogen oxides. Trams will contribute to the objectives of the AQAP by providing a large number of journeys through the city centre; improving mobility and accessibility without adding to current levels of nitrogen dioxide (trams have zero emissions at point of use). Trams are also relatively quiet, compared to other modes of road transport, providing a higher quality environment for those living, working and travelling in the area.

4.16 The tram's contribution to mode shift will enable further progress towards objectives set in the Air Quality (Scotland) Amendment Regulations 2002 and to national objectives to reduce emissions of greenhouse gases. CEC have identified air quality issues in the western corridor of the city leading to the airport area, with a particular focus on Corstophine Road, St Johns Road and the Drumbrae roundabout. Monitoring of this is being carried out with a view to determining it a second AQMA. Phase 1a will pass directly through this corridor and, as a result, will contribute to air quality improvements in the area.

Safety and reliability

4.17 Personal security will improve, reflecting tram design elements (CCTV and help points at all stops and vehicles) and designed access arrangements aimed at enhancing security. The planned high use of inspectors on vehicles will also assist this objective.

4.18 Trams will improve the overall reliability of public transport, as they generally benefit from greater segregation from general traffic and priority at junctions, and present an opportunity to significantly reduce the variability of dwell time at stops compared to a bus-only public transport service. In the absence of trams, a significantly increased number of bus vehicles would be required on the main Phase 1a corridor on Princes Street and Leith Walk to cope with forecast increased passenger demand. Despite continuing implementation of a wide range of bus priority measures, buses remain vulnerable to the effects of increasing congestion across the city.

4.19 The current method employed to maintain bus services despite the negative influences of increasing congestion is that LB review and update the operating timetables on a regular basis, flexing them as necessary and inserting additional buses to achieve bus frequency. An important issue in reflecting prevailing traffic operating conditions is to consider the implications of the natural variability in the levels of queues and delay that are experienced across the city on a day to day basis. In practice, journey times vary, so the timetables reflect an average journey time, in order to achieve a high level of reliability.

4.20 Research has shown that unreliability of journey time is particularly off-putting to public transport passengers. One piece of research, for example, suggests that the standard distribution of journey time (a measure of variability) was as off-putting to passengers, per minute, as 1.3 minutes of additional average journey time (Table 8.14, The Demand for Public Transport: a practical guide, TRL Report TRL593, TRL, 2004).

4.21 Over the past decade, CEC and LB have worked in tandem through a process of operational management interventions and improved bus priority measures at key locations, in order to maintain timetable and, thus, service delivery. It is commendable that it has been possible to steadily keep up with the changing demands for travel against the context that available road capacity has not markedly changed, and that road traffic volumes across the city have been on the rise over time. It is unlikely that the types of intervention that have worked in the past can indefinitely be sustained into the future.

4.22 It is envisaged that in a 'no tram' world, in order to meet passenger demand, it would be necessary to increase the number of buses along the tram operating corridor by more than 30% by 2031. This, in turn, would be likely to be commensurate with adjacent growth in highway traffic.

4.23 Despite increased priority, segregation and effective operational management, the introduction of higher frequency services to tackle the level of patronage growth alongside growth in other road traffic, allied with increased levels of bus queuing and passenger boarding and alighting times at critical stops would inevitably lead to deteriorating journey times and reliability.

4.24 The mechanisms at play leading to the possibility of a reduction in bus service reliability include:

- Greater demand => higher bus loads;
- Greater demand => increased other road traffic;
- Higher bus loads => longer journey times (due to dwell times);
- Higher bus loads => larger vehicles => even higher bus loads;
- High bus loads => Increased service frequency;

- Increased service frequency => Increased queing of buses at stops => Longer journey times;
- Increased service frequency => lower bus loads;
- Lower bus loads => shorter journey times (due to dwell times);
- Increased service frequency => increase bus / bus interaction;
- Increase bus / bus interaction => increased journey times and decreased reliability;
- Increased other road traffic (including additional buses) => increased bus / traffic interaction;
- Increased bus / traffic interaction => increased journey times and decreased reliability;
- Increased priority and segregation => reduced bus / traffic interaction; and
- Reduced bus / traffic interaction => reduced journey times and increased reliability.

4.25 Clearly this is a complex system, which can be influenced heavily by external measures (segregation / priority and management intervention). Therefore, it is not straightforward to predict the deterioration of bus journey times without detailed operational understanding and a clear view of what is feasible in terms of bus priority and segregation. With existing peak period traffic congestion and relatively high bus service frequencies already in place, significant future increases in bus provision would be likely to need supportive segregation and priority measures, which would impact adversely on road capacity for other traffic.

Accessibility and social inclusion

4.26 An integrated, efficient, accessible and high quality public transport system is vital to promoting economic growth in the local community and to improving its performance and competitiveness. Phase 1a of the tram will achieve this by increasing the number of people with access to the public transport network and with access to employment opportunities at the new development areas in Leith Docks and in the west of the city at Edinburgh Park, the Gyle and the airport. Phase 1b will similarly support the redevelopment at Granton (see section 13).

4.27 Phase 1a of the tram scheme improves accessibility to identified key trip attractions and destinations from a substantial portion of Edinburgh e.g.:

- George Street / Frederick Street junction – representing the city centre (employment, shopping, leisure and access to Waverley rail station with integration with bus and rail);
- Haymarket rail station (integration, interchange with bus and rail);
- Leith Ocean Terminal (leisure / shopping / employment);
- Edinburgh Airport (employment, transport interchange); and
- Gyle Centre / Edinburgh Park (shopping / employment).

4.28 Mapping of the levels of economic deprivation, employment levels and levels of educational attainment show a considerable variance across the city. A number of trends are evident, which make it possible to identify a range of pockets and corridors which are less affluent than others. Zones around Leith Walk, as well as around Saughton and Balgreen in the west, have been identified as areas where socio-economic status is considerably lower than surrounding areas. Employment, income levels and car ownership tend to be comparatively low in these areas.

4.29 Direct connection to the city centre and other employment areas, which will be facilitated by Phase 1a of the tram, will undoubtedly improve the situation for these areas. Despite the high levels of car ownership at the city wide level, pockets of low car ownership exist, broadly correlated to areas of high population density. The tram will offer an attractive service to those areas, with Phase 1a servicing Newhaven, Leith and Leith Walk, as well as Haymarket and Gorgie near the city centre and Saughton and Balgreen in the west.

4.30 The design of tram vehicles and tram stops will ensure that the trams and tram stops are fully accessible by people with mobility impairments, those travelling with small children and the

elderly. For these groups, and notwithstanding continuing improvements in access for people with mobility impairments on LB, there is a relative advantage for trams in terms of design specifications, ride-quality and reliable accessibility for a significant section of Edinburgh's population. Where the distance between tram stops presents a challenge to accessibility, the service integration patterns with buses have been designed to maximise the continuing accessibility of Lothian Buses for these groups.

Transport and land use integration

4.31 Phase 1a of the tram will connect the residential developments at Leith Docks with the city centre, West Edinburgh and the airport. The city centre and West Edinburgh represent the second and fourth largest concentrations, respectively, of employment in Scotland and West Edinburgh and, in particular, are forecast to grow considerably. At the core of this growth is the West Edinburgh Planning Framework area, south of the airport and identified by the Scottish Government as a national growth point. Phase 1a of the tram will be core infrastructure for this development area; without investment in new transport, it is unlikely that this major national opportunity can be realised. The tram will be particularly vital in responding to the expected growth in travel demand arising from the development. Without this development, major greenfield and greenbelt releases would be required. This not only has planning implications, but would result in a settlement pattern that would be more difficult to serve by public transport.

4.32 In the absence of the tram, the new development underway in North Edinburgh may contribute significantly more to city wide congestion as a direct result of the failure to integrate land use and transport policies. It is also possible that the new development will be diverted to less sustainable locations with less potential for effective transport integration.

4.33 The introduction of tram will provide an opportunity to significantly improve integration between transport modes. The major advantage here is that integration can be planned before the start of services. This is much more effective than trying to achieve integration between already established services. The interchange at Haymarket, and close proximity to Waverley Station and Edinburgh Park Station, mean integration with heavy rail will be effective. These interlinking services, along with the proposed frequency of the service, means tram will afford easier access to employment and service areas. The tram will also facilitate enhanced integration between public transport and travel by air by serving Edinburgh Airport. The integration of the bus, rail, air and the tram services to and from the airport will mean considerable improvement for the travelling public. This could lead to demand for additional feeder services to the main network, thus further benefits in terms of integrated public transport usage and inclusion.

4.34 A detailed description of the planned integration of service patterns between tram and buses is provided in section 9.

4.35 The tram will enhance the opportunity to make journeys on the public transport network through bus-tram service integration plans and ticketing arrangements, reflecting specifically designed stops and interchange facilities for effective integration with the bus and rail networks. This is most notable at:

- Edinburgh Airport;
- Waverley, Haymarket and Edinburgh Park rail stations;
- The foot of Leith Walk, St Andrews bus station, and the bus hubs at Ocean Terminal and the Gyle Shopping Centre; and
- Expanded Park and Ride at Ingliston and, potentially, other locations.

4.36 A fuller analysis of the existing and potential opportunities for transport interchange is provided in section 5.

4.37 In relation to land-use policy and proposal integration, Phase 1a of the tram integrates positively with land-use policies and proposals as detailed in:

- National Policy – National Planning Framework (NPF) and Scottish Planning Policy (SPP17);
- Regional Policy – Developing SESTRANS RTS and Edinburgh and Lothians Structure Plan 2015; and
- Local Policy – Edinburgh local plans and associated development proposals, most notably Leith Docks Western Harbour development and Haymarket-airport including Edinburgh Park / Gyle.

Patronage and mode shift

4.38 Phase 1a of the tram will permit further development while limiting additional congestion on key urban routes. The tram has the potential to reduce traffic congestion by encouraging drivers to use the tram instead of their car. As other tram schemes in the UK have shown, there is greater potential for modal shift from car to tram than to buses, or guided buses. This is especially so if the tram is in operation before new development is constructed and travel patterns have been established. Modal shift from car is a key objective of the LTS and RTS as it will help to relieve the problems of traffic congestion that are experienced in the city and the wider region. Modal shift is fundamental to achieving the environmental, sustainability, health and traffic aspirations of the tram.

4.39 Extensive work was undertaken at DFBC stage to build new demand forecasting models to predict use of the tram and the impact upon use of other transport: bus, rail and car. Annual demand for Phase 1a is predicted to be **10.9m** tram passengers in 2011 assuming that 75% of modelled demand occurs in the first year. This rises to **25.5m** in 2031 in the absence of EARL. This growth is predicated on a forecast of substantial growth in the total travel market, as well as the additional predicted commercial and housing development as a result of the scheme. Between 2005 and 2031, demand for journeys by car in the city is forecast to increase by **37%** (1.2% p.a.) and demand for journeys by public transport is forecast to increase by **61%** (1.8% p.a.).

4.40 The introduction of the tram is forecast to generate a sizeable shift from car to public transport, with the biggest impacts in areas directly served by the tram. However, the proportion of people moving to public transport in the wider Edinburgh area is limited by the fact that Phase 1a of the tram has a limited influence in other areas of the city.

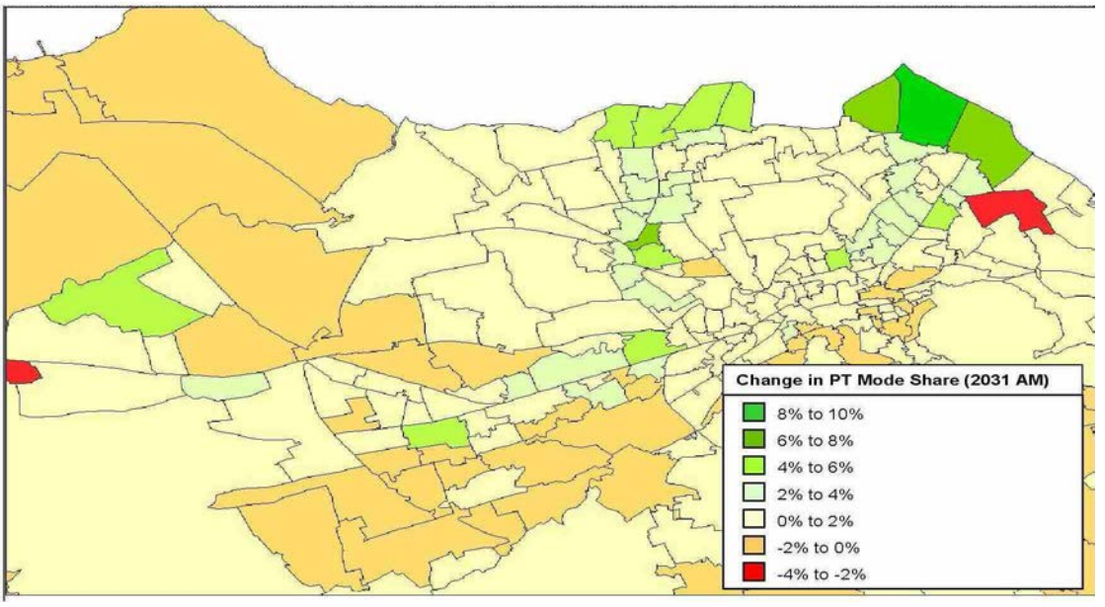
4.41 Table 4.2 presents the forecast mode shift from the introduction of Phase 1a of the tram. The data is for all trips into, out of and within Edinburgh in the daily morning (AM) peak from 0700-0900, the inter-peak (IP) from 1000-1200, and an annualised total. Figures are provided for forecast years 2011 and 2031. The shift to public transport, in terms of mode share percentage points, is in keeping with what would normally be anticipated for such a scheme in the context of an entire car travel market for the city, including those areas outside the market for Phase 1a of the tram.

Table 4.2. Mode shift to public transport with Phase 1a of tram.

2011	**Without tram**	**With tram**	**Difference**
AM peak	47.1%	47.9%	0.9%
Inter-peak	24.8%	25.4%	0.6%
All	32.5%	33.2%	0.7%
2031	**Without tram**	**With tram**	**Difference**
AM peak	50.5%	51.9%	1.4%
Inter-peak	27.9%	29.0%	1.1%
All	36.0%	37.3%	1.2%

4.42 The impact of the tram on mode shift is proportionately higher in areas that it will directly serve and where it is appropriate to anticipate achieving mode shift. Figure 4.1 presents the forecast percentage point change in mode share by area of trip origin for the AM peak period in 2031 with the full Phase 1 scheme implemented.

Figure 4.1. Geographical change in public transport usage with Phase 1 of tram (2031).



4.43 From Figure 4.1 it is apparent that changes in mode share of up to 10% from car to public transport will be generated for trips from certain areas directly served by the tram. Areas exhibiting mode shift of greater than 5% (encompassing significant areas of development and growth which otherwise would be associated with higher levels of car travel) include:

- Leith / Newhaven;
- Craigleith;
- Roseburn;
- Sighthill; and
- Edinburgh Airport.

4.44 Tram patronage and revenue, in the context of overall TEL patronage revenue, and the analysis of risks thereto is summarised in section 9.

4.45 Abstraction from buses to the Phase 1a tram is predicted to be **8.3m** passengers in 2011, rising to **17.8m** by 2031. About **21%** of tram patronage (2.3m) is attracted as new public transport patronage in 2011, rising to **26%** (6.7m) in 2031. This proportion of tram patronage new to the public transport market is significant and in keeping with that achieved on successful tram schemes such as Croydon Tramlink, Nottingham and Dublin.

4.46 The sources of demand for Phase 1a of the tram are set out in Table 4.3. The increasing share from car is consistent with the higher congestion levels and hence attractiveness of tram expected and forecast in the later year.

Table 4.3. Sources of Phase 1a tram patronage.

Millions of passengers	**2011**	**2031**
From bus	8.3	17.8
From rail	0.3	1.0
From cars or new generated trips	2.3	6.7
Total Phase 1a tram patronage	**10.9**	**25.5**

Economic activity and locational impacts (EALI)

4.47 The key EALI impacts of introducing Phase 1 of the tram are projected to be:

- **Employment development**: In 2011, more than 22,500 m^2 of employment development is anticipated to be advanced as a result of Phase 1a of the tram. This rises to more than an additional 48,900 m^2 by 2015 and 52,800 m^2 by 2020, as the development pipeline catches up in the "without tram" scenario.
- **Residential development**: The construction and occupation of more than 900 additional residential units are anticipated to be advanced as a result of Phase 1 by 2011, rising to 5,250 by 2015 and 5,600 by 2020. The majority of these (4,500 by 2015 and 3,800 by 2020) would be in Granton and therefore, dependent to a great extent on Phase 1b. Post 2020, the development pipeline recovers in the "without tram" scenario, resulting in a net gain of 2,800 units with tram.
- **Employment generation**: More than 590 jobs, in present value terms, are expected to be generated or brought forward by the development impact of Phase 1a of the tram, after allowing for displacement of jobs elsewhere in Scotland.

4.48 It should be recognised that the full benefit arising from the EALI analysis is incumbent primarily upon the promulgation of the planned developments in North Edinburgh. The timing of these developments may be dependent on the implementation of Phases 1a and 1b of the tram up to the assumed development horizon of 2020.

4.49 It should also be noted that a substantial proportion of the capital investment will be spent in Scotland, encompassing utility works, land purchase, civil engineering works and professional services.

Benefits and costs to Government (TEE analysis)

4.50 As required by STAG, the economic welfare impacts of delivering Phase 1 and Phase 1a only of the tram were assessed as part of a Transport Economic Efficiency (TEE) assessment. The appraisal provides a review of what users are willing to pay in order to use the tram line; the financial impact on private sector transport providers; and impacts arising from land use or other impacts of the tram line.

4.51 Both Phase 1 and Phase 1a of the tram project were appraised against a 'reference case' as well as a conventional 'do minimum'. The 'reference case' sensibly reflects the traffic management and bus policies that would be necessary to cater for travel demand growth, should the tram scheme not be implemented. This includes, for example, the closing of Shandwick Place to through traffic (private cars), both with and without the tram, as well as priority signalling for buses at major junctions. The appraisal against the 'reference case' contained in the DFBC assumed that the Edinburgh Airport Rail Link (EARL) was developed as planned both with and without the tram, reflecting wider transport planning in Scotland. As part of that work, the scenario excluding EARL was also prepared as one of the sensitivity tests contained in the Risk and Revenue report which was submitted as Appendix III of the DFBC. The rationale for the reference case rather than a conventional do minimum is further explained at 4.56 below.

4.52 The benefits and costs of Phase 1a of tram, appraised against the 'reference case' and calculated over a 60-year period in accordance with STAG requirements, are summarised in Table 4.4.

Table 4.4. Benefits and costs to Government from Phase 1a of tram.

£m Present Value, 2002 prices	Phase 1a	
	Without EARL	With EARL
Public transport user benefits	415	395
Other road user benefits	212	34
Private sector provider effects	(23)	(44)
Accident effects	(12)	(12)
PV of scheme benefits (incl. accidents)	**592**	**374**
Investment costs	390	390
Public sector provider effects	(55)	(50)
PV of scheme costs	**335**	**340**
Net PV	257	34
Benefit Cost Ratio to Government	**1.77**	**1.10**

4.53 For comparison, the Benefit Cost Ratio (BCR) determined by the previous STAG reports presented during the Parliamentary process was calculated as 1.21 for Line 1 and 1.40 for Line 2. The parallel study of Lines 1 and 2 operating together as a network assessed the BCR as 1.51.

4.54 There is a healthy net present value (NPV) of **+£257m** and **£1.77** of benefits for each £1 of costs, for the Phase 1a scheme, in the absence of EARL, indicating a scheme that offers good value for money in transport economic efficiency terms. Total transport benefits are weighted in favour of those to public transport users; the case is not unreasonably reliant on benefits to other road users. It should also be noted that Phase 1a creates the spine of tram scheme through the city centre area that can be extended on a more efficient incremental cost basis. Therefore, Phase 1a bears a heavy burden of fixed costs.

4.55 The scenario and sensitivity testing detailed in the full STAG2 report and Revenue and Risk Report (Appendices II and III), suggests that the planned development and forecast economic growth being achieved is central to maximising benefits and patronage.

'Reference case' compared to 'do-minimum'

4.56 The main appraisal of the tram presented above (and that previously presented as part of the DFBC) was undertaken against a 'reference case' rather than a 'do minimum'. The use of a 'reference' case rather than a conventional 'do minimum' continues to relate only to the second forecast year (2031) and is necessary because of the forecast scale of growth in trip demand. Very significant increases in the level of bus service provision would be necessary to accommodate the increased demand. It is considered that the performance of these services (in terms of journey time and reliability) would considerably reduce unless significant measures were taken to accommodate them on the road network.

4.57 The 'reference case' includes a representation of measures which might be required to maintain bus service performance at current levels. Therefore, the 'reference case' reflects the likely 'real world' application of CEC's policies to support public transport if there were no tram. These measures were represented by introducing to the 'reference case' some of the impacts on car traffic designed to accommodate the tram – a mode of transport capable of conveying many more passengers per vehicle than buses.

4.58 The work underpinning the STAG appraisal also included an appraisal of the tram scheme against a conventional do minimum, which incorporated none of the impacts on car traffic mentioned above, but instead included a calculated deterioration of bus journey times from interaction with car traffic. This appraisal resulted in a higher BCR than the appraisal against the reference case reflecting additional public transport user benefits of the tram (relative to poorly performing buses in 2031), as well as increased highway decongestion benefits of restoring some of public transport's modal share (together these outweighed the increased

contribution of road congestion to the physical introduction of the tram onto the road network).

Interaction with EARL (sensitivity test)

4.59 On the 27th June 2007, the Scottish Parliament decided to review the proposals for EARL in its current form. This review resulted in the announcement on the 27th of Sept. 07 that the heavy rail link as proposed under EARL would not go ahead, however, an alternative option would be considered which proposes the building of a heavy rail station at Gogar which would connect with tram to provide a link to Edinburgh airport. It is too early in the consideration of this option to provide an assessment of the impact on the ETN, however, the proposal is may have a beneficial impact on tram's viability. It has to be understood, however, that any changes to the scope of the tram project resulting from this proposal would require additional funding as it does not form part of the core Business Case for tram.

4.60 The proposal will require appropriate assessment under STAG appraisal guidelines and, as such, be required to take into account the impact of the proposal on the existing transport infrastructure. No detailed work has so far been undertaken to assess this impact, given the relative recent announcement. However, it is likely to have a net beneficial impact on the tram projections.

4.61 In light of these developments, EARL is no longer part of the 'do minimum' case against which the case for tram is assessed and it therefore has been considered as a sensitivity test as discussed below. This information is presented primarily to provide a clear audit trail for the development from the approved DFBC to the current FBCv2, particularly in terms of the BCR impact.

4.62 A qualitative market-based assessment of how EARL and the tram would have interacted reveals the following:

- EARL would provide direct routes to the national railway network and therefore be well placed to capture a good share of the public transport market for regional and national travel to / from the airport. This is a quite different market to that for travel by tram;
- Although both EARL and the tram provide links to Haymarket and Waverley, EARL has the potential to capture a significant proportion of public transport trips between the airport and the city centre; and
- However, the tram has the advantage of providing links to a wider range of destinations within the City of Edinburgh, as well as more wide-spread opportunities for transfer connections to bus services.

4.63 This FBCv2 assumes that EARL will not be implemented as envisaged within the DFBC. In the absence of EARL, patronage and revenue outputs for the tram shows that the tram gains market share, particularly in respect of those travelling between the Airport and the city centre where EARL would provide a shorter journey time. Additional tram patronage in the absence of EARL is forecast to be 0.5m in 2011 and 1.6m in 2031 against that reported in the DFBC.

4.64 In terms of Transport Economic Efficiency (TEE), sensitivity testing shows that in the absence of EARL the BCR for Phase 1a of the tram increases from 1.10 to 1.77. The increases reflect significant increased decongestion benefits to other road users (including cars) as a result of the tram in the absence of EARL, rather than a marked increase in benefits to public transport users. Further into the future, this relative increase in economic benefits due to decongestion become increasingly uncertain due to the unstable behaviour of a saturated road network.

5. PROJECT SCOPE

Purpose

5.1 This section provides a succinct reference within which the strategic functionality of Phase 1a of the tram project is captured. It also defines the baseline scope of the project from which any changes will be identified, considered and measured. Reference should also be made to the phasing plan for the project, as described in section 3.

Summary of Act powers

5.2 The Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (the Acts) give the authorised undertaker various powers including:

- The power to construct the tram line, as authorised by the Acts or any part of it, and to operate it as a stand alone line or as part of a network;
- Compulsory purchase powers;
- The power to construct relates to works both within the Limits of Deviation (LOD) and outwith the LOD. Within the LOD there is the power to construct the authorised works i.e. the tram works. Outwith the LOD there are limited powers mainly restricted to ancillary road works required to amend kerb lines. There is also the power to carry out specific works within the Limits of Land to be Acquired or Used (LLAU) – e.g. the construction of a substation or landscaping; and
- The powers to operate include provisions in relation to fares, penalty fares, removal of obstructions along the tram line and the power to create bylaws.

The powers are to be exercised so as to comply with the Code of Construction Practice and the Noise and Vibration Policy and to ensure the residual impacts are no worse than those predicted in the Environmental Statements.

5.3 Despite the wide powers conferred on the authorised undertaker by the Acts, various other consents are partially completed or still require to be obtained including:

- Prior approvals – for structures, buildings including substations, tramstops; overhead line equipment (OLE) poles and fixings;
- Temporary traffic regulation orders (TTROs) for construction;
- Traffic Regulation Orders (TROs) for operation. Four Orders are planned to be made – the exact extent of the wider area effects is still to be determined and will be informed by the modelling outputs;
- Building fixings agreements with owners;
- Listed building consent (there are some powers in the Acts in this regard but this does not cover all listed buildings);
- Scheduled ancient monument consent;
- Environmental consents e.g. badger licences;
- Approval of the planning authority to the Landscape and Habitat Management Plan (LHMP); and
- Her Majesty's Railway Inspectorate (HMRI) consents (now superseded by ROGS requirements – Railway and Other Guided Transport Systems (Safety) Regulations, 2006).

5.4 The LOD and the LLAU, as approved by the Scottish Parliament and as restricted by side agreements entered into with various objectors, are shown on the baseline drawings produced by the System Design Services (SDS) designers and set out the geographical boundaries of the project.

Route alignment

Newhaven to Constitution Street

5.5 From the two side-platform tramstop at Newhaven on Lindsay Road to Ocean Terminal, the tram will run segregated parallel to the street and then on-street for a short section. A new retaining wall structure, approximately on the line of the existing pedestrian ramp, will provide

access from the regraded Lindsay Road to Dock Road. The alignment runs along the existing road, running to the tramstop at Ocean Terminal, which comprises both a centre island and side platform, where a turnback facility is provided. From Ocean Terminal, the tramline runs on-street along Ocean Drive, over the existing bridge at the Victoria Dock entrance and the existing Tower Place bridge, both of which will be modified to accommodate the tramway. An island platform tramstop will be provided off-street on Ocean Drive near the new casino and proposed residential developments, from where the alignment runs off-street as far as Tower Street.

5.6 From Tower Street to the Foot of the Walk, the tramway runs on-street, a mixture of segregated and non-segregated. Two side platforms will be provided at the south end of Constitution Street, with the southbound platform being used by both bus and tram. This tramstop serves the Foot of the Walk and provides a key interchange with revised bus services, with stopping locations on Great Junction Street and Duke Street situated as close as possible to the junction. These are to be linked by good pedestrian walking routes and real-time passenger information for bus and tram services.

5.7 General traffic and northbound buses will be excluded from the southernmost section of Constitution Street. Laurie Street and Academy Street will be the alternative routes available to this traffic.

Foot of the Walk to York Place

5.8 The tramlines will run on-street (centre running) for the length of Leith Walk from Foot of The Walk to Picardy Place. Platform stops, located centrally between tram lanes, are proposed at Balfour Street and McDonald Road. The London Road and Picardy Place junctions will be modified as necessary.

5.9 At London Road junction, the existing roundabout will be replaced by a conventional T-junction, with bus stops retained in Elm Row.

5.10 At Picardy Place, there will be a gyratory arrangement for general traffic, with two side platforms providing interchange with London Road corridor bus services at adjacent bus stops. The tram will cross the junction of Broughton Street, and will run in the centre of the street along York Place to the northeast corner of St Andrew Square.

City centre

5.11 The layout of the tramline through St Andrew Square will consist of a twin track running southbound and northbound on North St Andrew Street, the east side of the square and on South St Andrew Street. There will be an island tramstop on the east side of the square, facilitating interchange with the Bus Station and a bus stop on the north side of the square.

5.12 Buses and general traffic will be accommodated northbound and southbound in North St David Street, the west side of St Andrew Square and South St David Street. The transfer of southbound traffic from North and South St Andrew Streets and the east side of St Andrew Square will take place on a permanent basis before construction work starts on the east side of the square.

5.13 From the junction of South St David Street and Princes Street the tram will continue along Princes Street. In order to allow for future extensions to the network, passive provision, in terms of track geometry, is to be made for Line 3 to join the Phase 1a tram track at the St Andrew Street junction with Princes Street. Princes Street will be served by an island tramstop, located between Hanover Street and Frederick Street. The tram track will continue to the west of Princes Street across the junctions with South St. Charlotte Street and Lothian Road. From the West End the route will continue on a central alignment along Shandwick Place, with an island stop located between Atholl Crescent and Coates Crescent. Interchange with buses in the westbound direction will be facilitated by a bus stop at the west end of Coates Crescent. For special events which require curtailment of the tram service at

Shandwick Place there will be a temporary bus stop in the eastbound direction at the east end of Coates Crescent.

5.14 Buses will continue to use Shandwick Place, along with trams, while general traffic will no longer be routed via Shandwick Place. Traffic management measures will be introduced in order to accommodate general traffic which currently uses Shandwick Place on alternative routes, such as Palmerston Place, Morrison Street and the West Approach Road. In addition, Torphichen Place will become a two-way street to facilitate access for general traffic on the Tollcross-Queensferry Road axis by avoiding the need to negotiate Haymarket junction.

5.15 Continuing towards Haymarket the tram route will run in both directions along West Maitland Street. At Haymarket there will be a revised junction / crossroads configuration. Bus services that serve the Corstorphine Road corridor will also be routed westbound along West Maitland Street providing improved bus priority and easing the volume of traffic around the gyratory. Buses for the Dalry Road corridor may, subject to suitable junction timing permitting, also make use of West Maitland Street, westbound.

5.16 Eastbound, West Maitland Street will accommodate both buses and general traffic, as at present. Dalry corridor services will be able to continue to use the gyratory via Morrison Street. The roads around the junction, such as Morrison Street, Dalry Road and Grosvenor Street will also be re-configured. The tram will continue through the junction and through the site of the existing Caledonian Alehouse, which is to be demolished, towards Haymarket Yards. A twin side platform stop is proposed on a viaduct structure in front of Rosebery House that will carry the tram off street parallel to Haymarket Terrace. The stop will provide an interchange with the Haymarket heavy rail station and with buses. Bus services in the westbound direction will be split between a stop for local services in the extended forecourt of the Haymarket station building, providing good connectivity with eastbound services on Dalry Road, and a stop at the back of the westbound tram platform for longer distance bus services. A facility for tram crews to take rest periods will be incorporated underneath the viaduct structure at this location. West of this stop the alignment will make its way down through Haymarket Yards between Verity House and Elgin House to run parallel to the heavy rail track alongside Haymarket Yards and Balbirnie Place.

Roseburn to Carrick Knowe

5.17 The alignment continues parallel to the railway line and crosses Russell Road. From here the tramline skirts around the northern boundary of the ScotRail depot. The tram alignment will be supported by a retaining wall to the rear of the business properties fronting onto Roseburn Street. An elevated stop is proposed immediately opposite the Murrayfield stadium turnstiles to serve both the stadium and the surrounding area.

5.18 The tram route crosses Roseburn Street on a viaduct where provision will be made for the installation at a later time of the delta junction to facilitate the Phase 1b extension, and continues to the south of the rugby stadium on a viaduct which will extend the existing rail embankment. The tram route continues to the south of the training pitches where the increased space allows for a steep grassed embankment in preference to a vertical wall. A new bridge will be provided over the Water of Leith, and to the west the tram continues on a grassed embankment. The residents of the adjacent properties in Baird Drive will be screened, as far as practicable, from the operation of the tram by planting on the embankment. The tram line crosses Balgreen Road on a bridge parallel to the railway. A tramstop to the west will be accessed by a ramp from Balgreen Road. The tram will continue along the south of Carrick Knowe Golf Course in the area reserved for a dedicated transport corridor, and then will rise to cross to the south of the railway on a new bridge at the west end of the golf course.

Carrick Knowe to Edinburgh Park

5.19 Between Carrick Knowe and South Gyle Access the tram will use the alignment of what is currently the guided busway which runs parallel to the railway. The existing busway will be adapted to allow the tram to use it. Two existing bridges over Saughton Road and

Broomhouse Drive will also be converted for use by the tram. Stops will be provided adjacent to Saughton Road (two side platforms) and South Gyle Access (two side platforms). The tram will cross South Gyle Access on a new bridge and then run in the verge beside Bankhead Drive and the railway. The bus services that are displaced from the guideway will be provided with bus priority measures in advance of the guideway undergoing conversion for tram use.

5.20 A tram stop, consisting of two side platforms, will be provided at Edinburgh Park Station to allow for interchange for passengers between light and heavy rail. Investigations are underway with a view to also providing a park and ride facility at this location. The tram alignment will then rise onto a viaduct and turn north to re-cross the railway and enter Edinburgh Park. The tram will run in a reserved public transport corridor, which has been included in the business park masterplan, and a tram stop, consisting of two side platforms, will be provided at the centre of the park.

Gogar Junction

5.21 The alignment crosses Lochside Avenue and South Gyle Broadway at signalised junctions and a tram stop comprising two side platforms and located at the edge of the car park, will provide access to the Gyle Centre. The tram will pass underneath the A8 and the roundabout slip roads in a new tunnel structure.

Depot

5.22 The depot is situated between the Fife rail line and the Gogar roundabout. This utilises a small triangle of waste ground and some agricultural land at the edge of the greenbelt. The depot will be constructed at a low level in order to facilitate the entry of trams from beneath the A8 underpass at an appropriate gradient to avoid infringing the runway approach envelope and, therefore, minimise visual impact from the A8, This has resulted in the requirement to remove existing earth bunds and the further requirement to undertake a significant amount of excavation to lower the existing ground level by approximately 4.5 metres. A depot building will house staff accommodation and control room for the system, together with maintenance facilities and storage. Stabling will be provided for the tram fleet, with provision for future fleet expansion. There will also be a tram stop for staff only for accessing the depot.

Gogarburn

5.23 The alignment continues west parallel to the A8 to a new stop at Gogarburn, which will serve the Royal Bank of Scotland plc's World Headquarters. The Gogar Burn will be crossed on a new bridge.

Ingliston and airport

5.24 The alignment will run west through farmland to Ingliston. The existing Park and Ride facilities at Ingliston will be extended and served by a tram stop consisting of two side platforms, replacing the X48 bus service. Passive provision will be made for the later extension of the tram system to the west. To the north the tram will run alongside the Gogar Burn, through the rear of the airport hotel car park and cross the airport service road. The terminus stop, which will be a centre platform, will be on the site of Burnside Road and will provide an integrated transport hub served by trams, buses and taxis.

Interchange

5.25 The integration with buses, achieved through service integration plans, is dependent on successful physical integration of bus and tramstops at key locations which have been identified as being critical for an effective interchange infrastructure and these now form part of the scope of the project.

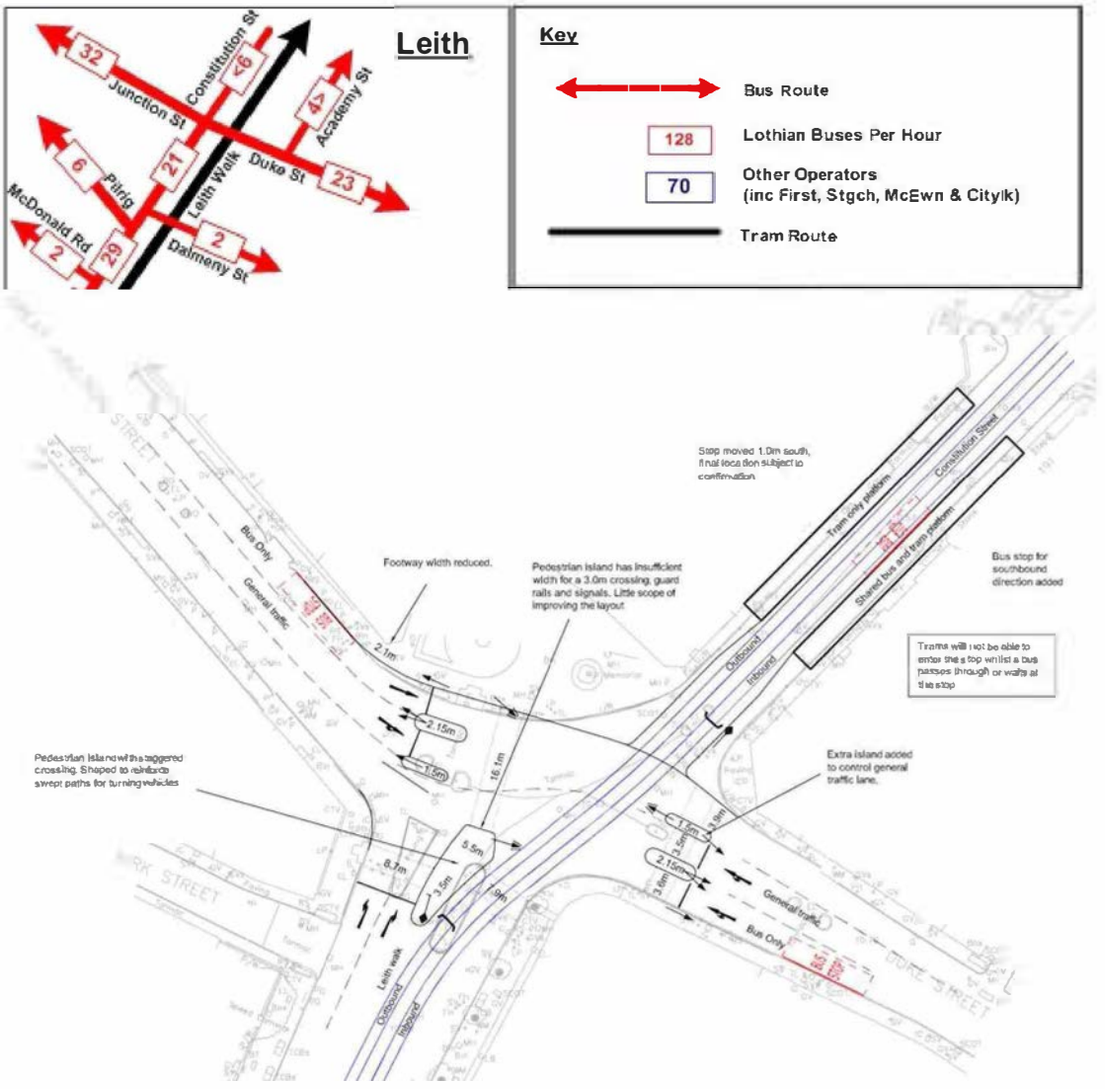
5.26 Since Royal Assent, various options have been developed for interchanges. The base assumption for all interchanges is that, where possible, interchange should strive to be cross

platform, under cover, timetabled and simple. It should seek to avoid the necessity for passengers to cross roads, walk distances greater than 50 metres or have gradients greater than 2.5%. However, specific characteristic of the location and / or design constraints may make it impossible to comply with this. The principal bus / tram interchanges for Phase 1a and other opportunities for interchange are outlined below.

Foot of Leith Walk

5.27 This interchange (Figure 5.1) is the key to being able to curtail bus routes at the northern end of Leith Walk. As the numbers of passengers involved, in what will be enforced modal interchange, is significant, a high quality of design, minimising both walking distances and waiting times, must be achieved. The network design will address the issue in such a way as to minimise terminating buses.

Figure 5.1. Interchange at the Foot of Leith Walk.



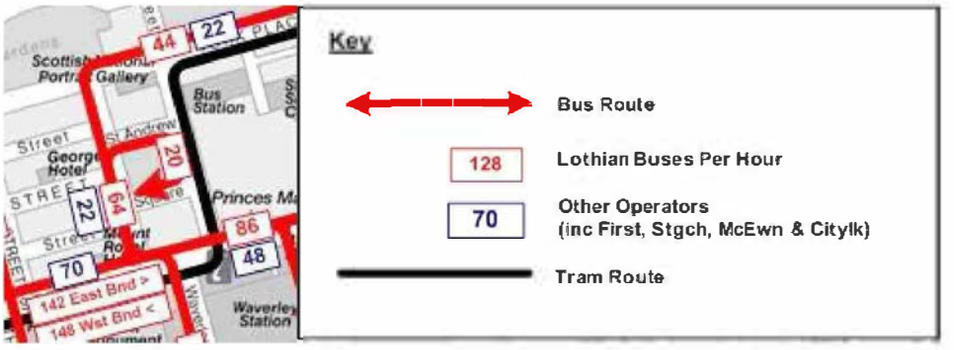
5.28 The interchange solution for the Foot of Leith Walk has now been developed, as indicated above, and further improvements are being developed in order to move the bus stops on Great Junction St and on Duke St closer to the junction to improve connectivity and visibility with the tramstop. Given the space available, road layout and traffic movements that constrain the area, the design has sought to optimise the interchange whilst providing safe traffic management and pedestrian movement. This is achieved through the use of tram lanes, bus only lanes and improved pedestrian crossings sighted along the walking desire lines.

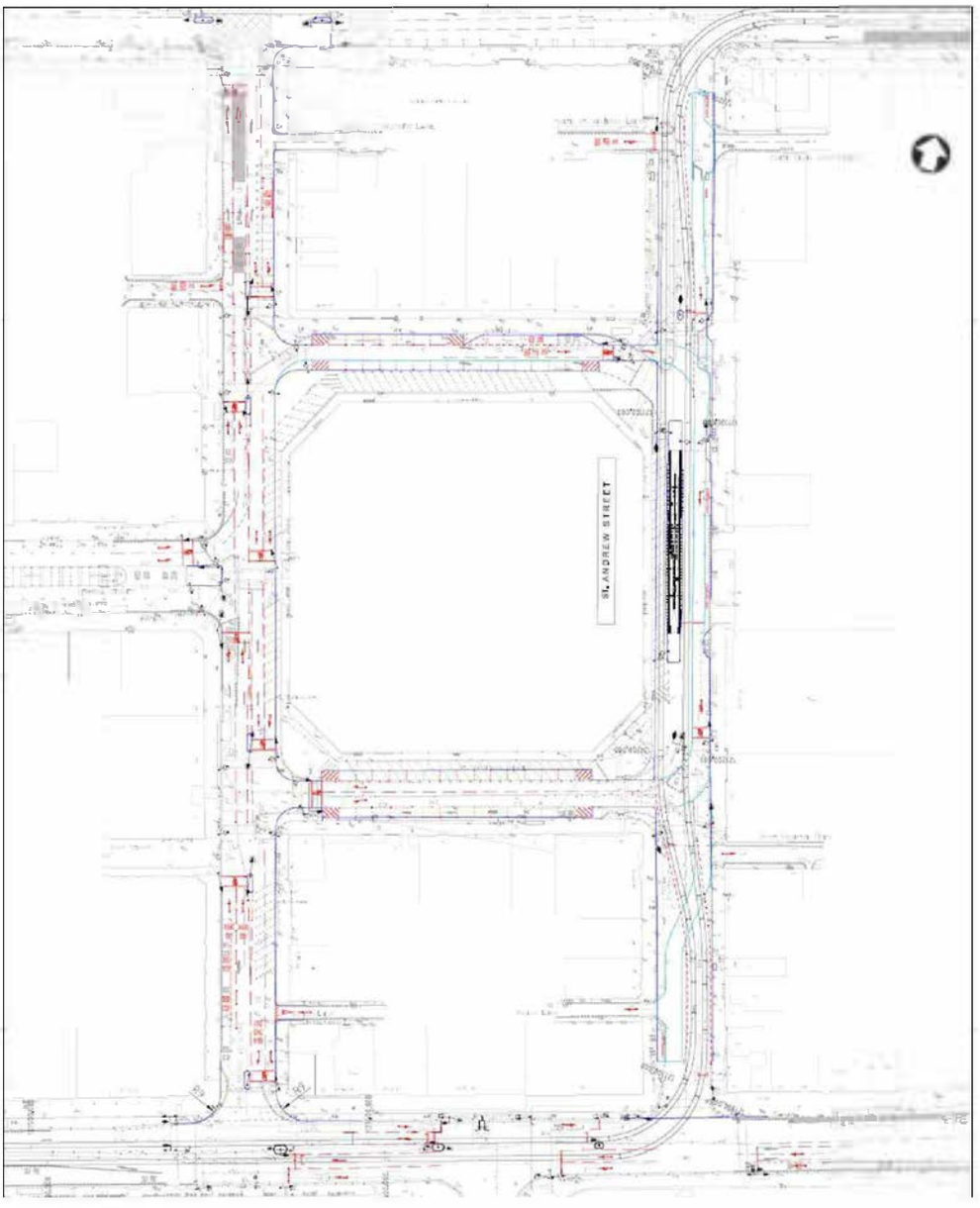
St Andrew Square

5.29 An interchange at the east end of the city centre (Figure 5.2) is essential to accommodate buses reaching the city centre from points west and south of the West End which currently continue via Leith Walk. These are the routes which need to be truncated in order to achieve modal transfer on Leith Walk. In addition, there will be certain "through" bus services.

5.30 The design proposal involves reopening of South St. David Street for buses to run south to north and north to south, with trams accommodated in St. Andrew Street and the east side of the square. Interchange stops will be located on the north side of St. Andrew Square (buses) and close to the bus station (trams). The design proposals meet the operational requirements of both bus and tram, and the gradient and distance requirements for passengers.

Figure 5.2. Interchange at St. Andrew Square.



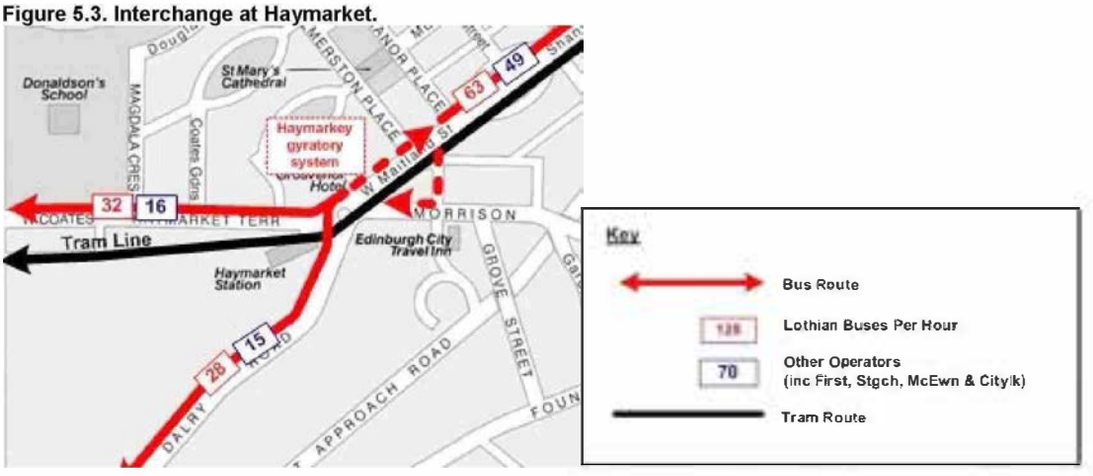


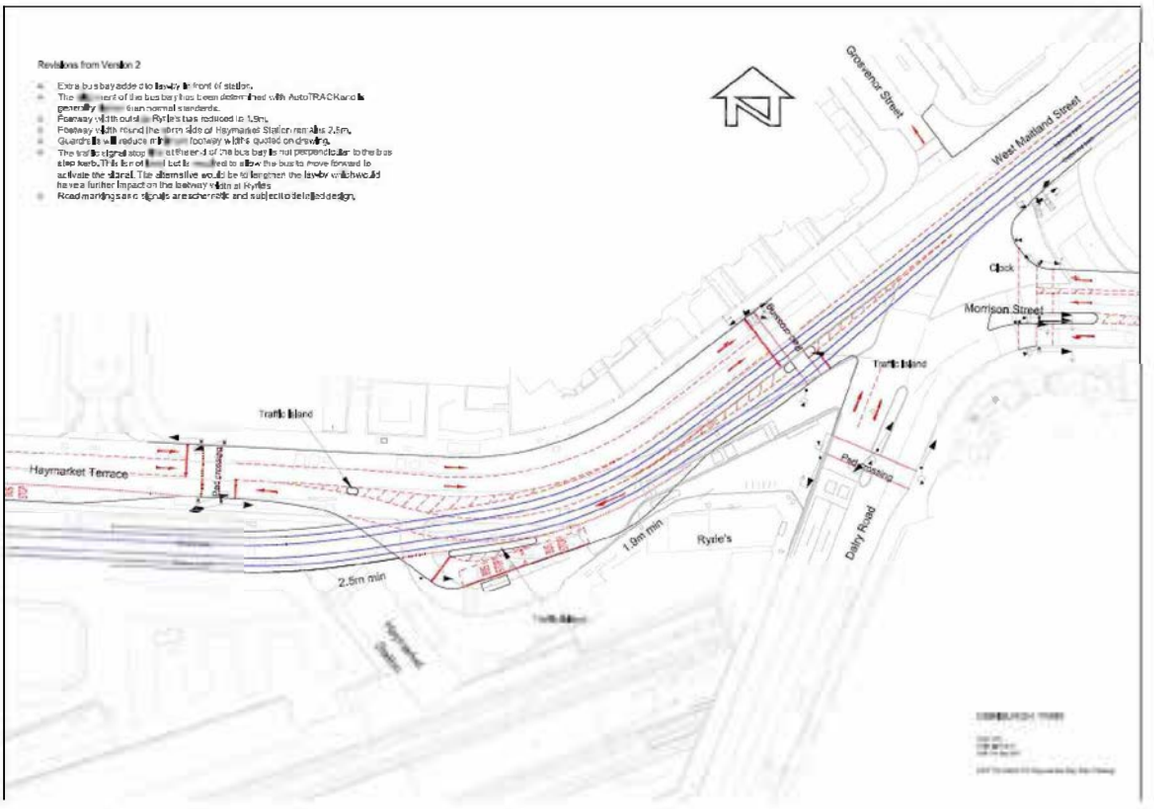
Haymarket

5.31 Interchange between tram and bus and, in some cases, heavy rail, is a key function to be taken into account in the design of all tramstops. However, locations other than those referred to above are not crucial to any alterations to bus services which are entailed in the service integration plans in section 9. While not a critical factor in relation to planned alterations to bus services, one interchange in particular is highly significant in regard to interchange between heavy rail and TEL bus and tram, namely, Haymarket (Figure 5.3).

5.32 In this case, there are no plans to curtail bus services to feed into trams. However, the separate objective of ensuring the best possible opportunity for interchange between heavy rail and both trams and buses necessitates the provision of appropriate interchange infrastructure at Haymarket. Therefore, it is essential that tramstop and bus stop locations at Haymarket are at the core of plans developed under the Haymarket interchange project. It is also vital that tram project work takes account, as far as is possible, bearing in mind the geographic constraints of the limits of deviation, of future plans for Haymarket redevelopment.

Figure 5.3. Interchange at Haymarket.





Ingliston Park and Ride

5.33 The tram service from / to Ingliston will be a direct replacement of the existing X48 bus service. The approved extension of the existing Park and Ride and potential future integration opportunities with regional bus services, necessitate high quality interchange facilities.

Edinburgh Park Station

5.34 The design locates the tramstop directly outside the rail station, thus allowing for interchange between tram and heavy rail. Investigations are underway for providing a park and ride facility adjacent to the tramstop.

Interfaces with other projects and functional boundary

5.35 In addition to the interchange considerations above, the tram has important interfaces with other projects as follows:

EARL and proposals for future interchange with heavy rail at Gogar

5.36 Following the announcement that EARL would not go ahead, the Scottish Government is proposing an alternative option which would include a heavy rail station at Gogar with connection to the tram to serve passengers from Fife and further north travelling to the airport. Given the relative recent announcement no detailed work has so far been undertaken to assess this impact, however it is likely to have a net beneficial impact on the tram projections.

Edinburgh Waverley infrastructure enhancement

5.37 This project commenced on site in January 2006 and has included the construction of a new bay platform at Haymarket Station in order to relieve congestion at Waverley during the works there. This is parallel to the tram alignment through Haymarket Yards and will be adjacent to the access to be created as part of Phase 1a to the Haymarket Station car park. To date there has been close interaction between the two projects and this has been incorporated into the tram alignment. Cooperation will need to continue to ensure that both projects can be fully implemented.

Edinburgh Airport Outline masterplan

5.38 Commitments have been made to Edinburgh Airport Limited, New Ingliston Limited and Meadowfield Limited regarding the need to ensure that any future access road to the airport can be accommodated alongside the tram depot at Gogar. The depot has been designed to ensure that this commitment can be achieved. In addition, the tramstop location at the airport and the interaction with the buses and taxis needs to continue to be coordinated to ensure that an integrated transport solution is delivered.

Ingliston Park and Ride Phase 2

5.39 Phase 2 of Ingliston Park and Ride lies adjacent to the Ingliston Park and Ride tramstop on Phase 1a, the future Phase 3 of the tram (the Newbridge Shuttle) and the existing Phase 1 of the Ingliston Park and Ride site. Due to these significant interfaces, careful consideration is being undertaken in the detailed design in order to ensure all of these projects benefit from the park and ride extension. In order to facilitate this, CEC and SESTRAN have instructed **tie** to commence construction of Ingliston Park and Ride Phase 2 as a standalone project. This will allow park and ride patronage to continue to increase in advance of the tram coming into service.

Haymarket masterplan

5.40 Given the potential for interchange at Haymarket, CEC have been provided with the tramstop location for use in developing the Haymarket Masterplan. It is also vital that the tram project takes account of, as far as is possible, the future plans of the Haymarket area. To this end a representative of the tram project team attends all of the Haymarket Interchange Masterplan Steering group meetings.

Waterfront Masterplan

5.41 This sets out the development aspirations for the Waterfront area. Some of the development is underway and has been completed, for example Telford College, with other schemes well under construction. However, to ensure that the Masterplan can be implemented in full, there will need to continue to be close interaction between the CEC Planning Authority, Waterfront Edinburgh and the tram project.

Leith Docks Development Framework

5.42 This framework sets out the development aspirations of the Leith Docks areas, which is one of the biggest development opportunities in Edinburgh. CEC has already been working closely with Forth Ports, the largest landowner in this area, in relation to the redevelopment of the area. The tram project continues to work closely with both CEC and Forth Ports to ensure that the wider redevelopment of this area fits with the tram alignment that has been developed following considerable consultation with Forth Ports.

St Andrew Square Capital Streets Plan

5.43 Given the status and importance of the St Andrew Square, and the plans to improve the streetscape and setting of this area in advance of the tram works, the project and CEC are working closely together to co-ordinate the works required for both the project and to minimise any unnecessary work. It has been planned for the MUDFA contractor to undertake the works necessary for buses, taxis and general traffic to be relocated to the west side of St Andrew Square in the first half of 2008. This paves the way for the Capital Streets Project contractor to undertake their works to all areas of the Square, except for the east side, during 2008. The Infraco will then complete the works on the east side of the square, using free-issue materials provided by the Capital Streets Project, so as to provide homogeneity in finish, in conjunction with the construction of the tram alignment. CEC's aim is to create a public realm space and the aim of the project is to create a transport interchange. These aims are complementary and, accordingly, continued careful interface will be required.

City centre management

5.44 Given the tram runs through the city centre, the project has been and will continue to consult and work with the City Centre Management Company to minimise any impacts to retailers from the construction, operation and maintenance of the tram and to continue to ensure buy-in for the project from the retailers.

Road Network / Road Traffic Management Interfaces

5.45 A large section of the tram network runs along / within the road network in the city centre. To avoid an unacceptable impact on road users and the road network, there has been close

liaison with the roads authority during the design development. This has been both in respect of the impacts of construction and operation of the tram. Traffic management plans will be agreed with the roads authority and both TTROs and TROs are being prepared, in respect of the construction and operation phases, respectively.

NR interfaces

5.46 A large section of the tram runs alongside the main Edinburgh to Glasgow heavy rail main line. Liaison is underway with regard to NR agreements, licences and leases and given the proximity of the alignments it will be necessary to assess the requirements for whether any immunisation works to the heavy rail system is needed. Accordingly, there will need to be continued close interaction and collaboration with NR to try to ensure all of the necessary works are carried out as efficiently in terms of time and money as possible.

Vehicle capability

5.47 The tram provided by the selected bidder will comply with specific design criteria, including the following:

- High safety standards, compliance with HMRI tramway guidance;
- High reliability, minimum maintenance required and ease of repair;
- Proven design and technology and industry standard technology;
- Track gauge of 1,435mm;
- At least 230 passenger total carrying capacity with standees @ 4 passengers / m^2;
- At least 80 seats, of which a minimum of 16 seats must be accessible to passengers without using steps;
- Up to 7.5 m^2 of floor area to be allocated to full height luggage racks;
- Trams nominal 43m in length in order to be able to meet the passenger and luggage carrying capacity identified above;
- Nominal width of 2.65m externally;
- 100% of the floor area will be low floor with a height above rail level of between 300mm and 400mm;
- Passenger doors will be situated on both sides. All doorways will allow for level boarding access at 300 – 350mm above the top of the rail.
- The slope of the floor at the entrance shall be less than 5%;
- Double door clearance width of no less than 1,300mm and clearance height of no less than 2,050mm;
- Compliant with the Rail Vehicle Accessibility Regulations 1998, wheelchair spaces will be accessible directly from these doorways without steps;
- Maximum operating speed of 80kph;
- Operable from a nominal 750dc overhead power supply;
- Modular construction (ease of maintenance);
- Minimum operating capability of at least 100,000km per year;
- Bi-directional;
- Fitted with equipment to automatically indicate the trams position to and communicate with a central control centre;
- Fitted with 'bus-tracker' GPS unit to allow tram locations to be seen and displayed on CEC 'bus-tracker' displays and in the bus control room to facilitate effective interchanges;
- Internal flatscreen display panels for showing realtime passenger information;
- Internal and external destination displays;
- Provision for wheelchairs;
- Capable of supporting a buffing load appropriate for segregated tramway operation without a physical connection with NR;
- CCTV equipment to provide rear views for driving, front and internal recorded views for incident investigation and crime prevention;
- Seats will be at least 450mm wide;
- Headroom through the seating area will be at least 2.2m to ceiling in the low floor areas;
- If loss of overhead supply, batteries will allow all essential systems to operate for a minimum of 30 minutes;

- Door performance – 12 seconds cycle time for the doors to open and close which includes DDA (Disability Discrimination Act) requirements and passenger and driver reaction times;
- Single roof mounted pantograph with maximum and minimum operating heights of 6.7m and 3.8m respectively;
- The pantograph will comprise a base frame, frame, horned slipper holder, pantograph spring and electrical raising / lowering device;
- Tram inspector to tram driver alarm device unique to each tram;
- Cash vault fitted to the cab for depositing ticket revenue;
- Flange lubrication on at least 20% of the fleet; and
- Passenger counting equipment on at least 20% of the fleet.

Route capability

5.48 The performance criteria of the route include the following:

- Phase 1a has a target journey time (including layover and dwell times of 25 seconds at each stop) of 44 minutes and 30 seconds in each direction.
- The design of the network will enable 99% of monitored tram departures to be no earlier than one minute and no greater than two minutes late, compared to the scheduled headway. The reliability of the service will be measured at Edinburgh Airport where arrivals and departures will also be monitored to check the regularity of a tram waiting to be loaded, Edinburgh Park Station (departure), Haymarket (departure), Foot of the Walk (departure), Leith (departure) and Picardy Place (departure).

5.49 The scheme has been designed to allow a service frequency of eight tph in each direction for each of the two services . Eight tph between Ocean Terminal and the airport and eight tph between Newhaven and Haymarket, resulting in a frequency of 16 tph on the common section. There is capacity to enhance this service. Further details of the proposed tram service patterns are provided under 'Tram operations' below.

5.50 The general design principle is to provide the optimum segregation for the tram-way, which will allow for consistency of run-time and reduced interaction with other road traffic and which, in turn, leads to increased patronage and benefits. The route is all double track. There will be one depot which will provide maintenance and stabling facilities for the entire fleet of trams on the initial network. There will be turnback facilities at:

- Edinburgh Park Station;
- Haymarket Yards;
- Shandwick Place;
- York Place;
- Foot of the Walk; and
- Ocean Terminal.

5.51 A tram will be timetabled to be present and available for boarding at the airport tramstop throughout the operational day.

5.52 The layover will be four minutes minimum or 10% of the timetabled runtime, whichever is the greater. There will be layover facilities at the airport and Ocean Terminal. The depot halt at Gogar as well as the Haymarket tram stop will be the locations where drivers changeover.

5.53 The system will operate as a "line of sight" tramway with tramway signalling provided at road junctions and at tram crossings as appropriate. The following assumptions have been made as part of the run time simulation model. However, it should be noted that these are for design purposes only and that the eventual speeds will be established and agreed with the independent competent person (ICP) prior to shadow running:

- maximum speed of 80 kph;
- assumed reductions in speed due to horizontal and vertical alignment;
- assumed reductions in speed due to line of sight conditions; and
- road traffic speed limits.

5.54 Provision will be made in the design for a delta junction at Roseburn to allow flexibility in operations. However, for Phase 1a only plain line will be laid for the Airport to Haymarket route without the turnouts, but with provision for these to be retrofitted at a later date. Passive provision in the design has also been made for the connection of Line 3 at Princes St and at Ingliston for a future potential extension to Newbridge.

Operations and control functionality

5.55 The control room will be the focal point for the control and operation of the ETN. Its purpose shall be to provide a working place for supervisors to manage and coordinate day-to-day activities associated with tram system operations and will be linked by telephone to the bus, NR and CEC CCTV control rooms for coordination. The depot control room will be located on the first floor of the depot building.

5.56 The depot control room comprises of a number of workstations, at which control room staff sit and use equipment to remotely control or retrieve data from the system. The operator interface shall be designed to carry out control functions in an ergonomically efficient manner.

5.57 The depot control room workstations will provide indication and control of such auxiliary systems and services as follows:

- Operation of passenger help / passenger emergency help point system;
- Tram position and detection system status and alarms;
- Public address announcements, volume level control and indications;
- 'No-break' power supply status and alarms;
- Intruder and fire alarms;
- Communications systems status and alarms;
- Ticket vending machine alarm indications;
- CCTV;
- System plant / services status indications and alarms;
- Traction power system;
- Radio system;
- Emergency telephones;
- Performance monitoring system;
- Central data recording and storage;
- Security;
- Passenger information display management;
- Communications network monitoring;
- Video / CCTV image printing; and
- 'Bus tracker' overview display to indicate the locations of interconnecting bus services.

5.58 Equipment at, or near, tramstops and at road crossings will be needed to facilitate tram signal and traffic controls. This will include poles and signs, together with control boxes and electrical supply pillars. Control cabinets will be required close to all signals. Tram stop equipment cabinets will house all other control equipment. The tramway will be signalled using tramway signals. The road and tram signals will interface with the urban traffic controls (UTC) and will require pillars or cabinets to house the tram recognition system.

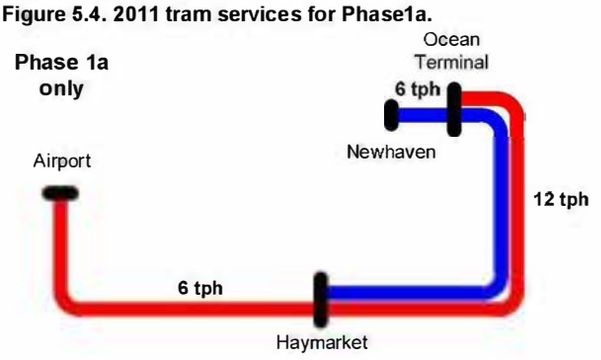
Tram operations

5.59 The JRC modelling work, in conjunction with the service integration plan, prepared for the DFBC produced the patronage forecast for the tram and for buses. For phase 1 it separately identified Phase 1a, although for completeness, the information for both Phase 1a and 1b is provided below. This allowed the tram and bus service plan to be validated and adjusted to ensure sufficient capacity is provided at an affordable level throughout the network. The service integration plan seeks to provide an integrated public transport network upon introduction of the tram.

5.60 The tram service provision is based upon the number of trams per hour (tph) necessary to carry the demand predicted by the model in the AM peak hour in the busiest direction. This

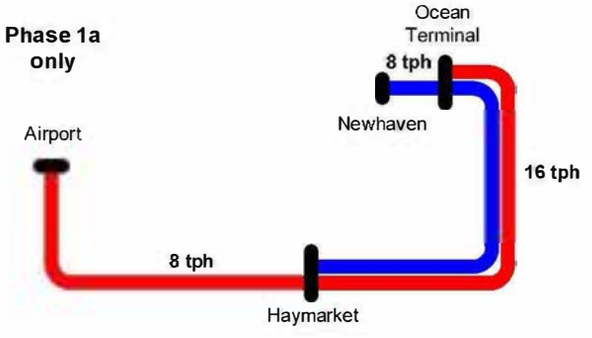
tram service frequency is applied in 2011 when the tram opens and for up to the first four years of operation, dependent upon the rate of patronage ramp-up as shown in Figure 5.4 .

Figure 5.4. 2011 tram services for Phase1a.



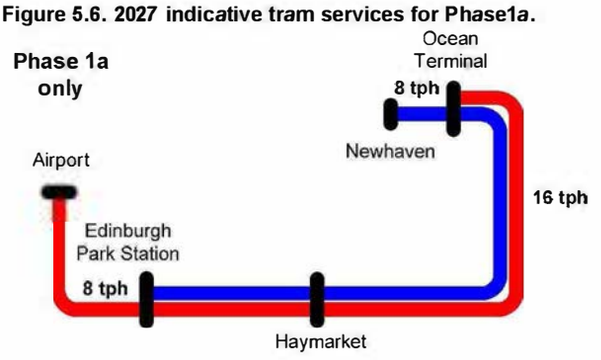
5.61 The modelling process indicates that, after the initial 'build-up' period, the tram services will require to be strengthened to provide sufficient capacity primarily to serve demand on the Ocean Terminal to Haymarket section of the network (Figure 5.5). On that basis, the services will increase to 8tph on each of the service routes, initially in the morning and evening peaks, Monday to Friday but building by 2016 to a whole day peak service, Monday to Friday, between 08:00 and 19:00.

Figure 5.5. tram services for Phase1a after initial 'build-up' period.



5.62 The modelled passenger projections indicate that, after the year 2027, the tram services will require to be strengthened further to provide sufficient capacity to serve demand on the Haymarket to Edinburgh Park section of the network (Figure 5.6). Consideration of this has led to a potential solution of extending, for Phase 1a, the Newhaven to Haymarket service to Edinburgh Park, providing 16tph between Ocean Terminal and Edinburgh Park.

Figure 5.6. 2027 indicative tram services for Phase1a.



5.63 The times of first and last tram services and the frequencies during the operating day for:

- 6 trams per hour initial timetable;
- an 8 trams per hour morning and evening peak enhanced timetable, and
- 8 trams per hour 07:00 to 19:00 enhanced timetable

Are shown in Tables 5.1, 5.2 and 5.3 below.

5.64 These scenarios are based upon the following assumptions and conditions:

- The two balanced services combine to give a total of 12 or 16 trams per hour per direction on the common section between Ocean Terminal and Haymarket are required during the daytime to replace the withdrawn bus services (and therefore demand and capacity) on Leith Walk;
- For the purposes of ramping up / down service short workings between Edinburgh Airport, Haymarket Yards and St. Andrew Square are based on the ability to turn trams at St Andrew Square using the turnback in York Place;
- Edinburgh Airport service tram frequency is ramped up / down from Ocean Terminal or Haymarket service tram frequency is ramped up / down from Newhaven;
- Service proposals are based on the requirement to always have a tram present at the Airport tramstop.
- Trams going into service between the Gogar depot and Ocean Terminal / Newhaven will run “in service” from the Gyle (first tram Gyle to Ocean Terminal at approximately 05:15 Monday to Saturday);
- Haymarket service trams going out of service running between Newhaven and Gogar depot will run “in service” as far as the Gyle;
- Edinburgh Airport service trams going out of service will run “in service” from Ocean Terminal to Edinburgh Airport with a short “dead run” from Edinburgh Airport to Gogar depot; and
- The period of time between the last tram returning to the depot at night and the first tram leaving the depot in the morning Monday to Saturday is about 4hrs 30 minutes. Consequently the maintenance window will allow work on the system infrastructure for about 3 hours and 45 minutes, depending on location each night and allowing time for the implementation and withdrawal of isolations.

Table 5.1. First and last tram services and frequencies for 6 and 6 tph operational timetable.

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

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

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

Notes:

[a] from approx 23:15 trams run from Airport - City Centre only

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

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

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

Table 5.2. First and last tram times for the enhanced AM and PM peak timetable.

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

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

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

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

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

Table 5.3. First and last tram services and frequencies for 8 and 8 tph enhanced timetable.

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

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

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 07:00	07:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6		6	6		8[a]	0
1a	Ocean Terminal to Airport	6	6	6	6		6	6		6	0
1a	Haymarket to Newhaven	0		6	6		6	6			0
1a	Newhaven to Haymarket	0		0	6		6	6[d]			0
1b	Airport to Ocean Terminal	0	6		6	6	6		6	6[a]	0
1b	Ocean Terminal to Airport	6	6		6	6	6		6	6	0
1b	Granton to Newhaven	0	6		6	6	6		6	6[b]	0
1b	Newhaven to Granton	6	6		6	6	6		6	6[c]	0

Notes:

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

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

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

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

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

Operational integration with bus

5.65 It is a critical element of planning for the tram system that the operation of bus and tram (and other modes of transport) should be as fully integrated as possible. The principal bus operator in Edinburgh is LB, which is wholly owned by the public sector. To facilitate tram / bus integration and maximise the operational and service opportunities this presents, CEC established Transport Edinburgh Limited.

5.66 The objective is to deliver an integration plan which:

- Creates a combined bus and tram network which will be financially viable from the start of tram operation;
- Avoids unnecessary duplication of provision, and thereby maximises operating efficiencies; and
- Minimises enforced passenger interchange between modes, except where interchange infrastructure is assumed to be deliverable.

5.67 TEL will plan and manage the two operations as a single unit to provide an integrated transport network. Operationally, TEL will retain its bus set-up and take full advantage of the appointment of Transdev as the operator for the tram system. Key areas for integration are set out in the TEL Business plan:

- Fares strategy;
- Ticketing strategy and systems;
- Revenue protection;
- Service integration and service patterns;
- Interchanges;
- Operational support systems;
- Safety and quality management; and
- Risk management and insurance.

5.68 A summary of the TEL Business plan and the planned bus services to integrate with the tram service patterns above are provided in section 9.

Project constraints

5.69 The tram project will continue to address the effect on the World Heritage Status of Edinburgh. **tie** has sought to minimise or eliminate any adverse impact the tram system may have by working closely with the CEC Planning Authority to develop complementary solutions. The design work developed as part of the recommended procurement option is targeted on the most sensitive sections of the route, with the aim of facilitating planning solutions in these areas. The topography, layout, numerous ancient monuments and Sites of Special Scientific Interest, have all been evaluated and have shaped the alignment and detailed design of the tram system that is part way through the planning approvals process. **tie** is committed to minimising any adverse impact on these areas.

5.70 During the construction phase there are periods where 'restricted' or 'no construction' can be achieved in certain areas, primarily during the Edinburgh Festival and in the run up to Christmas. The scheduling of construction takes into account when areas will be curtailed, and minimises any potential down-time by pragmatic targeting of resources.

5.71 The programme restrictions which may affect the construction of the tram network include the following:

- The August Festival period will run from the first Sunday in August to the first Sunday in September. The area affected by this restriction will be from Haymarket to Picardy Place;
- The December Christmas market restriction will run from early December to the first working day of the New Year, inclusive;
- No work can commence at Haymarket Station prior to 17 November 2007;
- Edinburgh Park has an 18-month construction window on the north site and a 24-month construction window on the south site (which includes the bridge) from the commencement of the works;
- Seasonal constraints on site clearance of trees and shrubs;
- Constraints associated with badger and other protected species;
- CEC has requested that the Fastlink guided busway is kept operational as long as possible in the construction programme, until suitable alternative bus priority measures are provided for those services currently using Fastlink; and
- There is an 18 month window to complete the main civils work adjacent to Murrayfield.

5.72 In addition, various documents were prepared during the Parliamentary process, which impose constraints on the construction and operation of the tram. These include:

- **Code of Construction Practice** (CoCP) – This was developed during the parliamentary process and the Bill amended to provide that the authorised undertaker must use all reasonably practicable means to ensure that the works are carried out in accordance with the CoCP. This document sets out the working hours, noise levels during construction, methods of minimising dust, vibration and the like during the construction period, consultation requirements etc.;
- **Code of Maintenance Practice** – This has been developed from the CoCP specifically to cover maintenance activities after the tram becomes operational;
- **Noise and Vibration Policy** – Again this was document was developed during the parliamentary process and the Bills were amended to provide that the authorised undertaker must use all reasonably practicable means to ensure that the Noise and Vibration Policy is applied to the operation of the tram. This imposes operational requirements during testing and commissioning on the tram supply and infrastructure contractors and, thereafter, the operator and maintainers. The scheme must be designed and constructed so as to endeavour to comply with the policy, failing which, there will be a need for further mitigation measures e.g. noise barriers following the operation of the tram. Noise and vibration are important considerations that have been taken into account in the tram supply evaluation and the tram to be provided by the preferred tram supplier has been demonstrated to have low noise and vibration characteristics. The policy also sets out monitoring requirements and the basis of an insulation scheme in the event that this is found to be necessary.
- **Landscape and Habitat Management Plan** – This was also developed during the parliamentary process in response to the objectors along the Roseburn Corridor. It sets out the likely impacts on the corridor as well as the mitigation and the ongoing management of the corridor once the tram is constructed and is operational. This requires the approval of the planning authority prior to the works along the Roseburn Corridor commencing;
- **Environmental Statement** – The Bills were amended so as to provide that the residual impacts of the scheme must be no worse than as assessed in the Environmental Statements;
- **Tram Design Manual** – This has been developed and approved by the Planning Authority as supplementary planning guidance which will be a material consideration in the assessment of all the prior approval application; and
- **Side Agreements** – Various agreements have been reached with objectors (in exchange for an objector withdrawing its objection) which contain provisions which will constrain the construction of the tram. For example, in relation to the Gyle Shopping Centre, the LoD has been changed to minimise the absolute land take and reduce land assembly costs. Further, the alignment was changed to suit potential future development.

Project workscope

Track

5.73 The nature of tramline surfacing (track, swept path, affected roads and footpaths) is dependent upon its environment. The various track finishes will include the following:

- Tar macadam or other similar road surfacing;
- Block paviors, stone setts or the like;
- Ballast, eg depot area, and some off street sections outside the built-up area;
- Concrete or similar hard surface e.g. on a bridge or other structure, an apron or special surface in the depot, sidings and tramstops; and
- Grass track through the sensitive area of Edinburgh Business Park.

5.74 On street, trackslab construction (reinforced concrete) must provide strength to support the traffic / tram loads (including risk of voids beneath) together with appropriate stray current protection. Steel rails are fixed within the trackslab. The trackslab may also be designed for specific circumstances to mitigate ground borne vibrations and noise. Off-street the rails may

be fixed within "grasstrack" (usually a "lawned" type slab or unit construction) or traditional ballast and sleeper type arrangement in certain sections outside the built-up area.

5.75 The different track forms comprise the following:

- Street running track (integrated and segregated);
- Grass track;
- Direct fixation track;
- Ballasted track; and
- Special trackforms in the depot and at tramstops.

5.76 The trackform that has been designed shall:

- Facilitate ease of construction and minimise disruption to other road users and the public during the construction phase on all roads and across all junctions between Haymarket and Ocean Terminal via Princes Street;
- Minimise the potential for stray current and be in accordance with the requirements and codes of practice for stray current and the **tie** Earthing and Bonding Policy document;
- Ensure simplicity of overall maintenance and ease of rail replacement and relaying. Minimise the disruption to other road users caused by future repair or replacement;
- Comply with the operational noise and vibration requirements as stated in the Noise and Vibration Policy;
- Integrate fully with roads, such that differences in roads surfaces, specifically finished levels and skid resistance, are minimised as far as is reasonably practicable;
- Take account of the potential vandalism risk posed by the type of trackform, e.g. ballast which could be thrown at trams; and
- Integrate fully with surrounding area functionality and appearance, to ensure that hazards to pedestrians, the mobility impaired and cycle users are minimised, as far as is reasonably practicable, and such that track surface finishes are in accordance with all design requirements and guidance.

5.77 The following track elements have been designed in order to ensure compatibility between the wheels and rails of all operational and maintenance vehicles using the system in terms of sufficient adhesion and the mitigation against the risk of derailment, wear, noise and vibration:

- Various track alignment criteria;
- Rail sections;
- Points and crossing configurations, including checking of wheels adjacent to, and on approaches to, rail crossings;
- Provisions for checking of wheels on small radius curves, adjacent to, and on approaches to, discontinuities in the rail, such as at rail movement joints;
- Possible provision for flange running at rail crossings and other discontinuities in the rail;
- Rail grades;
- Consideration of all parameters against full defined construction and maintenance tolerance, including the interface between new wheels and worn rails and vice-versa;
- Rail inclination; and
- Rail lubrication.

5.78 Track will be a standard tramway track with steel rails set to standard gauge (1.435m).

5.79 Trackwork components to be provided include but are not limited to the following:

- Rails;
- Sleepers and points and crossing bearers;
- Turnouts;
- Points and points motors;
- Points baseplates and slippers;
- Points rollers;
- Crossings;
- Check rails and check rail fastening systems;
- Guard rails and guard rail fastening systems;
- Transition rails;

- Rail joints (fishplated and welded);
- Insulated rail joints;
- Isolatable rail joints and provisions for access to associated rail / cable connections;
- Rail movement joints;
- Rail fastening systems;
- Rail pads;
- Baseplates;
- Resilient baseplate systems;
- Rail embedment for street running track;
- Paved trackbed and concrete trackbed systems;
- Grooved rail drainage systems (including boxes);
- Buffer stops and vehicle arrestor systems;
- Ballast;
- Granular filtering;
- Granular blanketing;
- Geotextile membranes;
- Plastics membranes;
- Geosynthetic reinforcement;
- Provision and installation of signs and markers; and
- Grasstrack.

5.80 The track will be double track.

Depot

5.81 The depot is to be located at Gogar and complies with the Civil Aviation Authority regulations in relation to bird strike and height restrictions given the proximity to the croswind runway at Edinburgh Airport.

5.82 There will be road access from the A8 Gogar Roundabout. All existing utilities and services will be relocated. The depot will be secured by a continuous 2.4m high security fence and will have a CCTV system.

5.83 The depot accommodates a minimum of 32 berths that are 43 metres long in the stabling area free of fouling points and walkways. The design provides for expansion up to 37 berths. Staff and visitor parking is to be provided with a minimum of 100 spaces.

5.84 The main tram workshop, other workshops, stores, management, administration, operations and maintenance offices and staff welfare facilities (support accommodation) and the control room for the complete ETN, shall be contained within a steel framed building clad in an insulated panel cladding system. The roof of the building shall be insulated to a suitable standard with the minimum number of penetrations.

5.85 The building workshop shall accommodate a minimum of two tram maintenance roads each accommodating two trams, plus a wheel lathe road that includes a further single tram service road.

5.86 The support accommodation shall be arranged on two floors set to one side of the main tram maintenance workshop. The depot control room shall be located at first floor level with the equipment room set below. A view of the depot external stabling area and tram entry / exit point shall be provided to control room staff from within the control room.

5.87 The depot shall be provided with the appropriate electricity supplies including 400V / 415V for individual items of workshop equipment both inside and outside the building, 230V for internal domestic use and 110V for small tools.

5.88 Natural light in offices shall be maximised and all rooms shall be placed within the building in locations appropriate to their function.

5.89 Additional service space shall be provided for the accommodation of gas, compressed air and battery charging equipment as well as for the accommodation and systems directly linked to the tram operations.

5.90 Full heating and ventilation will be provided throughout the building with air conditioning to the control room, equipment room, training and meeting rooms.

5.91 The plant and equipment to be provided and installed will include the following:

- Remote controlled vehicle shunter;
- Underfloor vehicle lifting jacks / stands;
- Tram wash and cleaning equipment capable of high quality operation all year round;
- Cab air-conditioning repair;
- High-level access platforms;
- Wheel hub removal / press;
- Tyre splitter;
- Depot furnishings;
- Cleaning (shot blast / wet spray);
- Workshop cranes;
- Craneage (general);
- Underfloor wheel lathe;
- Bogie maintenance area;
- Re-railing equipment;
- Pan maintenance and load-test jig;
- Permanent way / track-way maintenance vehicles / ancillary engineering vehicles;
- Stores (computerised / inventory and maintenance linked software);
- Small tools;
- Spares / consumables;
- Fork lift truck;
- Temporary lighting stands / equipment;
- Mobile / fixed staging for tram and end of tram inspections;
- Road / rail vehicle;
- Mobile generators;
- Rail groove cleaning equipment;
- Mobile platforms (road / rail based);
- Track measurement equipment;
- Sand plant; and
- Mobile paint shop booth.

Tramstops

5.92 Tramstops will be platform stops, side platform stops or combined side and island platform stops. The tramstops must be long enough to cater for a 43m tram.

5.93 Side platforms are to a minimum of 3m wide. Island platforms will be a minimum of 4m wide. The platform height must match the requirements of the tram to ensure level access in accordance with the Rail Vehicle Accessibility Regulations.

5.94 Tramstops have been designed to be compliant with:

- The requirements of the Tram Design Manual;
- Her Majesty's Railway Safety Principles and Guidance;
- DDA requirements;
- Rail Vehicle Accessibility Regulations;
- Taking into account the Mobility and Access Committee for Scotland (MACS);
- The Department for Transport Inclusive Mobility Guide to Best Practice on Access on Pedestrian and Transport Infrastructure; and
- The Building Regulations (Part M).

5.95 In addition, the tramstop must comply with the following:

- Mobility-impaired access and egress to and from each platform. The minimum width of ramps provided on the ETN System shall be 2m between handrails;
- Ramps, if required, shall have a maximum gradient of 1 in 20;
- No ramp shall be longer than 10m without the incorporation of a landing; and
- Landings shall be no shorter than the width of the ramp.

5.96 Tramstop finishes are to be in accordance with the Tram Design Manual. Provision is to be made for 400mm wide tactile strips. The platform edge is to have a 65mm wide white inset line to the leading edge of the line-side coping. Boarding areas will be indicated.

5.97 Each tramstop will be equipped as is appropriate for the location of the stop. Such equipment may include any of the following:

- Shelters providing canopied waiting areas;
- Tramstop lighting columns;
- Public address;
- Tramstop CCTV;
- Passenger help points and emergency points;
- Braille assistance;
- Tramstop name signs;
- Advertising / information signs and displays including real time passenger information displays;
- Litter bins;
- Guardrails, handrails and cycle racks;
- A perch rail / seating; and
- Ticket vending machines.

5.98 Each stop will be provided with an equipment cabinet, which will house the majority of the control equipment such as communication and signalling equipment. Where practicable, this would be co-located with a sub-station. Such cabinets are generally metal units with a 1-2m frontage, up to 1m depth and 1.5m high.

Structures

5.99 The project requires the construction or modification to a number of structures along the route of Phase 1a:

- Lindsay Road retaining wall;
- Victoria Dock entrance bridge;
- Tower Place bridge;
- Leith Walk railway bridge;
- Haymarket Station viaduct;
- Russell Road bridge;
- Russell Road retaining wall one and two;
- Water of Leith bridge;
- Baird Drive retaining wall;
- Balgreen Road bridge;
- Balgreen Road retaining wall one;
- Carrick Knowe underbridge;
- Saughton Road bridge;
- Broomhouse Road bridge;
- South Gyle access bridge;
- Edinburgh Park Station bridge;
- A8 underpass;
- Gogar Burn bridge;
- Gogar Burn culverts;
- Gogar Burn retaining walls;
- Murrayfield Tramstop retaining wall;
- Roseburn Street viaduct;
- Murrayfield Stadium retaining wall;

- Murrayfield Stadium underpass;
- Bankhead Drive retaining wall;
- Gyle tramstop retaining wall;
- A8 retaining wall (under redesign to minimise this structure);
- Depot Internal retaining walls (under redesign to minimise these structures); and
- Depot Access bridge.

5.100 Due cognisance will be taken of the historical status of any of the structures affected by the works.

5.101 The structures are designed and are to be constructed to comply with the Noise and Vibration Policy.

5.102 The design is to minimise the need for bearings and movement joints within the structures. Where bearings are used either elastomeric or pot type bearings will be used to accommodate longitudinal and transverse translations and rotations while minimising lateral loads on sub-structures. All bearings must be replaceable under full live loading.

5.103 The structures are designed to comply with the loadings imposed by construction and maintenance vehicles.

5.104 All elements are designed and provided to cater for tensile breakage of one rail at any location at ultimate limit state only. Clearances will be to HMRI requirements.

5.105 Finishes to all concrete components of the works comply with the following:

- All buried and permanently submerged surfaces F1, U1
- Pier tops, bearing shelves and hidden surfaces F2, U2
- Parapet coping, exposed surfaces F3, U3
- Main Bridge deck U4.

5.106 The structures are to be designed for minimal maintenance requirements.

Roads and utilities

5.107 The majority of the works required to divert or protect utilities are being carried out by the contractor appointed under the Multi Utilities Diversionary Framework Agreement (MUDFA).

5.108 In addition the roads and utilities works include the following:

- Road and junctions (including all necessary off-alignment works);
- Site clearance;
- Safety barriers and fencing;
- Drainage works including track drainage;
- Earthworks;
- Surfacing;
- Road lighting;
- Traffic signage and road markings;
- Traffic signals and tram signals;
- Landscaping;
- Temporary and permanent traffic measures;
- All associated cable ducting required for the works;
- Depot access and utilities, including within the depot;
- Utility diversion works whether carried out by MUDFA, Infraco or otherwise; and
- Removal of all redundant services and apparatus affecting the works.

The tram network will be segregated from the road, wherever feasible, providing efficient use of available space, using a variety of means, as appropriate, to the features and constraints of the individual locations. These include the use of road markings and varying surface types for visual or textural delineation. The design of the segregation details will optimise their effectiveness, without significantly compromising safety and operational factors, including the

shared use by buses as appropriate, operation of junctions and emergency and maintenance access.

5.109 Wide-area modelling of traffic impacts consequent to the design is being provided as a pre-requisite to approval, and prior agreement with CEC on the TROs and TTROs necessary to implement the design and complete the works. Details are provided in section 8.

The roads design meets the standards set out in the Design Manual for Roads and Bridges (DMRB), City Development Transport – Development Quality Handbook – Movement and Development and the Tram Design Manual.

5.110 Where cycleways are provided, for example along the Roseburn Corridor, these are designed and constructed in accordance with the relevant guidelines including:

- Design Manual for Roads and Bridges;
- CEC "Roads Development Guidelines";
- Scottish Executive's "Cycle by Design"; and
- Sustrans "Cycle Friendly Infrastructure Guidelines for Planning and Design".

5.111 All surfacing materials and drainage will comply with the DMRB. Road signs will comply with the Traffic Signs Regulations and General Directions 2002 and Chapter 8 of the Traffic Signs Manual. The works will be consistent with "Edinburgh Standards for Streets".

5.112 The traffic and tram signalling systems will support the run-time of the tramway whilst minimising the impact on other road users. It shall be fully integrated with CEC's urban traffic control system. A protocol is developed with CEC regarding the installation and integration of the traffic and tram signals. The signalling system will incorporate recent / current technological developments, as appropriate, to optimise the combined efficiency of the tram and traffic signals.

5.113 The traffic management system will accommodate the direct and consequential impacts of the Tram system and will be subject to approval by **tie** and CEC (section 8).

5.114 Road lighting will conform with CEC policy and the Tram Design Manual. The lighting columns and OLE poles will be rationalised to minimise road clutter.

5.115 Road User Safety Audits shall be carried out when they are required by the Roads Authority and sufficient to demonstrate the integrity of the design process to the ICP (and HMRI).

Substations

5.116 Eight new 11kV substations will be built along the Phase 1a route to accommodate the traction power supply:

- Cathedral substation;
- Haymarket Terrace substation;
- Leith Sands substation;
- Leith Walk substation;
- Russell Road substation (initially to be a track paralleling hut);
- Bankhead Drive substation;
- Ingliston Park and Ride substation; and
- Jenner's Depository substation.

5.117 There will also be a substation at the depot. The substations will be spaced along the route at approximately 2km intervals, as dictated by the needs to supply power to the system. The substation buildings will be approximately 15m by 4m plan area, including a provision for Distribution Network Operator supply.

5.118 Each Edinburgh Tram traction power substation will include:

- The traction substation enclosures (where substations are containerised);
- The associated Scottish Power HV (11 kV) three-phase power supplies with associated HV switchboard, metering and local emergency tripping facility;
- 230V LV services with associated metering and distribution equipment for substation services i.e. lighting, small power etc;
- Traction substation transformer-rectifier(s) and equipment;
- Traction dc switchboards;
- Feeder and bypass isolators;
- Substation earthing;
- Negative busbars;
- Batteries / chargers;
- Supervisory control and data acquisition (SCADA) interface marshalling panels;
- Associated internal power and control cabling;
- Provision for a 11 kV supply to the depot services transformer; and
- Miscellaneous items to complete.

5.119 The Russell Road track paralleling hut will be provided with similar equipment as all other substations. However, a high voltage supply from Scottish Power will not be provided and the substation will be used as a track paralleling hut in the first instance.

5.120 The equipment at the depot traction and services substation will comprise three HV supply cables from three Scottish Power circuit breakers, or ring main units feeding two indoor transformer-rectifier units for depot stabling traction and main line traction, and the other to the services transformer in the depot building.

5.121 One four-panel 750 V dc switchboard, with direct acting overcurrent protection, relay overcurrent protection, thermal image, earth fault protection on three (two for the yard and one for the workshop) track feeder circuit breakers and direct acting reverse current protection on the rectifier circuit breaker will be fed from one rectifier transformer; a three panel 750V dc switchboard feeds the main line in the usual way described above.

5.122 The whole of the depot yard will be earthed on the negative side including the workshop traction supplies.

5.123 The enclosure of the yard and workshop circuit breaker will be solidly earthed, and also connected to the rectifier negative pole.

5.124 Two negative busbar cubicles (one for the yard rectifier and the other for the main line rectifier), a tripping and closing battery and charger, all associated internal power and control cabling, and earthing will be provided.

5.125 In an annex segregated from the main enclosure for fire protection, two motorised track feeder isolators with motorised earthing function and a motorised load break bypass isolator with over-current detection and tripping relay will be provided.

5.126 At all substations, control and indication multi-pair cabling will be provided and connected to a SCADA remote terminal unit (RTU).

5.127 Subject to the agreement of Scottish Power, the 11 kV feed to each traction substation shall be derived from and form part of the local distribution network providers (Scottish Power) network ring with a dedicated ring main unit or switchboard feeding the ETN rectifier of the traction substation. In the event Scottish Power is unable to agree to this electrical arrangement then additional HV switchgear shall be provided in series with the Scottish Power switchgear.

Overhead line equipment

5.128 The OLE will be energised at a nominal 750v, in accordance with BS EN 50163:2004: Railway Applications – Supply voltage of traction systems.

5.129 The Overhead Line Equipment will utilise a single contact wire system, with additional parallel (buried) feeders. Standard materials will be used with the exception of the route sections from Newhaven Road to Ocean Drive tramstops where stainless steel material (for tubes and fittings) will be provided. The contact wire will be supported by either side poles, centre poles or building fixings as appropriate to the particular location.

5.130 For safety considerations, in areas where tram path is shared with the public traffic, the contact wire height and the profiling of the wire will take into account the interface with the public buses (especially open-top buses).

5.131 In addition the following general safety requirements have also been followed:
- ICP and HMRI requirement for minimum wire heights where a support has failed;
- Minimise the risk of contact with wire from open top double decker buses, over-height road vehicles, window cleaners carrying ladders and any third party work;
- Activities associated with the Edinburgh festival, Christmas fun-fair on Princes Street, and similar public events; and
- Provide the necessary clearance for designated high-load routes.

5.132 Aerial parallel feeders will not be permitted. All parallel feeders will be buried, located in suitable ducts running along the tracks, with cross feeding to the OLE conductors at suitable intervals.

Communications and signalling

5.133 The Tram Position and Detection System will monitor the efficient and effective movement and overall regulation of trams running on the ETN. The tram position and detection system will include both tram-borne and trackside equipments.

5.134 The Tram Position and Detection System shall collect, in real time, the following from each tram for transmission to the control centre:
- Tram number;
- Tram run number;
- Tram destination;
- Driver staff identity number;
- Driver duty number; and
- Tram in service / out of service.

5.135 The Tram Position and Detection System will provide a number of functions which will include:
- Tram identification;
- Tram position on network (outside of depot);
- Tram progress monitoring;
- Route setting;
- Processing of manual and automatic 'Tram ready to start' and advance signal demands requests from trams;
- Permit trams to safely transverse tram / road crossings; and
- Provide controlled entry to and exit from the depot berthing and maintenance facilities.

5.136 The systems to be provided include the following:
- Tram position, route setting and detection system;
- Passenger information display systems;
- Telephone network;
- Public address system;
- Operational radio system;

- Passenger help / passenger emergency help points;
- Closed circuit television;
- SCADA; and
- Operational data network.

5.137 There will be a control room which will be the focal point for the control and operation of the ETN. Its purpose will be to provide a working place for the operational employees to manage and coordinate day-to-day activities associated with system operations.

Maintenance effects and requirements post–completion

5.138 Following completion, commissioning and acceptance of the system, it is assumed that the system will be maintained over its expected life to a high standard which includes refurbishment and / or renewal of major system components during the life cycle of the system.

5.139 High level requirements for maintenance and renewals for the whole network are contained in the Maintenance ER, the Roads Demarcation Agreement matrix of responsibilities and have been costed in the Life Cycle Costs report prepared as part of the DFBC and TEL Business Plan development. Tramco and Infraco bidders have included detailed maintenance specifications within their Contractors Proposals and have provided the associated firm costs for undertaking this maintenance. The systems performance and operations requirements are based on the Operations and Performance ER document which is part of the suite of ER documents which, along with the Contractors Proposals, will form part of the Infraco, Tram Supply and Tram Maintenance Agreements.

5.140 Life expectancy for key system components are summarised in Table 5.3 and these were used in the Lifecycle Cost Report prepared for the DFBC and incorporated into the costs. Achievement of these is an obligation passed through the Infraco Agreement onto the equipment suppliers and the maintainers to deliver a robust maintenance and renewals regime. The regime will comprise day-to-day maintenance (daily maintenance and operational maintenance of systems / sub-systems), planned refurbishment of major systems for the Tram fleet (including e.g. upholstery, motors, pantographs) and planned renewals as dictated by the specified performance criteria of the individual system.

Table 5.3. Anticipated system element life expectancy.

System element	System life expectance (replace at end of year)
Trams – refurbishment	15 years
Trams – replacement	30 years
CCTV	15 years
Ticket vending machines	15 years
Passenger help points	15 years
Passenger information displays	15 years
Public address	10 years
Radio communication systems	15 years
Control room equipment	15 years
Signalling	20 years
OLE	40 years
Traction power equipment	35 years
Track – off street locations	30 years
Track – on street locations	50 years
Buildings	50 years
Structures	120 years

5.141 The details of the maintenance to be performed by Tramco and Infraco are set out in the contract documents and are explained further in section 7.

Performance effects and requirements post-completion

5.142 Post completion performance effects and requirements form part of the sensitivities considered in the TEL business plan. An operational performance regime framework has been established in the contracts between TEL and the operator and maintainer. Key performance indicators include tram punctuality, systems availability, systems reliability, target repair times as well as qualitative measures for cleanliness, appropriateness of passenger information provision, helpfulness of staff.

5.143 In addition, the impact the tram has on the wider area road network has been modelled, and the emerging effects will have to be monitored as the construction and testing is undertaken. This will ensure that any adverse impacts can be addressed as they arise through the use of various traffic management measures provided for within the TROs that are in the process of being obtained. Items such as signage and changes to traffic light sequencing and timings will be optimised in the light of experience gained with the changing traffic patterns that will emerge.

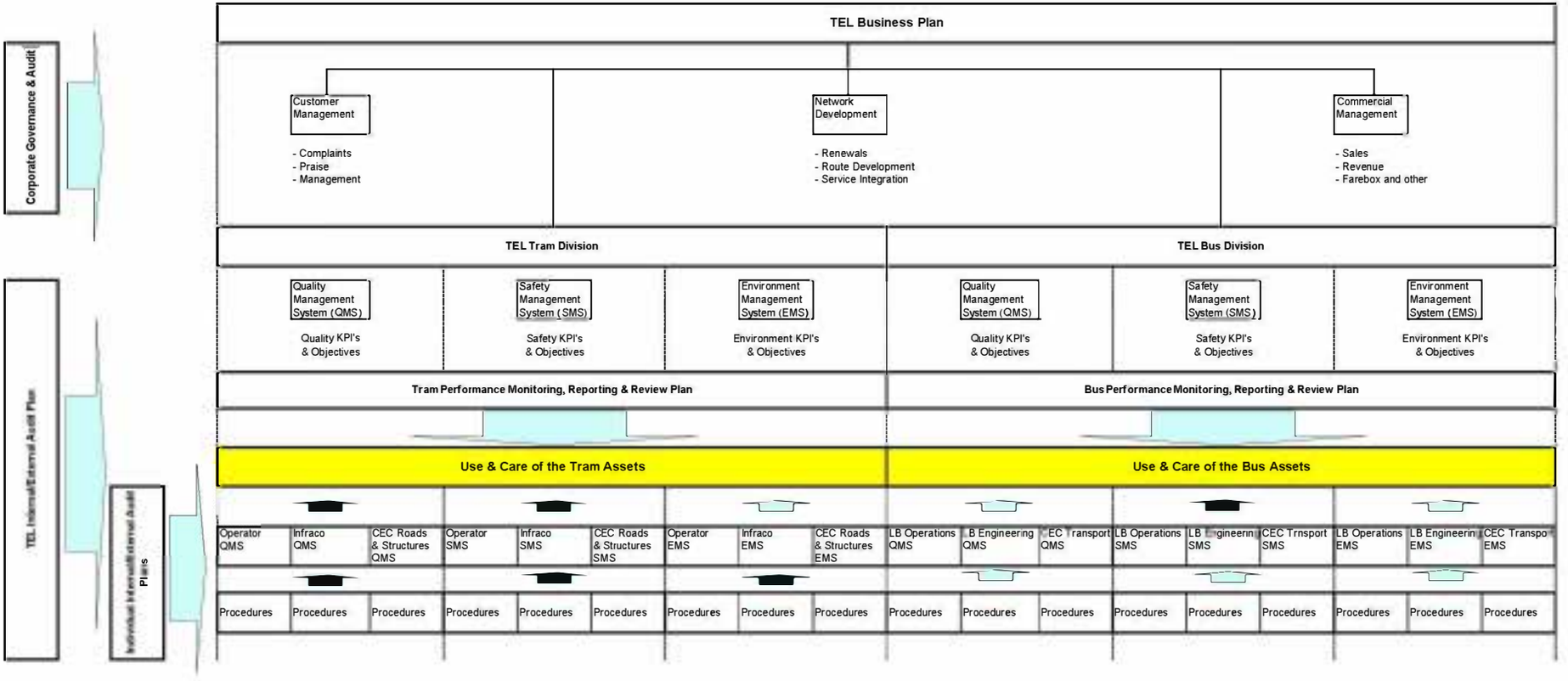
Safety and environmental effects and requirements post-completion

5.144 Project design considers safety risks to those who use, maintain and operate the tram system as well as other road users and parties such as NR and BAA. These are detailed in the project hazard log and are mitigated through design, procedures and maintenance. These identified mitigations will be verified during each phase of the project leading up to the final testing.

5.145 The case for safety will include evidence that the hazards have been mitigated to reduce the risks to as low as reasonably practicable before the system is approved to commence passenger operation. The project safety certification committee is responsible for closing the hazards and providing the assurance to the ICP under ROGs. Maintaining the ongoing safety assurance will be achieved through the TEL safety management system (Tables 5.4 and 5.5) which will encompass all elements of the tram operation and maintenance, relying on the operator safety management system for tram operation, the Infraco safety management system for tram and infrastructure maintenance and the CEC roads safety management processes for traffic signal maintenance.

5.146 This assurance regime will provide an integrated and comprehensive management process and will retain the services of the ICP on an ongoing basis after opening to provide independent audit and approvals for any changes to safety procedures or modifications required to the tram system.

Table 5.4. Proposed TEL integrated management system.



Summary of the Safety Management System (SMS):

i. All safety responsibilities flow through the contractual routes to TEL as the ultimate client for Tramco, Infraco and Transdev Edinburgh Tram;
ii. TEL's role is the overall strategic safety of the ETN and for ensuring that there are appropriate internal and external audit and management processes in place with all relevant parties;
iii. Transdev Edinburgh Tram Limited has day to day responsibility for the operation of the ETN;
iv. Infraco has the responsibility for the safety of the infrastructure;
v. Tramco has responsibility for the safety of the trams;
vi. TEL are to arbitrate in safety issues where alternative solutions impact differently on the parties concerned and consequently TEL must accept the consequences of so doing;
vii. TEL has overall strategic policy liaison with third parties;
viii. Contracting partners (those listed in the four right hand columns in table 5.5) co-operate with each other in the implementation of their SMSs; and
ix. TEL manages the contract to maintain the ticket machines at tramstops directly.

Table 5.5. Summary of responsibilities under the Safety Management System.

	Transdev	**Infraco**	**TEL**	**Tramco**
Transdev				
Infraco	Obligations to provide safe tram and infrastructure for safety of all tram staff and passengers. Obligation on both parties to act on identified deficiencies. Obligation on Transdev to operate equipment properly.			
TEL	Overall responsibility for passenger safety, conditions of carriage and contracting party for the transportation. TEL ensure Operator performs obligations.	Infraco to provide safe tram and infrastructure. TEL to ensure Infraco performs obligations.		

	Transdev	Infraco	TEL	Tramco
Tramco	Obligation on Transdev to use equipment properly. Tramco to provide safe trams for crew and passenger safety.	Infraco to ensure Tramco performs obligations. Infraco to ensure infrastructure does not damage tram. Tramco to ensure tram does not damage infrastructure.	Tramco provides safe tram for passengers (H&S)	
Network Rail	Incident management at interface, joint responsibility, control room liaison.	Safe working at the interface – joint responsibility. Infraco ensures Tramco does not import risk to NR.	Semi-annual review meetings to discuss liaison.	Ensures Tramco does not import risk to NR.
ORR	Transdev to comply with own SMS. RIDDOR reporting.	Infraco to comply with own SMS. RIDDOR reporting.	TEL to comply with own SMS. Through Monthly Safety Management Review Meeting make sure RIDDOR reports are reviewed across the system.	Tramco to comply with own SMS. RIDDOR reporting.
HSE	None.	Construction works that are off the operational system.	Engagement through ICP for liaison.	Possible RIDDOR reporting.
CEC as Roads Authority	CEC obligations to Transdev, same as for any other road user. Remote calling of junctions. Transdev to report any unauthorised and / or unsafe work on the road.	Maintenance interfaces	Lead TRO and coordinate traffic measure refinements process. CEC obligations to TEL in connection with shared maintenance.	Tram to signalling interface.
CEC Planning	Provide input on safety implications of third party planning implications.	Provide input on safety implications of third party planning implications.	Lead in any planning applications for the system.	None.
CEC Events Management	Support TEL.	Support TEL.	Lead planning for special events, Festival etc.	Support Infraco.

	Transdev	Infraco	TEL	Tramco
Buses (LB only)	Day to day operational communication as appropriate to achieve integration.	Input to planning process for Infraco works that may impact on LB.	TEL overview.	None.
Non-bus road users	Transdev and uses have mutual duty of care. Transdev to operate trams accordingly.	Infraco and uses have mutual duty of care. Infraco to maintain tram infrastructure so as to assure safety of other users.	None.	Tramco to maintain tram so as to assure safety of other users.
Scotrail as Haymarket depot operator	None.	Maintenance interfaces.	None.	None.
Scotrail as station operator	Communication and action in connection with station evacuation.	Maintenance of remote PIDS.	Policy.	None.
Local residents	Transdev cooperates with Infraco in respect of noise issues.	Maintenance of noise levels. Some maintenance issues at boundaries.	None.	None.
Police, traffic enforcement	Transdev to report incidents to Police. Police to instruct tram movements under emergency and some degraded modes.	None.	Policy.	Some interfaces in connection with tram recovery.
Police, emergency	Communication. Transdev to cooperate in incident investigation	Infraco to cooperate in incident investigation.	Policy.	Tramco to cooperate in incident investigation.
Fire Brigade	Communication. Provision of communication in respect of emergency isolations.	Implementation of emergency isolations and issue permit to works to Fire Brigade.	Policy.	None.

	Transdev	Infraco	TEL	Tramco
BAA and Murrayfield	Joint incident management arrangements. Joint crowd control arrangements. Event management.	Maintenance at interfaces.	Policy.	Tramco maintains trams to Electromagnetic Compatibility standards.
Frontagers	Transdev reacts to any unauthorised works. Transdev liaises with Infraco.	Main point of contact for frontagers that wish to undertake work that may impact on the tram system. Implementation of mitigation measures for such works. Infraco liaises with Transdev.	Support Infraco and Transdev.	None.
Static advertising hoarding contractors	Transdev reacts if contractor fails to work safely.	Infraco reacts if contractor fails to work safely.	TEL manages contractors to control safety in respect of the tram system.	None.
Tram carried advertising	Transdev reacts if contractor fails to work safely or if advertising impairs safety of operation.	None.	TEL manages contractors to control safety in respect of the tram system.	Tramco reacts if contractor fails to work safely or if advertising impairs safety of trams.
Suppliers	Transdev to manage its own suppliers' safety.	Infraco to manage its own suppliers' safety.	Tel to manage its own suppliers' safety.	Tramco to manage its own suppliers' safety.
Utilities	Transdev reports any unauthorised and / or unsafe work on the road to Utility	Stray current management. EMC with Communications Utilities; Working arrangements for Utilities when on or near tramway.	Oversee stray current management.	Tramco maintains tram to EMC standards.
Third party agreement safety obligations	TBD.	Limitations on working heights at the depot and airport stop in respect of BAA.	TBD.	TBD.

5.147 Environmental management has been an integrated part of the project development, with environmental impacts and mitigation measures identified in the project Environmental Management Plan. In particular, noise, vibration and visual impact are considered. There is an obligation in the Acts to use reasonably practicable endeavours to ensure that the residual impacts are no worse than as predicted in the Environmental Statements. This has been applied during the design and will be monitored through construction and testing to ensure that they are achieved. Post completion, environmental management is a fundamental element of the Operators contract and the infrastructure contract with each being required to operate environmental management systems that comply with ISO 14001 and to discharge the obligations of the Acts and the Environmental Management Plan and Environmental Statements.

6. Governance

Background

6.1 The delivery of Edinburgh's integrated transport system has the following key players:

- CEC as the Authorised Undertaker under the Tram Acts, will be the user of the output from the project and is part-funder of the project;
- TEL is a wholly-owned subsidiary of CEC which is working on the delivery of an integrated bus and tram system;
- LB is the main bus operator in the Edinburgh City Region and is owned 91% by CEC;
- **tie** is the delivery agent for the tram as specified by its client CEC acting through TEL; and
- TS is the principal funder.

6.2 This section describes the:

i) Project governance structure through to mid-2007;
ii) Period from mid-2007 to Financial Close; and
iii) Anticipated project governance structure for the construction period.

6.3 The objective of this section is to demonstrate that the project governance structure competently controlled the project while accommodating differing governance requirements applicable to different periods in the development of the project and that robust arrangements are in place for subsequent stages.

Governance structure – Period to mid-2007

6.4 The structure deployed in the period to mid-2007 is described in the following sections and highlights the following four key bodies, the roles of which are represented in Figures 6.1 and 6.2:

- TEL Board;
- Tram Project Board (TPB); and
- TPB sub-committees: Business Planning, Integration and Commercials (BPIC) and Design, Procurement and Delivery (DPD).

6.5 From mid-2007, following an announcement in the Scottish Parliament by the Cabinet Secretary for Finance and Sustainable Growth, changes in the governance structure were executed to reflect significant changes to the project funding arrangements. These changes are described in Sections 6.23 to 6.68 below.

6.6 It should be noted that sections 6.4 to 6.19 are written in the past tense as they describe a historical period. However, as is explained in Section 6.15, the structure deployed from mid-2007 retained a number of the key features of the previous structure.

Figure 6.1. Governance to mid-2007.

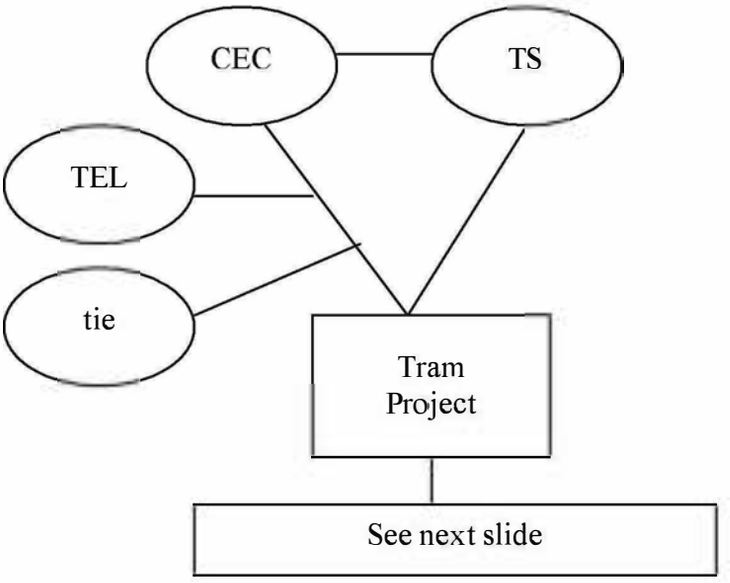
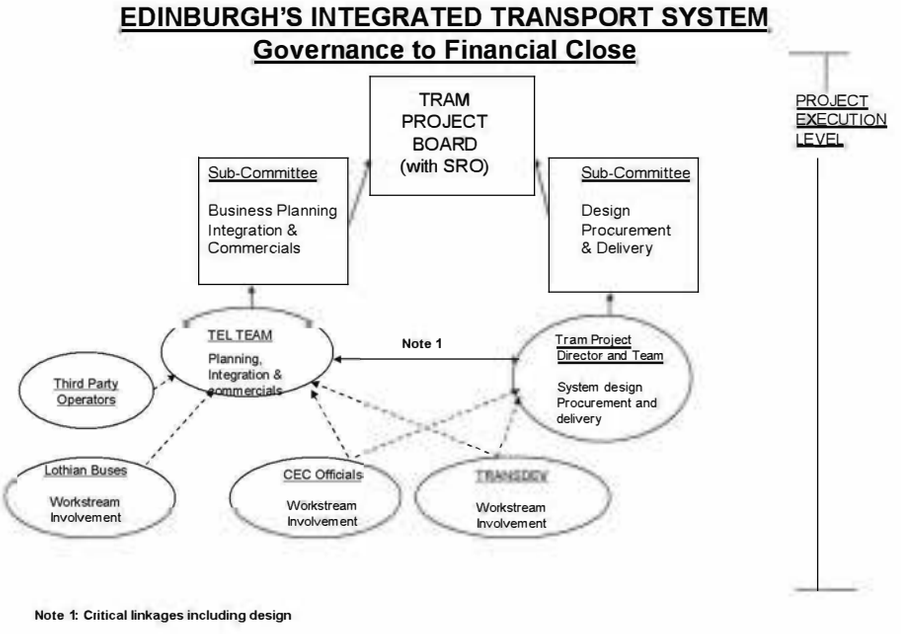


Figure 6.2. Governance to mid-2007 – Project Execution Level



6.7 The role of each body in the period to mid-2007 was as follows:

TEL Board

6.8 The role of the TEL Board was focussed on its statutory stewardship role and on its overall responsibility to deliver an integrated tram and bus network for Edinburgh, on behalf of CEC. It made the formal recommendations to CEC on key aspects of the project including Business Plan and Business Case approval, contractual commitment and matters which have a political dimension. Attendance was restricted to Directors, other than additional attendees at the

discretion of the Chairman. The TEL Board also addressed any matters outwith the direct arena of integrated bus and tram systems and any statutory TEL considerations.

TPB

6.9 The TPB was established as an independent body to monitor the execution of the project. In doing so, the TPB followed normal best practise in project management.

6.10 The membership of the TPB was 6 people (Office of Government Commerce constituency definitions "highlighted"):

- Chair;
- Senior TS Representative;
- Senior CEC Representative - "Senior User Representative";
- TEL CEO and Project "Senior Responsible Owner"; and
- "Senior Supplier" representatives (**tie** Executive Chairman and TEL Operations Director).

6.11 The Chair was the TEL Non-executive Chairman, rather than the Project SRO. Other parties, principally senior project management and advisers, were called to attend as required, though a common group, including the Tram Project Director, attended most meetings.

6.12 The empowerment of Senior Representatives of TS and CEC enabled the TPB to act with appropriate efficiency.

6.13 The Senior TS Representative was empowered by TS to support all decisions made by the TPB except those matters reserved by Scottish Ministers and set out below. In particular, the milestone approval requirements set out in the grant award letter are within the approval powers of the Senior TS Representative. The Senior CEC Representative was empowered by CEC to support all decisions made by the TPB, except those matters reserved by CEC.

6.14 Exceptionally, the TS or CEC Senior Representatives could withhold approval of matters within their powers for further reference in their respective organisations.

TPB Sub-committees

6.15 Execution workstreams were categorised as either BPIC or DPD. The BPIC programme was under the direction of TEL management and was focussed on the period leading up to the submission and approval of the DFBC in late 2006. The DPD programme was under the direction of the Tram Project Director. Critical linkages and dependencies required to be managed effectively. At operational level, CEC, TS and Transdev had key involvement in many of the workstreams. The structure encompassed all workstreams and approvals needed to deliver the integrated system. In particular, the two programme leaders were required to ensure that all other project-related activities ("influencing groups") were fully aligned with the governance structure.

6.16 The role of the sub-committees was to challenge and filter workstream outputs and provide recommendations to the TPB. Membership of sub-committees were partly sub-set of the TPB and partly additional advisers and stakeholder representatives. Membership varied according to the subject-matter on the table. The sub-committees had no delegated decision-making authority (except as specifically delegated by the TPB), but made recommendations to the TPB.

The tie Board

6.17 In addition to the four primary bodies, the **tie** Board retained a specific role, in line with its previous responsibilities, as follows:

i) To apply quality assurance to the execution by the Tram Project Director and their team
ii) To make formal funding requests to TS and be accountable for expenditure; and
iii) To enter into contractual arrangements necessary to execute project delivery.

The **tie** Board placed reliance on the governance processes executed by the TPB in assessing the work required to execute its own responsibilities under ii and iii.

Scottish Ministers' Reserved Matters

6.18 The following matters were reserved by Scottish Ministers and could not be determined by the TS Senior Representative without further consultation within TS and the SE:

- Those of CECs reserved matters set out below which may be referred to the Scottish Ministers for determination;
- Approval of the Business Case;
- Commencement of physical works under MUDFA;
- Entering into contracts for the delivery of tram vehicles (Tramco) or system infrastructure (Infraco);
- Increases in Scottish Ministers' funding beyond the total of grant already offered to CEC; and
- Decisions in relation to the application of concessionary fares to the Edinburgh Trams scheme.

CEC Reserved Matters

6.19 The following matters were reserved to CEC and could not be determined by the CEC Senior Representative without further consultation within CEC:

- Those TS reserved matters set out above which may be referred to the Council for additional determination;
- Approval of the Business Case;
- Commencement of physical works under MUDFA;
- Commencement of physical works for Infraco;
- Entering into contracts for the delivery of tram vehicles (Tramco) or system infrastructure (Infraco);
- Changes to contractual costs or budgets from that previously agreed by the TPB. The formal mechanism for informing the Council to be through the TPB on which the CEC Director of Finance (or his delegate) sat. Depending upon the scope and scale of financial change, it may have been necessary to seek approval from the Council Executive or full Council;
- Matters of substantive public interest which require political involvement, as are determined by the CEC Senior Representative;
- Decisions in relation to the application of concessionary fares to the Edinburgh Trams scheme; and
- Statutory processes**:**
    - *Prior Approvals* – All Prior Approvals are to be approved by CEC, through the planning process;
    - *Land Acquisition* – The land acquisition process where it depends upon Council agreement or use of powers must be authorised by the Council either under delegated or direct Council approval procedures (i.e. GVD, CAAD etc);
    - *Traffic Management* – Traffic Management will be facilitated by the production of both TROs and TTROs that will emerge from the approved roads design. Both TROs and TTROs will need to be approved and made by the Council;
    - *Roads and Structures design* – Facilitated through the design approval process; and
    - *Roads Demarcation Agreement* – The Roads Demarcation Agreement will detail the ownership and maintenance liabilities for future operation of the tram and its associated infrastructure. It will also detail the agreed associated financial arrangements between the operator, the maintenance contractor, **tie** and CEC, and may include a transfer of obligations / risks.

Governance structure – mid-2007 to Financial Close

6.20 The structure described in Sections 6.4 to 6.19 above were applicable through the period to mid-2007, including the following key milestones:

- Award of the MUDFA contract in October 2006 and subsequent mobilisation;
- Submission to and approval by the Council of the DFBC in December 2006;
- Development and issue of principal documents in support of the Infraco and Tramco procurements, assessment and negotiation of bidder responses throughout the period; and
- Award of additional project funding of £60m from TS in March 2007.

6.21 On 27 June 2007, the Cabinet Secretary for Finance and Sustainable Growth announced that funding would be conditionally provided to continue the delivery of the Edinburgh Tram system, up to a maximum of £500m, with no further indexation for inflation. Additional funding required for the project would require to be provided by CEC or by other parties under the direction of CEC. The detail of these arrangements is explained in section 10.

6.22 Discussions subsequent to 27 June 2007 among the principal stakeholders determined that the changes to the governance structure set out in Sections 6.23 to 6.68 below would be implemented to reflect the revised funding arrangements.

Transport Scotland

6.23 The primary interests of TS, acting on behalf of the Cabinet Secretary, were summarised as follows :

- Satisfaction that the airport / Leith tramline would be delivered and in priority to all other lines;
- Confirmation that the BCR as presented in the FBC is greater than 1.0 reflecting the absence of EARL;
- Confirmation in the FBC that there will be no Government subsidy requirement for the integrated bus and tram operations; and
- Adherence to proper practices designed to protect the public pound.

6.24 TS withdrew from the formal governance processes (TPB and sub-committees) in favour of a monitoring regime based on regular reporting and meetings with CEC, supported by audit processes and issue of regular compliance certificates in relation to grant award letter terms.

City of Edinburgh Council

6.25 In the light of the revised funding arrangements and, in particular, the increased risk resting on CEC's resources, CEC re-assessed its internal arrangements including the relationship between the Council, TEL and **tie,** together with the role of the TPB, and the necessity for the appropriate involvement of elected members in decisions associated with the project.

6.26 The principal revisions to the internal Council processes included updating of the Operating Agreements which govern the relationship between the Council and its arms length companies ; and the creation of a consultative group of senior officers within the Council (the Tram Internal Planning Group), to ensure adequate internal coordination with respect to the project, chaired by the Council's Chief Executive and involving the Directors of City Development, Corporate Services, Finance and Services for Communities, with support from the Council Solicitor, Communications and the Tram Project team.

6.27 In addition, the role of elected members in project decision-making was addressed and a sub-Committee of the Council's Transport, Infrastructure and Environment Committee, dedicated to the Tram Project, was established. This codified the powers reserved to elected members and those delegated to officials and facilitated communication with elected members on the key aspects of the project. The sub-Committee will be chaired by the Executive Member for Transport and will meet on a 6-8 weekly cycle. The purpose of the sub-Committee is to review

and oversee decisions with respect to the project. The Director of City Development is responsible for the interface between this sub-Committee, TEL and the TPB

Project level

6.28 The role of the TPB was confirmed and the delegated authority arrangements (including the powers reserved to CEC), previously enshrined in the approved remit of the TPB, are contained in the revised Operating Agreements being prepared by the Council and which will be agreed with **tie** and TEL in advance of Financial Close. The membership and remit of the TPB was changed to accommodate the withdrawal of TS and further amendments to composition are planned to further reinforce the effectiveness of this body. In all other material respects the operation of governance by the TPB continued as in the period to mid-2007.

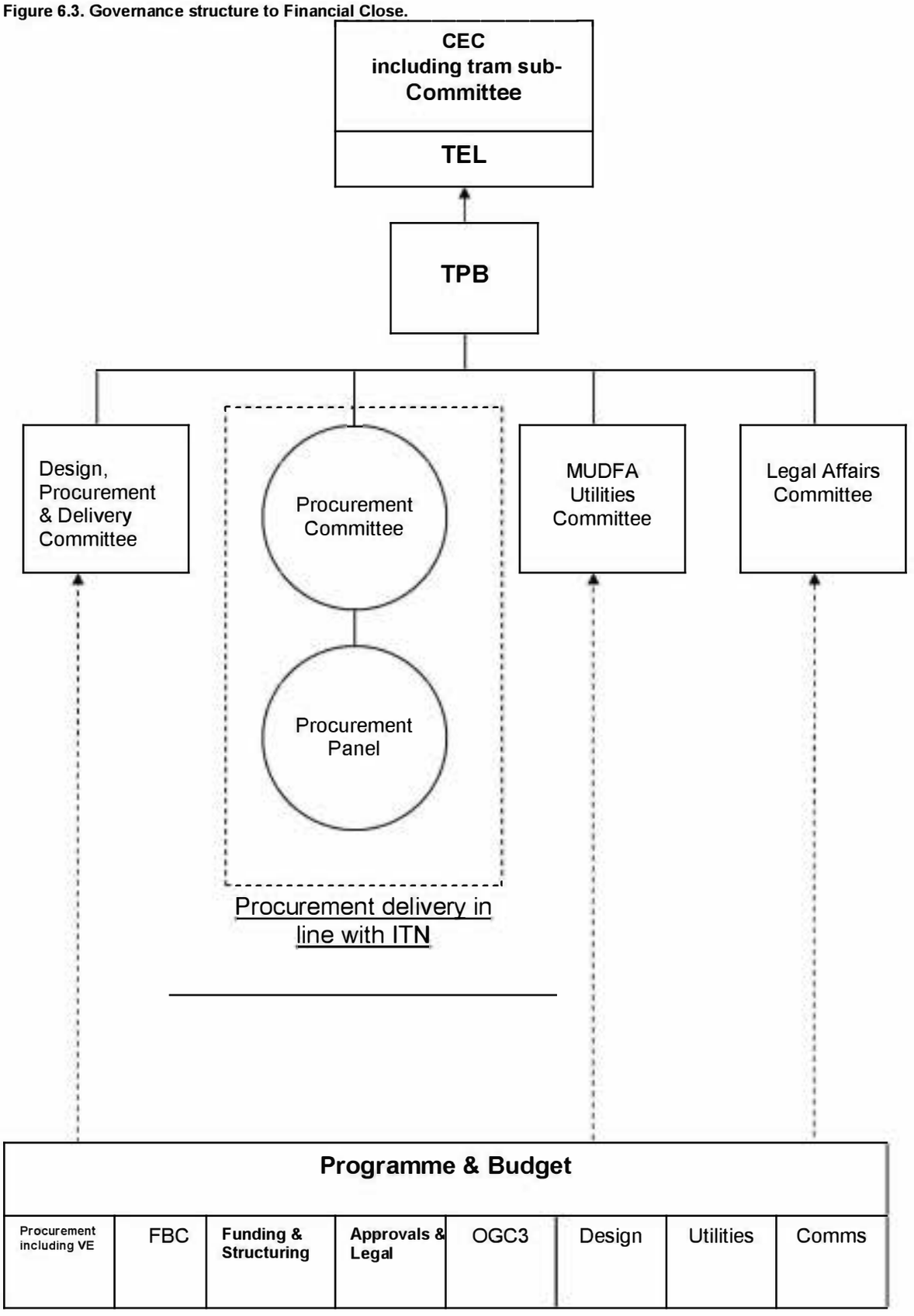
6.29 At a practical level, the following changes were executed to the TPB's committee structure:

- A new committee was established to oversee the execution of the utility diversion works under the MUDFA and related agreements;
- The DPD committee continued to monitor and interrogate specific aspects of the procurement process for Infraco and Tramco, including the performance under the principal system design contract;
- A second new committee was established to provide a top-down view of the emerging output from the procurement process in the context of available funding and related scope decisions. Additional machinery was created to ensure that the procurement process followed the mandated process.
- A third sub-committee, the Legal Affairs Committee, was established to monitor the overall coordination of legal advice and to address any legal issues arising, including approvals processes. This committee focuses in particular on the risk transfer provisions in the principal contracts.

As in the previous period, all committees are designed to expedite review and resolution of key issues, but none have formal decision-making power, which is reserved to TPB under its own delegated authority.

6.30 The committee structure is designed to ensure that all key aspects of the project are addressed timeously and thoroughly during an intensive and critical period leading to award of the Infraco and Tramco contracts and finalisation of funding terms at Financial Close. Figure 6.3 summarises the governance structure currently in place and which will be the primary structure through to Financial Close.

Figure 6.3. Governance structure to Financial Close.



Governance structure – Construction period

6.31 The further changes proposed to be implemented in the period to Financial Close to prepare for the construction period are as follows:

Roles of TEL and **tie** Boards

6.32 The TEL Board is focussed on its overall responsibility to deliver an integrated tram and bus network for Edinburgh on behalf of CEC. It will make formal recommendations to CEC on key aspects of the project and matters which have a political dimension. The Board is responsible for compliance with its Operating Agreement and it will also address any matters outwith the direct arena of integrated bus and tram systems and any statutory TEL considerations.

6.33 For the foreseeable future, **tie** will have only one major project, the tram. It will maintain roles with certain smaller projects and will require to comply with normal statutory responsibilities as a limited company, including formal compliance with its Operating Agreement.

6.34 The **tie** Board presently comprises a group of Elected Members and a group of independent non-executive directors (NXD), under the Executive Chairman. The TEL Board presently comprises Elected Members and Council officials under the non-executive Chairman.

6.35 It is proposed that the composition of these two Boards is re-visited to ensure the following objectives are achieved:

- Ensure the TEL Board has the composition necessary to be the active arm of the Council in oversight of project delivery and preparation for integrated operations;
- Maintain the necessary strength of the **tie** Board to ensure that the **tie** Executive Chairman and management team continue to be kept under appropriate scrutiny, challenge and quality control;
- That **tie** Limited's contractual responsibilities are subject to proper stewardship; and
- Ensuring compliance with statutory requirements and with the terms of **tie**'s Operating Agreement.

6.36 The composition of the TEL Board, looking ahead to the construction period, will be based around the existing composition and consideration will be given to changes and new members in the period to Financial Close.

6.37 In overall terms, the composition of the **tie** Board will be maintained in its present form. The Board will maintain its Audit and Remuneration committees, membership of which are restricted to the NXDs. In addition, a new **tie** Board sub-committee will be established to address Health and Safety, chaired by an experienced NXD.

6.38 It is also envisaged that certain of the Elected Members of the **tie** Board and its independent NXDs will join (if not already members) the TEL Board or the Tram Project Board (including specific sub-Committees) to ensure consistency of approach and to utilise relevant experience productively. The re-deployment of the Elected Members and the independent NXDs will reflect :

i. The emphasis of the TEL Board on oversight (on behalf of the Council) of matters of significance to the Elected Members in relation to project delivery and preparation for integrated operations ; and
ii. The emphasis of the TPB on delivery of the tram system to programme and budget and the preparation for integrated operations.

6.39 The **tie** Board will delegate authority to its Executive Chairman to execute its contractual responsibilities for the tram project, but explicitly subject to the delegated authority structure within the tram governance model.

6.40 In the event that **tie** assumes responsibility for additional major projects in the future, the Board composition may need to be addressed.

6.41 It is recognised that there is inevitable duplication between the scrutiny by the **tie** Board of its Executive activities and the oversight role performed by the TPB. However, in a large, complex project, this seems a worthwhile price to pay for robust governance.

6.42 In addition to the changes to the **tie** and TEL Boards and as previously envisaged, the Council's majority shareholding in Lothian Buses plc will be transferred to TEL and parallel changes to the composition of the Lothian Buses Board will be effected in due course. There is an additional level of cross-Board membership and meeting attendance which improves consistency across key aspects of the project to deliver an integrated bus and tram system.

6.43 It is suggested that the TEL Board may meet no more frequently than quarterly during the period of construction, probably linked to progress reporting to the Council. This contrasts with an anticipated 4-weekly cycle for the **tie** Board and for the TPB / sub-committees and largely eliminates duplication between the TPB and the TEL Board's processes. The frequency of TEL Board meetings is expected to increase as operational commencement approaches. The TEL Board will receive a comprehensive progress report from the TPB, channelled through the Chairman.

6.44 The interface between the TPB, the TEL Board and the new Council Tram sub-committee requires further assessment to ensure good communication consistent with minimal duplication and this will be developed further. The focus of the Council sub-committee is around matters directly affecting the Council and providing assurance that matters which cross Council departmental boundaries are managed cohesively (for example, responsibilities for roads management and budgets).

TPB and its sub-committees

6.45 The TPB maintains its role as the pivotal oversight body in the governance structure. The TPB is established as a formal sub-committee of TEL with full delegated authority through its Operating Agreement to execute the project in line with the proposed remit set out in Section 6.32. In summary, the TPB has full delegated authority to take the actions needed to deliver the project to the agreed standards of cost, programme and quality. The TPB also exercises authority over project design matters which significantly affect prospective service quality, physical presentation or have material impact on other aspects of activity in the city.

6.46 The delegation of authority to the TPB will require to be formalised by the TEL Board in due course.

6.47 The suggested membership of the TPB is seven people (OGC constituency definitions "highlighted"):

- Chair (David Mackay);
- Senior CEC Representatives - "Senior User Representatives" (Donald McGougan and Andrew Holmes);
- TEL CEO and Project "Senior Responsible Owner" (SRO) (Neil Renilson);
- "Senior Supplier" representatives (**tie** Executive Chairman and TEL Operations Director) (Willie Gallagher and Bill Campbell); and
- Executive Member for Transport (Phil Wheeler).

The Chair will continue to be the TEL Non-executive Chairman, rather than the Project SRO. Other parties, principally senior project management and advisers, will be called to attend as required, though it is anticipated that a common group of senior project directors will attend most meetings.

6.48 The TPB will meet on the 4-weekly cycle already established. The precise structure of the delegated authorities will be re-assessed in due course and if different from the current authorities will be subject to appropriate approval processes.

6.49 The current sub-committee structure will be dissolved and the new sub-committee structure will comprise:

Engineering and Delivery Committee (E&D)
- Delivery under contracts – Infraco, Tramco, utilities / MUDFA, design;
- Health and safety, quality and environment;
- Improvement initiatives – Value engineering, innovation, ICT; and
- Project interfaces and approvals – Land and property, traffic, third parties.

Financial, Commercial and Legal Committee (FCL)
- Financial management – Reporting, control, audit, risk management, insurance; and
- Contract management – Reporting, compliance, interface with delivery, claims and variations.

Benefits Realisation and Operations Committee (BRO)
- Operational and integration planning;
- O&M contract planning;
- Transdev; and
- Marketing.

Communications Committee
- Communications management – Utilities / MUDFA, construction, media, stakeholders

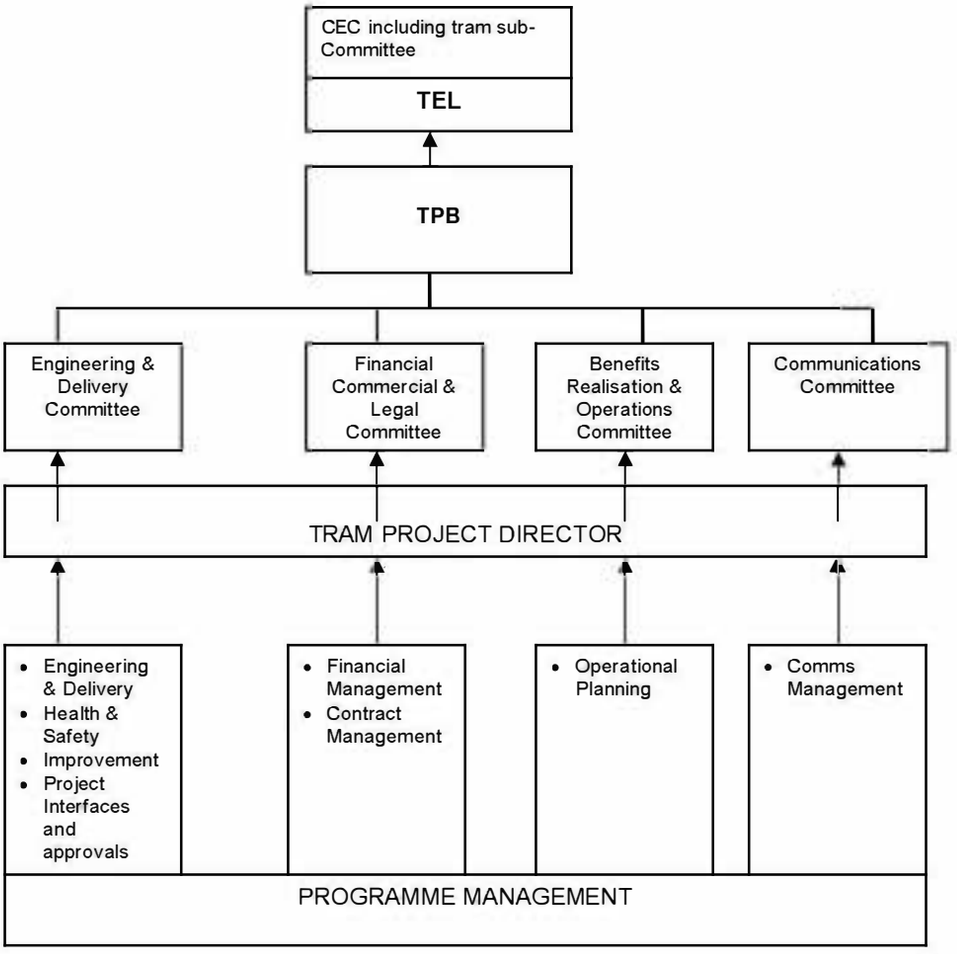
6.50 Detailed remits and attendees will be prepared in due course. Sub-committees will meet also on a 4-weekly cycle, supporting the TPB meeting.

6.51 In order to create close cohesiveness between the TPB / sub-committee governance model and the project management structure, the sub-Committees will directly interface with the Project workstreams and the individual directors responsible.

6.52 To further reinforce cohesion, the **tie** Executive Chairman will Chair each of the sub-committees. The attendance of senior project and client officers, and the clear responsibilities allocated to individual Project Directors, will ensure that appropriate independence and challenge is achieved. As currently, the sub-committees will have clear remits and will focus on detailed interrogation of key issues, leading to recommendations to the TPB which retains decision-making authority over all key areas.

6.53 The Construction period governance structure is summarised in Figure 6.4.

Figure 6.4. Governance structure for Construction period.



Health and Safety (H&S) considerations

General

6.54 H&S obligations are well-understood and entrenched in the project governance and management structure. The increased level of physical activity which may give rise to H&S risks once construction commences reinforces the need to ensure H&S responsibilities are clear and that the highest standards of H&S management are applied. These considerations must be addressed on a daily basis in all actions and at all levels by parties involved in Project.

6.55 In overall terms, the key H&S considerations for CEC, TEL, the TPB and **tie** are:

- The health and safety of their people – the corporate H&S Management Systems address this responsibility;
- Ensuring that CEC, TEL, the TPB and **tie** deliver against clearly stated H&S responsibilities in the framework of the project including working alongside third party H&S management systems;
- Monitoring and reporting regularly that these responsibilities are being properly discharged;
- Ensuring that all persons employed by CEC, TEL and **tie** are competent;
- Ensuring that contracts entered into address H&S issues adequately; and
- Ensuring that H&S ramifications are considered when key investments and business decisions are made.

6.56 These H&S considerations apply currently, throughout the period to Financial Close and throughout the period of construction and into operation of the tram system.

6.57 The H&S responsibilities are currently defined clearly to meet the demands of the current project activity including the utility works now underway. These responsibilities will require to be revised to integrate with the revised governance structure described in this paper and to enable effective management of the full-scale construction activity which will follow Financial Close. The narrative below provides a description of the responsibilities of the bodies involved in the project and has been drafted with the full involvement of DLA. A precise and legally supported H&S regime will be put forward for approval and then implemented in advance of Financial Close.

Relationship of revised governance model to H&S responsibilities

6.58 The TPB creates an inclusive decision making process which is important for the effective operation of the project. The TPB will be a formal sub-committee of the TEL Board so that members of the TEL Board on the sub-committee retain the formal responsibility for decisions taken at the TPB, with all other parties to TPB deliberations being participants or observers only. The TPB itself is not a shelter from health and safety liabilities or a clearing house for liabilities. Legally CEC, TEL and **tie** cannot delegate H&S responsibility to the TPB in the governance structure and thereby declare that they have discharged their H&S liabilities and have no further duty regarding input into or consideration of H&S issues.

6.59 The ultimate responsibilities for the TPB decisions flow up to the TEL Board and CEC. However, **tie** will have significant H&S responsibilities, including the intended election under the Construction Design and Management Regulations 2007 (CDM 2007) of **tie** as "Client" under those regulations. A Procurator Fiscal may consider that all parties (CEC, TEL and **tie**), together constitute the entity for the discharge of H&S obligations. As a result, H&S implications must be considered by all these parties when making significant decisions affecting design and implementation through the construction phase of the Project. The HSC guidance *Director's Responsibilities for Health & Safety* must be followed by CEC, TEL, the TPB and **tie**. Appropriate leadership should be demonstrated in this area by the boards and senior management.

6.60 Where changes are submitted for TPB approval, or are requested by the TPB, **tie** / TEL / CEC (and the appointed CDM 2007 parties) will be legally responsible for identifying and managing any impact that these changes will have on safety. The TPB will be responsible for ensuring that they understand and have responsibility for any decisions made in this respect. It is intended that **tie** will be mainly responsible for implementing the decisions made throughout the construction period.

6.61 It is considered that TEL / CEC would remain the "client" in terms" of CDM 2007 as the TPB is not a separate legal entity although it will make decisions on behalf of TEL / CEC. **tie** is responsible as the elected second client under CDM 2007 and the client / employer (for general health and safety regulations) for the overall project safety management for the development and implementation of the project. However, such an election is not a full delegation of all rights and responsibilities. **tie** and the TPB must ensure that its activities or its stakeholders or advisors do not undertake actions that encroach upon the role of the designer under CDM 2007, as this would mean that they would require to demonstrate competency in this role and fulfil added responsibilities.

6.62 The revised project governance structure described in this paper will distance TS from the H&S responsibilities, as their responsibilities are related to those of the principal funder of the project, in the absence of any material involvement in design or construction matters. However, they will incur H&S responsibilities if this relationship changes and TS become involved in such matters again.

6.63 Health and safety, quality and environment will form an element of one of the new TPB governance sub-committees. H&S matters within **tie** will be the responsibility of the Engineering and Delivery Director. In addition to the E&D Director's leadership on this issue,

a senior NXD will be the nominated chair of the HSQE sub-committee of the **tie** Board to add a further H&S check in the operation of **tie** and the TPB.

6.64 A regular safety report is produced and presented to the **tie** Board and to the TPB each month. The TPB will ensure that safety is a core agenda item for each meeting and will ensure that the safety report tabled at each meeting is actioned, where appropriate. Copies of these reports, or summary documents as appropriate, will be disseminated to TEL and CEC. This will ensure that H&S issues are considered at senior level on a regular and disciplined basis.

Legal backdrop

6.65 There may be occasions where a decision which is made by the TPB under its delegated authority from TEL is driven by one of the stakeholder directors to the exclusion of the other members of the Board. In the event of an incident, this may result in the contractual relationships or duties between the stakeholders being considered. Notwithstanding that financial indemnities could be put in place to cover losses suffered, if a particular party declares that it will be held accountable for a decision impacting safety, it is important to highlight that it is not possible to ensure that fines imposed as a result of prosecution can be the subject of an enforceable indemnity. It is not possible to contract out of criminal liability nor is it possible to insure against a fine. Although it may be competent to include a clause in a contract, it is possible that such a clause would be construed by the courts as unenforceable and contrary to public policy. In this context, the representative of each stakeholder would need to look to their employer, with regard to personal accountability.

6.66 The creation of appropriate safety responsibility structures, safety management systems and culture will form a key defence to any prosecution assuming all procedures have been followed. Clearly there could also be a number of other parties involved in a safety incident, for example contractors, sub-contractors, agency staff, designers, CDM-Coordinators and third parties.

6.67 The Corporate Manslaughter and Corporate Homicide Act 2007 will come into force on 6 April 2008. Corporate homicide will be committed where a death is caused by an unlawful or grossly negligent act of the senior management of an organisation. The management and organisation of activities by senior management must constitute a "substantial element" of the breach, in other words, partial delegation of the duty will not prevent liability attaching to senior management. Breach is punishable by a fine. Although directors do not face personal liability under the Act, the offence will make directors more vulnerable to disciplinary action and further crystallise their accountability for health and safety compliance to their stakeholders. It remains possible for directors and senior management to face personal liability if there is sufficient evidence to bring a prosecution under the existing common law or under the Health & Safety at Work etc Act 1974.

Summary

6.68 H&S is clearly of paramount importance both currently and in the construction phase of the Project. CDM 2007 will be a key focus and will be given appropriate prioritisation by all parties at all levels. The application of legal H&S responsibilities in the context of the governance and management of a large, complex project requires very careful analysis. A definitive structure will be developed, submitted for approval and implemented before Financial Close.

7. Procurement

7.1 This section of the FBCv2 sets out details of the procurement strategy that was followed by **tie** leading to the recommendation of the preferred bidders for the Infraco and Tramco supply and maintenance contracts, including confirmation that the negotiated position achieved is within budget and basis of the conditional contract award recommendation. This includes how the strategy aligns with delivery of value for money benefits and in particular details the various contract packages, incentives and sanctions that deliver these benefits. This section should be read in conjunction with the section 11, Risk Management, which refers also to the allocation of risk between the public and private sectors.

Background to procurement strategy

7.2 The procurement strategy developed and applied for the tram addresses both the issues experienced on other light rail procurements in the UK and the specific circumstances affecting Edinburgh. The resultant structure is a series of contracts which, managed as a group, will transfer risk effectively to the private sector, advance the scheme as quickly as possible and provide strong value for money.

7.3 The UK light rail sector has encountered difficulties in the last six years. These have affected both existing projects and those in procurement. On the earliest schemes, it appears that the private sector showed over-confidence in respect of the risks it faced, and in some cases, the public sector showed a lack of foresight. This may have been related to a lack of understanding of the flexibility which is required to run a public transport system under a long-term contract and the risks in forecasting public transport revenues for a specific service over the long-term.

7.4 The result is that, on many of the projects that have been completed, neither the public nor private sectors are happy with the outcome. Contractors have lost significant amounts of money on the underlying construction projects due to changes in scope over which they have little control. Tram operators are facing escalating costs, competition from buses and revenues which fall short of what is required to cover fixed costs. Meanwhile the public sector has realised that it has little ability to control the behaviour of the tram operators due to the lack of suitable sanctions available under their project agreements.

7.5 This outcome has made the private sector extremely wary of light rail projects. This is documented in the National Audit Office report of 2004, commenting on the effectiveness of light rail schemes. Unfortunately, this industry feedback arrived too late to inform the development of a number of procurements in England, which have encountered significant affordability problems, with costs increasing due to bidders factoring in significant margins to deal with the risks that they have difficulty pricing accurately. These affordability issues have led to significant delays and, in several cases, the cancellation of the projects affected. However, schemes which were not yet in procurement have had the opportunity to learn from the issues that have arisen on both existing schemes and the stalled / cancelled procurements. The Procurement Strategy for the Edinburgh Tram addresses this.

7.6 **tie** has sought to harness first-hand experience from key individuals involved in those schemes. **tie** has successfully achieved this by:

- Recruiting individuals into the project team with breadth and depth of experience of other light rail projects;
- Engaging with TEL, who will be responsible for integrating the tram and bus services;
- Appointing an operator, Transdev, with experience of procuring and operating light rail schemes in the UK and overseas;
- Selecting advisers with a broad experience of light rail and other public / private procurements; and
- Engaging with the bidder market in a consultation exercise.

7.7 **tie**'s Procurement Strategy has resulted in it taking a greater degree of control over the process during the early 'development' phase, compared to what the public sector has done on other projects. This has resulted in **tie** progressing the overall project sufficiently in

advance of seeking bids from Infraco bidders such that it was able to offer the private sector Infraco and Tramco bidders a better defined basis on which to bid and a less onerous risk allocation (and in particular reducing the extent of design and approval uncertainty at bid stage). Therefore the private sector were able to price their bids with a greater degree of accuracy and certainty than has been achieved on other projects. In this way, **tie** believes it has significantly reduced the cost of the overall project, having considerably de-risked certain of the elements of the project that fall to the private sector to deliver. This is shown by the minimal risk allowance included in the Infraco and Tramco bids.

Market consultation

7.8 In October 2005, following the issue Prior Information Notices (PINs) in the Official Journal of European Union (OJEU), **tie** selected a shortlist of six potential Infraco bidders and five potential vehicle suppliers who were then invited to Edinburgh for discussions. The overall conclusions were that there were certain areas that merited further consideration and these have been reflected in the principles of the Procurement Strategy.

Objectives of Procurement Strategy

7.9 The objectives of the Procurement Strategy are summarised as follows:

- Transfer design, construction and maintenance performance risks to the private sector
- Minimise the risk premium (and / or exclusions of liability) that bidders for a design, construct and maintain contract normally include. Usually at tender stage bidders would not have a design with key consents proven to meet the contract performance obligations and hence they would usually add risk premiums for this.
- Mitigation of utilities diversion risk (i.e. potential impact of delays to utilities diversion programme on Infraco works).
- Gain the early involvement of the operator to mitigate risks on takeover of the operation Tram Network

Key elements of Procurement Strategy

7.10 The Procurement Strategy that **tie** has followed for this project has been developed to address the common challenges faced by all light rail procurements and the specific issues associated with Edinburgh. It is a unique approach and this section sets out the main ways in which the Procurement Strategy differed from market norms. However, it is also important to understand that most of the differences relate to the process of procurement and not the outcome of the procurement.

7.11 The outcome of the procurement strategy is two contracts with different private sector entities: an operating contract, the Development Partnering and Operating Franchise Agreement (DPOFA) and an infrastructure (Infraco) contract. The Infraco contract will act as a "holding contract" with the design and vehicle provision (including the maintenance contract) being novated to the infrastructure provider (under the Infraco contract) at Financial Close as described at below. This outcome is not dissimilar to the approach adopted on, amongst others, Docklands Light Railway (DLR).

7.12 Whilst the light rail market does not have a fixed template for how transactions should be undertaken, there has been a general approach on projects to date whereby a single contract has been let for all key activities in providing the tram service. **tie**'s approach clearly differs from this, in the ways set out below. The entire Procurement Strategy has been developed to help facilitate the speedy implementation and completion of the construction phase of the project and to remove uncertainty and, therefore, cost from bidders' proposals i.e. to deliver value for money.

7.13 In summary the key attributes of the strategy are:

- The separation of system delivery and operation to focus organisations on their strengths, minimising margin on margin and risk premiums;
- Early introduction of the operator – to ensure effectiveness of design, construction and commissioning ready for operation;
- Early commencement of design by SDS – to reduce scope and pricing risk in infrastructure and tram vehicle bids, together with a reduction in overall programme;
- Separate procurement of the tram vehicle – to enable the selection of the optimum combination of the tram and infrastructure suppliers;
- Re-aggregation of the supply chain – by novation of the design (SDS) and tram vehicle (Tramco) contracts to the infrastructure provider (Infraco) to create a single point responsibility for the design, construction, commissioning and subsequent maintenance of the tram system, with the consequential transfer of performance risk to the private sector;
- Maintenance of the tram vehicles and infrastructure for up to 15 years post commencement of operations – to incentivise selection of components with 'whole life' cost in mind and to incentivise Infraco to mitigate the risk of latent defects arising during the operational phase;
- Separate procurement of utilities works to enable completion of the utilities diversions before commencement of infrastructure works, thus reducing risk to the construction phase and avoiding the risk premiums that would otherwise be included if this work was included with the Infraco package;
- Validation of the SDS designs by TSS and CEC expertise where appropriate – to provide comfort that the designs produced will deliver the required performance;
- Incentivise completion in accordance with programme by adopting a milestone payment mechanism in SDS, Tramco and Infraco contracts, with significant cash retentions and retention bonds pending completion of system reliability tests; and
- Parent company guarantee and retention bonds and warranties in the SDS, Tramco and Infraco contracts to provide recourse in the event of failure.

7.14 These arrangements deliver the strategy through:

- Early involvement of the tram system operator;
- Risk transfer to the private sector at an affordable level;
- A shorter overall programme; and
- A single point of responsibility for the delivery of the operating tram system and subsequent maintenance.

Introduction of operator at early stage

7.15 A key strand of the Procurement Strategy was the decision to select the operator for the system in advance of completing the parliamentary process which is a pre-requisite to the letting of contracts for the fabric of the system. The principal reasons for early involvement of the operator were that it:

- Has allowed **tie** to use the operator's knowledge and experience during the parliamentary process, Business Case development, planning, design and procurement phase. The operator will continue to deploy their knowledge and skill during the construction, system integration and commissioning phases. This will ensure that the system will be capable of being operated effectively;
- Facilitates input from an experienced operator on issues such as:
    - Review of designs from an operational perspective; and
    - Input into the procurement process; and
- Has, in partnership with TEL, assisted in the proper planning of an integrated service network with the existing LB operations including fares and ticketing policy.

Separation of operations and system delivery

7.16 The separation of the day to day operation of the tram network from the initial construction of the tram system is a further characteristic or consequence of early operator involvement. This allows those parties responsible for providing vehicles and infrastructure to concentrate on their strengths, which ought to be reflected in more competitive contract pricing from those parties as they will not need to consider procedures and risks that they do not necessarily understand.

Establishment of Joint Revenue Committee (JRC)

7.17 Edinburgh is in an almost unique position, in that the main bus operator in the city is owned by the public sector. Recognising the unique opportunity this presented, the CEC decided to establish TEL to take on the responsibility for integrating the services of LB and the tram and to seek appropriate arrangements with third party transport operators.

7.18 As part of the process of coordination and integration of buses and tram, a JRC was established with the objective of the development, testing and successful commissioning of a modelling suite to support the viability of the tram alone and the TEL Business Plan including LB and to provide ongoing revenue forecasting for TEL. The JRC contract was awarded to a joint team of Steer Davies Gleave and Sir Colin Buchanan and Partners in September 2005.

7.19 A Modelling Revenue Stakeholder Group (MRSG) was established to assist JRC to define the parameters and inputs which allows them to deliver the scope of services under their contract. The members of this group, comprising representatives of **tie**, TEL, CEC, Transdev and Transport Scotland, have ensured the inputs to the modelling process were appropriate and that the outputs from the model are robust. **tie** remains the contractual client for JRC.

7.20 The JRC modelling and service integration plan reached conclusions as reported in detail in sections 4 and 8 of the DFBC, approved in 2006. The models proved to be a useful iterative tool to optimise the bus and tram network service integration.

Procurement of Technical Support Services (TSS) provider

7.21 The resources provided under this contract facilitate review of the SDS design to assure compliance with the performance objectives for the tram and the sourcing of technical personnel to support the management and control of the project.

Early involvement of designer

7.22 Another key strand of the procurement strategy was the early involvement of the design contractor. The SDS contract was awarded in September 2005. This contract has allowed **tie** to advance design work for of the tram, thereby reducing the planning and estimating risks, in respect of scope, to which bidders for the Infraco contract are otherwise exposed. It has also facilitated the opportunity to procure advanced works on utility diversions and identify, at an earlier stage, the land requirements and permanent traffic regulation requirements of the identified Tram Project scope. During the Infraco procurement process, price critical design elements have been provided to bidders to refine their pricing and improve the reliability of the construction programme.

Utilities diversions undertaken in advance of infrastructure

7.23 A significant benefit arising from having undertaken early design work is that **tie** was able to procure the necessary utility diversions, to enable delivery of the permanent infrastructure work, prior to commencement of the system construction. This provides very significant construction programme benefits and, therefore, cost benefits, due to reduced risk exposure of the infrastructure provider, creating the best opportunity to minimise disruption and maximise infrastructure construction productivity.

Separate selection of infrastructure and vehicle providers

7.24 **tie**'s approach of having separate competitions for infrastructure and vehicle provision means that it has flexibility to select the optimum tram vehicle. There are a relatively small number of vehicle providers in the light rail market, compared to the number of potential infrastructure contractors. Had **tie** adopted the conventional approach and asked the infrastructure providers and vehicle providers to team up and present a single proposal covering both, this would have restricted the range of choice available to **tie** and, hence, the effectiveness of the tram system procurement.

Land assembly process and third party interface agreements

7.25 Using the powers under the Acts, **tie** project manages the acquisition of all land and rights in land, temporary and permanent, required to construct, operate and maintain the tram. **tie** and its advisers have identified all parties with an interest in each parcel of land, determined the compensation payable, consulted with interested parties as part of an overall communications strategy and has given appropriate notification to enable CEC to take title in the land prior to the appointment of Infraco. This approach also reduces risk to the infrastructure works programme by bringing certainty to land acquisition at an early stage, thereby reducing the lead in time to commencement of construction works.

Outcome of procurement process – Summary

7.26 Both the Infraco and Tramco procurements have been concluded to Preferred Bidder stage. The Infraco and Tramco procurements have been negotiated to levels within budget levels and with a programme for Phase 1a completion and delivery into revenue service for first quarter 2011. Contracts will be finalised for award at the end of the Preferred Bidder period in January 2008.

Key contracts

7.27 Below is a detailed description and explanation of **tie**'s approach to the key contracts that it has or will enter into. The key contracts are as follows:

- Development Partnering and Operating Franchise Agreement (DPOFA);
- System Design Services (SDS);
- Joint Revenue Committee (JRC);
- Multi Utilities Diversion Framework Agreement (MUDFA);
- Infrastructure provider and maintenance (Infraco); and
- Vehicle supply and maintenance (Tramco).

7.28 **tie** has developed a nested set of contracts for Infraco, SDS and Tramco (including associated maintenance) using procurement personnel and legal advisors experienced in this area and tailored to the Edinburgh tram project's specific needs.

DPOFA

7.29 **tie** believe many previous tram procurements have suffered from insufficient operator engagement throughout the Parliamentary and development phases of these projects. On this basis, **tie** decided to separate the operation of the system from its construction, and, following a competitive tender, appointed Transdev as the future operator in May 2004, under the terms of the DPOFA.

7.30 Transdev staff form part of **tie**'s core team for the project, and have played an active role in the development of the design and contracts. It was **tie** and TEL's primary objective that this process would form the foundations for a strong and mutually beneficial long-term partnering relationship with Transdev for the later operation of the tram in Edinburgh.

Procurement approach

7.31 The principal attributes of the procurement approach for this contract are:

- Scope – Provision of consultancy advice during the design and construction phase, system operational support during the commissioning and trial running stages and subsequent operation of the tram system;
- 15-year contract duration;
- Performance reviews at three yearly increments, with provisions to reset the performance regime and an option for **tie** to voluntarily terminate the contract where there is a failure to agree a revised performance regime and **tie** chose not to follow the dispute resolution process;
- Reimbursable up to a cap based on demonstrated actual costs plus an agreed profit level for specified personnel at agreed rates up to the commencement of the operating phase;
- During the operating phase the contract will move to a primarily fixed cost mechanism; Payment will also be adjusted for performance against set quality criteria. The costs are fixed for the first three years after which they are adjusted under a review reset mechanism;
- Performance bond to provide financial recourse in the event of default by the supplier; and
- Facility to assign the agreement to TEL at commencement of system operation.

Operation and performance risk

7.32 Transdev have been awarded the contract to operate the tram and, ultimately, will be in day to day control of the quality of service provided to the public. However, responsibility for project development and delivery lies with TEL, **tie** and their advisors. One of the main advantages of involving an operator during the early phases of the project is to inject their perspective into the development of the network and, hence, to facilitate the development of the tram network operating at optimum performance level. This approach, which was endorsed by CEC, has helped facilitate the successful delivery of the project to date and will continue to do so.

7.33 To address performance issues during the operating phase of the contract, the DPOFA incorporates a payment mechanism which offers the operator an appropriate risk / reward balance. In summary, the operator will be incentivised under a regime based upon clearly defined and understood key performance indicators (kpis) to deliver performance against the required service specification, and this performance regime is designed to minimise costs and maximise performance.

7.34 The DPOFA has been renegotiated in order to align with the Infraco and Tramco Agreements and to reflect the integration under TEL of tram and bus operations, yielding synergies that have reduced costs and improved the ability to offer an integrated solution for the passengers.

Pricing and Revenue Risk

7.35 A key element of retained risk for the public sector relates to ongoing farebox revenue and operating costs. One of the factors influencing the decision to proceed with separate procurement of DPOFA and Infraco contracts was the past underperformance of a number of full PFI / PPP (private finance initiative / public private partnership) structures where 100% farebox risk was transferred to the private sector. In more recent deals, financiers have applied a heavy discount to revenue projections as a result of recognising that revenue is affected by many factors outside the operator's control and that operators therefore have great difficulty in forecasting it reliably and pricing the risk economically. However, TEL with the track record of the existing public transport market in Edinburgh, and with the role of integrating the bus and tram operations, is ideally placed to manage the tram revenue risk, which represents around a tenth of the existing bus risk.

7.36 The means to manage the public sector's exposure to operating costs has been built into the DPOFA approach, in the form of the development of a pain / gain sharing mechanism. This mechanism, which rewards the operator for the degree to which actual costs outperform pre-agreed targets, has the joint benefit of incentivising the operator to minimise costs and maximise performance.

7.37 Critically, the management of the public sector's exposure to revenue risk is facilitated by the development of an integrated tram and bus business under TEL.

Activities under DPOFA

7.38 During the development and procurement of the Tram Project, Transdev have brought their wider commercial and practical experience of operating and maintaining tram (and bus) networks in the UK and elsewhere. During this phase of the project, supporting TEL and **tie**, Transdev have assisted in all aspects of design, procurement and operational planning including:

- Assisting TEL with the development of integrated service and interchange plans for tram and bus;
- Generation of inputs and validation of outputs from the JRC modelling process;
- Reviewing and advising on the operability of design outputs from the SDS contractor;
- Assisting and advising on the development of the contractual arrangements for the Tramco and Infraco procurements;
- Reviewing and advising on the documentation for the Tramco and Infraco tender processes;
- Participating in the Tramco and Infraco tender evaluations;
- Considering and advising on the underlying operational aspects of the tram project and including underlying demand assumptions and issues;
- Considering and advising on the operational implications of the Procurement Strategy; and
- Assist in the preparation of the TEL Business Plan.

7.39 Throughout the Infraco and Tramco procurement Transdev have provided continuity and assistance to **tie** by being a key component of a group of advisors acting as the 'Intelligent Customer', which assisted in shaping and preparing information for the market to ensure a healthy competition and consequent value for money.

7.40 During the forthcoming construction and testing and commissioning stages Transdev are a key member of **tie**'s project management team and are mobilising to provide support to operate the tram system, enabling Infraco to deliver the commissioning and trial running stages of their works. Such support will include driver training, depot security, control room manning, safety and establishment of operating procedures.

7.41 During the commissioning and trial running stage Transdev will fully mobilise, train drivers and other personnel to prepare for full operation and complete arrangements for service integration. Post commencement of operations Transdev will continue to fulfil a project development and procurement role, as required, in relation to any further expansion.

Payment mechanism and incentivisation structure

7.42 Prior to commencement of operations, Transdev receive a time based fee, subject to an agreed cap and retention. During tram operations they receive a payment comprising:

- Fixed operating costs including an agreed fixed profit; and
- A performance regime payment, calculated to incentivise performance against a set of kpis including tram punctuality, reliability and qualitative measures.

7.43 These arrangements reflect the fact that operating costs are determined by a mixture of factors, only some of which are controllable or capable of influence by the operator. Therefore, this approach avoids the risk premium that has been included in the pricing of other tram projects due to start up uncertainty and other economic factors.

Benefits and risk allocation

7.44 The 2004 National Audit Office (NAO) report strongly supports early operator involvement as a means of improving the execution of tram procurement and achieving a stable and affordable system. This will be delivered by early operator involvement in areas such as:

- Service specification and timetable;
- Specification and design of tram vehicles and maintenance facilities;
- Specification and design of infrastructure; and
- Operational requirements and specification of the tram system.

7.45 Early involvement in such areas ensures that the operator, who will ultimately take 'ownership' of operation of the tram system, is able to influence the system design and configuration to optimise the system for operations. This mitigates a key interface risk that, under PFI type procurement arrangements would be priced at a premium.

7.46 Risks remaining with the public sector are as follows:

- 100% of revenue risk and an element of operating cost risk will remain with the public sector, albeit this is partly mitigated by the incentivisation regime in place with Transdev. Critically, revenue risk is mitigated by the development of an integrated tram and bus business under TEL;
- The risk of Transdev not being ready to operate the system when Infraco and Tramco commissioning is complete is now covered in the renegotiated DPOFA by Transdev's liability under the provisions of the DPOFA contract; and
- The risk of Transdev not fulfilling their obligations pre or post commissioning, resulting in the need to replace them as operator. The public sector's protection against costs incurred in replacing the operator would be limited to the liability provisions in Transdev's contract and calling the DPOFA performance bond. However, the bonded amount has been doubled as part of the DPOFA renegotiation.

SDS

Procurement approach

7.47 The principal attributes of procurement approach for this contract are:

- Scope – provision of design work up to detailed design stage including obtaining all necessary approvals;
- Approximately 3-year contract duration;
- Lump sum price with the supplier taking the inflation risk;
- Milestone payment regime to incentivise completion to time;
- Provisions to novate the contract to Infraco; and
- Performance bonds and warranties to secure redress in the event of major default.

Introduction

7.48 Commencement of design early in the procurement process, followed by a novation of the contract to the Infraco at financial close (as described below), is a key element in delivering the objectives of **tie**'s Procurement Strategy objectives of reducing construction contractor risk premiums, reduced delivery programme and single point responsibility for delivery of the tram system. The SDS contract was awarded to Parsons Brinkerhoff in September 2005 following a competitive tender.

7.49 Development of the design ahead of and during the Infraco tender has helped to create improved scope and cost certainty and is significantly reducing the overall project programme and, in particular, the lead time between approvals and commencement of construction. It also substantially reduces the risks associated with planning approvals, TROs, NR and other key stakeholder interfaces. As a result, the work of the SDS contractor substantially reduces

this risk for which the Infraco bidders would have otherwise included significant risk pricing. This is born out by the low level of risk pricing included in the Infraco and Tramco bids.

7.50 The anticipated novation of the SDS contract to the Infraco will mean that responsibility for the design and all risks arising are transferred to the private sector system integrator (Infraco), without the normal disadvantage of an increased risk premium, that bidders would apply due to uncertainty, if they had to carry out all of the design work post contract award.

7.51 It is expected that the Infraco will benefit significantly from the SDS provider's work and its experience of the planning and utilities diversion processes. The planned novation to Infraco incentivises the SDS provider to consider issues of practicality, cost and 'constructability' more than if it were simply **tie**'s consultant. The Infraco bidders have prepared their bids on the basis of the emerging SDS designs and the successful bidder is required, following a process of due diligence of the design, to adopt the SDS provider's design as at the date of Infraco contract signature. Variations to this design can be introduced with the agreement of **tie**, but at the risk of the Infraco unless they represent changes to **tie**'s Employer's Requirements (ERs), which are at cost to the public sector.

7.52 **tie** are taking account of the Infraco bidders common preferences for the extent of design work to be undertaken by SDS prior to novation and are adjusting the contract scope accordingly. This will:

- Avoid the cost of unnecessarily duplicated design effort; and
- Maintain Infraco's flexibility in obtaining best price from their supply chain by avoiding undue constraints on design of performance specified systems e.g. communications and tram position indication system.

Activities under the SDS contract

7.53 The original assumption was that overall design work to Detailed Design would be 100% complete when the Infraco contract is signed. Due to a number of delays, largely outwith **tie**'s control, this is now not achievable. However, by identifying key risk areas and prioritising SDS activities, **tie** is completing several key elements of the Detailed Design in time to inform the Infraco bids on price-critical items. This has enabled the Infraco bidders to firm up their bids based on the emerging Detailed Design and thereby reduce the provisional scope allowances and design risk allowances that they would otherwise have included.

7.54 The status of SDS's work is as follows:

- Completion of the *Requirements Definition* phase of the design in early 2006, the key elements of which were the development of full system requirements specifications, and the production of Management Plans and Technology Reviews;
- Completion of much of the survey and site investigation works including ground penetrating radar, geotechnical surveys, surveys of existing structures, noise and vibration baseline surveys, environmental and ecological surveys;
- Provision of utility diversion Preliminary Designs to support the procurement of the MUDFA contract;
- Establishing an interface and programme for submission of consents with CEC;
- Stakeholder management support and development of traffic / transport modelling in conjunction with the JRC;
- Completion of *Preliminary Design* (Stage 1) in mid 2006 including clarification, verification and update of the existing STAG drawings, route plans, sub-system specifications, outline system testing regimes, critical civil engineering specifications and trackwork specifications. This information was issued to Tramco and Infraco bidders as part of the invitation to negotiate (ITN) issued in July and October 2006 respectively. Further design information was released to the bidders during the tender process, as appropriate, to reflect further development of the design during the tender period;
- Provision of quantified estimates for the Infraco and utilities diversion works based on the Preliminary Design outputs;

- Delivering of the Detailed Design phase which develops the Preliminary Designs to the next level of detail, fully defining the scope of the project and enabling more accurate pricing of the works by Infraco bidders and the process for obtaining the various approvals required before commencement of construction; and
- Supporting the Infraco procurement process by:
    - Providing the detailed design information for several key elements enabling bidders to price with more certainty;
    - Inputting into the technical evaluation of the Infraco and Tramco bidders; and
    - Commencing the design due diligence process with Infraco.

Control and management of activities under SDS

7.55 **tie** is monitoring the quality of the solutions being developed by the SDS provider with the assistance of the TSS provider and Transdev, and drawing on the significant experience of other schemes gained by the **tie** team members. In particular TSS are reviewing that SDS have delivered their contract obligations in respect of design, including verifying that the designs will deliver the specified tram system performance.

7.56 This process, together with value engineering exercises, is mitigating the risk of 'gold plating' the design of the system, and any tendency towards low risk / high cost solutions which do not provide the overall best value for money that **tie** is seeking. **tie** has been tracking the estimated cost of the system throughout the design period, so that cost overruns could be identified quickly and mitigating actions taken while there is still scope to change the solution.

Payment mechanism and incentivisation structure

7.57 Payment of SDS is contingent on the completion of 'fine grained' programme milestones within each phase of the service, these phases being Requirements Definition, Preliminary Design and Detailed Design. The payment mechanism operates as follows:

- The contract defines:
    - Programme sub milestones for each phase of the work;
    - General management activities to support delivery of design; and
    - The proportions of the contract sum allocated to management activities and to each sub milestone; and
- Payment is made monthly for:
    - Completed management activities;
    - 80% of the value of completed sub milestone; and
    - The remaining 20% of completed sub milestones where the sub milestone output has been accepted by **tie**.

  All as assessed by **tie**

7.58 This arrangement strongly incentivises SDS to:

- Complete designs to programme, otherwise their cashflow is adversely affected; and
- Submit designs to that are complete and to the required quality otherwise again their cashflow is adversely affected.

Benefits and risk allocation

7.59 The risk transfer to the SDS is substantial and the separation of designer from the delivery contractor during the procurement phase affords **tie** control over scope definition that would not otherwise be achieved where design is undertaken by the delivery contractor after contract award under more conventional procurement approaches.

7.60 Following novation of SDS, after completion of the design due diligence process at Financial Close, the design risks pass to Infraco (although **tie** will retain a collateral warranty over the work of the SDS provider), but without the disadvantage of substantial risk premiums applied by Infraco bidders where design works are executed post contract award. Therefore, **tie**'s

approach will provide the benefits of having a designer involved in the project from an early stage, whilst retaining substantial risk transfer to the private sector.

7.61 In more detail the key delivered benefits of the SDS strategy are as follows:

- Delivery of preliminary design and key elements of the detailed design has resulted in a reduction in risk pricing in the Infraco tenders;
- Shorter period from letting Infraco contract to completion of the system – this also reduces the overheads incurred by the Infraco;
- Substantially reduced planning consents and TRO risk for the Infraco bidders to price. This resulted in a reduction in the pricing premiums that bidders would otherwise apply to cover the risks of increase in scope, quality and construction period as a result of the approvals process;
- Early design of utilities has enabled commencement and completion before commencement of Infraco works, which again reduces overall programme duration;
- Reduction in risks associated with utilities diversion – early completion of utilities diversions will result in a reduced likelihood that utilities works will disrupt progress of the main infrastructure works. It has also reduced pricing premiums because utilities diversion cost is a risk that the private sector has found difficult to assess and then manage;
- Greater level of support for compliance with undertakings – early SDS involvement will ensure that stakeholders have greater certainty and clarity about the plans for the tram system which may avoid disputes and delays at a later date; and
- Emerging certainty of scope and design has assisted the development of traffic and transport modelling by the JRC and, hence, a more reliable Business Case.

7.62 Key risks remaining with the public sector are as follows:

- **Potential reduction in innovation:** Advance design has limited Infraco's ability to innovate to realise possible cost efficiencies or design improvements. **tie** is mitigating this risk by consulting with Infraco bidders on alternative design solutions or technical approaches which they believe might offer improved value for money. **tie** is also critically reviewing the proposals of the SDS provider, with the assistance of the TSS consultants, Transdev and the expertise within **tie**. **tie** has also implemented a design assurance process by SDS; and
- **Risks associated with novation:** This strategy requires the Infraco to take over responsibility for the SDS design and contractual responsibilities at the point of novation. The novation risk is mitigated by:
    - Consulting with Infraco bidders to refine SDS design scope;
    - Flexibility within the SDS contract to adjust scope to suit the selected bidder's requirements prior to novation;
    - Detailed design being largely completed prior to award of the Infraco contract;
    - The absolute obligation to novate contained in the SDS contract; and
    - The preferred Infraco bidder's agreement to accept novation after successful due diligence.

JRC

Procurement approach

7.63 The principal attributes of procurement approach for this contract are:

- Scope – development of strategic models and their operation to provide patronage and revenue projections based on SDS tram system designs;
- Lump sum price with the supplier taking the inflation risk; and
- Payment against progress and milestones.

7.64 Edinburgh is in a fortunate position, in that the main bus operator in the city is majority owned by the public sector. Therefore CEC is exploiting this opportunity by establishing TEL, which will have responsibility for managing and integrating the services of LB and the tram.

7.65 Following a competitive tender, the JRC contract was awarded to a joint team of Steer Davies Gleave and Sir Colin Buchanan and Partners in September 2005. In the ensuing year the JRC developed a comprehensive and interdependent hierarchical modelling suite including a strategic model, a public transport model, a network assignment model and a micro-simulation model to support the development of the tram. The JRC is responsible with the SDS provider, on a jointly and severally liable basis, for the elements of the modelling suite related to the design process.

7.66 The public transport model was used by JRC to develop the patronage and revenue projections for TEL, including both tram and bus projections, which are detailed in the DFBC and this FBCv2. The JRC has also completed the STAG2 appraisal of the economic benefits and costs projected for the tram project.

Further work by JRC

7.67 In future the JRC will provide advisory support to **tie** and TEL in respect of modelling and advising:

- Both the short term and longer term target revenues for the tram;
- The impact of specific system design features, interchange facilities and of service and frequency changes on revenue predictions;
- The effect of changes in passenger numbers and fare structures on revenue;
- The likely benefits and disbenefits of integration with other public transport modes and the likely short term and longer term revenue impacts of competition from other public transport modes; and
- Support and development of the TTROs and TROs as well as establishing the impact of tram on the wider traffic network.

MUDFA

Procurement approach

7.68 The principal attributes of procurement approach for this contract are:

- Scope – Delivery of multi service utilities diversions, including pre construction phase programme development, design and constructability advice;
- Approximate two year contract duration;
- Priced bills of approximate quantities with work re-measurable as work is completed;
- Prices include for inflation over the duration of the contract;
- Interim payments made each month based on the prices contained in the bills of approximate quantities applied to the completed volume of work;
- Liquidated damages to provide cost recovery in the event of delay to completion due to default on the part of the contractor; and
- Cost incentivisation to encourage efficiency of outturn costs.

Introduction

7.69 It is clear from other light rail projects that the risks associated with utilities diversions are among the most difficult for the private sector to manage and price and have been a barrier to progressing with light rail schemes as highlighted by the NAO. One of the underlying reasons for this is that utility companies are not usually willing to negotiate with the private sector while there remain several competing bidders. However, in situations where utility diversions are included in the scope of the Infraco (or equivalent), all bidders still need to price utility diversions for their specific solutions, making suitable allowance for significant uncertainty of scope and the uncertainties of the prices that statutory utilities companies may subsequently charge.

7.70 This means that much of the work related to utilities is delayed until after a contract is signed. The process of agreeing a programme, designing the solution and carrying out the utility diversion works adds significant cost, time and risk to the development programme. A consequence of this is that there is a risk that utilities work can delay the scheduled

construction works and that the works are priced at a premium at bid stage. Increased forecasts of the costs of utilities diversions have been one of the significant reasons for cost overruns on other tram procurements.

7.71 The scope of this contract was determined by **tie** based on advice from the SDS provider, the TSS provider and input on scope from the utility companies themselves. The SDS provider determined the area of the track bed and which utilities apparatus underneath it will need to be replaced elsewhere, diverted or protected. The utilities affected are waste water, potable water, gas, telecommunications and power.

7.72 Diversion and protection of high pressure gas, high voltage power and certain BT and other telecommunications utilities are outside the scope of the MUDFA contract and have been separately procured by **tie** direct with the relevant utilities.

Activities under MUDFA

7.73 **tie** and CEC have already used their powers under the Tram Acts and as the Roads Authority to negotiate with the utilities, with the objective of securing their participation in MUDFA. Under the agreements the utilities companies have consented to the MUDFA contractor carrying out diversionary works on their respective utility apparatus which will be affected by the construction of the tram. These agreements also deal with the payment of costs and require the utilities companies to work with the MUDFA contractor and the SDS provider.

7.74 These negotiations have resulted in a number of positive solutions for utility issues, highlighting the benefits of early engagement with the utilities companies which would have been impossible if utility diversions had been left to the Infraco. The overall strategy of trying to achieve the utility diversion works under one contractor, digging one trench and securing one set of TTROs is highly innovative and maximises the opportunity to achieve the least disruptive and most productive solution, with consequential cost efficiency.

7.75 **tie** is retaining and managing the significant risks associated with utilities diversions and is implementing the utilities diversions through a single framework agreement. Following a competitive tender, the MUDFA contract was awarded to Alfred McAlpine (AMIS) in October 2006.

7.76 The practicalities of construction sequencing mean that certain utilities diversion work will remain the responsibility of the Infraco (e.g. relocation or protection of utilities where road kerb lines are to be cut back, re-siting of, or working around, utilities as a consequence of the location of supports for OLE). This presents a number of interfaces which the Infraco preferred bidder will manage out in conjunction with the designer prior to contract award.

7.77 In the period between award of the MUDFA contract and commencement of physical work in summer 2007, the contractor has undertaken a series of pre-construction activities including working with the SDS provider to optimise the design of the utilities, minimise disruption to the City of Edinburgh and maximise construction productivity. Other significant works undertaken by the MUDFA contractor relate to excavation works for the Gogar depot. In line with the agreed strategy for advance works and following a commercial review of their proposals, AMIS are undertaking ground preparation and excavation works at the site. This has substantial advantages as it streamlines the flow of works leading up to the start of Infraco construction works and allows to have the site well established, with access arrangements in place and temporary office arrangements being facilitated. To date the contractor has performed well within budget and ahead of schedule.

7.78 The physical diversion of utilities commenced in July 2007 and is scheduled to end in winter 2008. This will result in the majority of utilities diversion works being completed prior to commencement of 'on street' works by Infraco. This means that potential conflicts between the utilities and infrastructure works will be minimised and any remaining time overlap can be managed so as to avoid programme conflicts on the ground. To date work has commenced on some of the most congested sections, such as Leith Walk, and it is expected to be complete on cost and programme.

Payment mechanism and incentivisation structure

7.79 The MUDFA contractor is paid the value of the final scope of work delivered, based on the prices contained in the approximate bills of quantities. Interim payments are made each period by **tie** valuing the work in this way. Further, a pain / gain-sharing scheme has been developed by **tie** to incentivise the contractor at sectional and contract level to optimise the efficiency of the works and reduce costs.

7.80 Additionally, to manage the risk to programme and scope inherent in utility diversions, **tie** have adopted an intrusive management and supervision regime to ensure control to deliver the works within budget and programme, thus mitigating the risks to the commencement of Infraco works by the due date.

Benefits and risk allocation

7.81 The key benefits of the MUDFA strategy are as follows:

- **Cost and disruption minimised –** Allows the public sector to use its greater negotiating power to develop single contract solutions for all utilities in an area - thereby reducing cost and disruption to the public;
- **Increased confidence in overall programme –** Removes design of diversions, negotiations with utilities and carrying out of diversion works from being critical path activities for the Infraco – thereby removing substantial time related risk from the overall programme. Also allows utilities work to progress in advance of the Infraco appointment;
- **Price uncertainty for Infraco significantly reduced –** Removes a large source of cost uncertainty and, therefore, risk premium from the Infraco contract; and
- **Allows better forward planning for utilities –** This avoids the utilities having to make difficult decisions about whether to tackle problems now or wait and see whether there will be a diversion required on the problem area later.

7.82 Key risks remaining with the public sector are as follows:

- **Potential reduction in innovation –** If utilities were the Infraco's responsibility then they would have the opportunity to propose an alternative approach to utilities which could potentially be more cost effective. However, **tie** believe the scope to innovate with regard to utilities under the swept path of the tram line is very limited and the SDS provider has the specific remit to devise innovative, but robust, solutions to utilities diversion issues. This, coupled with the appointment of the MUDFA contractor (who are specialised in utility diversions), effectively mitigates this risk.
- **Scope and time –** These risks will remain with **tie** under this approach. Therefore, **tie**'s ability to manage these risks will be critical. The MUDFA contractor and the SDS provider will be carrying risks under the terms of their respective contracts. However, the cost of the risk to **tie** under this approach is considerably lower than would be the case had Infraco managed the utility diversions directly. This is because Infraco would have found it difficult to quantify the risks in advance of bidding, and the knock-on effects of those unquantifiable risks to Infraco's programme would be considerable.
- **Price risks –** MUDFA is essentially a re-measurement contract and there are a number of areas in which there is a risk of price increase including extension of time, unforeseen obstructions and work which was unquantifiable at the time of tendering, but is reasonably foreseeable. These risks are managed in a number of ways:
  - The use of prime cost sums in the bill of quantities to make a provision for foreseeable but unquantifiable work;
  - The use of provisional items in the bill of quantities. These work in a similar way to prime cost sums, but are used where there is more doubt about whether or not the work in question will be required; and
  - Contractor incentivisation scheme in the MUDFA contract under which the contractor shares benefits arising from efficient delivery. This helps to ensure that it is in the contractor's interest as well as **tie's** that the contract outturn cost be minimised.

Tramco

Procurement approach

7.83 The principal attributes of procurement approach for this contract are:

- Scope – Detail design, manufacture and commissioning into service of tram vehicles (capital works) and subsequent maintenance;
- Approximately 3 ½-year contract duration for capital works and duration of up to 30 years for maintenance;
- Lump sum price for delivery of vehicles for Phase 1a, with options for the supply of further vehicles to meet the 8 / 16 trams per hour operating service pattern. Fixed price per km operated payments for maintenance adjusted according to actual in service performance;
- Tram supply prices include for inflation over the duration of the contract, maintenance prices are indexed for inflation;
- Prices include for exchange rate risk from award of contract (**tie** takes the exchange rate risk up to contract award);
- Milestone payment mechanisms for capital works with performance related payment mechanism for maintenance;
- Liquidated damages for delay to completion;
- Performance bonds and warranties to secure redress in the event of major default;
- Contractor's liabilities capped at predetermined levels; and
- Tramco contracts are novated to Infraco at Financial Close.

Introduction

7.84 The key objective was to select the vehicle and vehicle supplier which best suit Edinburgh's needs. This contrasts with other light rail procurements, where vehicle suppliers and infrastructure contractors have bid as consortia, and the public sector has been unable to separately select both the best vehicle and the best contractor, resulting in a sub-optimal compromise.

7.85 Bids to supply vehicles have been evaluated based on the whole-life price, including maintenance, as well as the vehicles' qualitative features. Therefore, the cost of spare parts, special tools and specific maintenance programmes, both annual and periodic, has been considered, in addition to the upfront vehicle supply costs.

7.86 Two separate but related agreements have been competed and finalised with the successful bidder: the Vehicle Supply Contract and the Vehicle Maintenance Contract. These contracts will be executed simultaneously. The Vehicle Supply Contract covers the design, manufacture and supply of vehicles, capital spares, special tools and associated equipment. It also includes, as necessary, option prices for additional rolling stock should the anticipated further phases of the system take place, and to facilitate the proposed phased approach to the procurement.

7.87 The maintenance element of the contract has been subject to variant bids similar to the Infraco maintenance contract. The reference case was to provide tram vehicle maintenance for an initial 30–year operating period. Shorter maintenance periods with the option to extend in three yearly increments up to a maximum of 30 years were also considered. This approach tested the value for money of the reference case. The negotiated contract provides for the vehicle supplier and vehicle maintainer, for at least the initial five years, being the same company. However, this policy remains the subject of further discussion and development within **tie** and TEL and the performance of the vehicle supplier.

7.88 It is intended that both the Vehicle Supply Contract and the Vehicle Maintenance Contract will each be novated to Infraco at Financial Close. The Vehicle Supply Contract has a warranty / defects liability period post full service commencement matched to the Vehicle Maintenance Contract duration. On expiry or termination of the Infraco contract, the Infraco is contractually

obliged to assign the Vehicle Maintenance Contract (and also the Infrastructure Maintenance contract, assuming that neither have expired) to TEL or another suitable party.

Tramco procurement progress to date

7.89 The current status of the Tramco procurement is:

- Four bidders were prequalified;
- Four bids were returned on the 9th October 2006;
- Bids are were evaluated and two bidders were selected for further negotiation; and
- Negotiations have been concluded, evaluation updated and a preferred bidder selected.

Payment mechanism and incentivisation structure – Vehicle supply

7.90 Payment of Tramco for vehicle supply is contingent on the completion of 'fine grained' programme milestones. The principal milestones are:

- Completion and approval of production design work;
- Supply of vehicles;
- Successful commissioning into service; and
- Successful proving of vehicle performance through system reliability tests.

7.91 The payment mechanism operates as follows:

- The contract defines:
    - Programme milestones for each element of the work; and
    - The proportions of the contract sum allocated to each programme milestone; and
- Payment is made for each reporting period as set out in the contract for the value of each completed milestone. Overall there are 73 individual milestones, but key aspects are:
    - Initial payments during approach and consents – up to 10%;
    - Commencement of tram works – further 10%;
    - Activities in connection with manufacture of the first tram – further 19%;
    - Delivery and commissioning of first tram – further 12%;
    - Delivery and commissioning of next 26 trams – further 26%; and
    - Other testing, delivery of documents / manuals – final 23%.

All as assessed by **tie**.

7.92 This arrangement strongly incentivises Tramco to:

- Complete vehicle design, supply and commissioning to programme, otherwise their cashflow is adversely affected; and
- Deliver vehicles to the required standard that are capable of being commissioned and integrated into the tram network, otherwise their cashflow is adversely affected.

7.93 As a further incentive, liquidated damages provisions are included in the contract. These represent the costs to **tie** of any delay to delivery and which may be applied in the event of default by the tram supplier.

Payment mechanism and incentivisation structure – Vehicle maintenance

7.94 The tram fleet reliability and availability are crucial to provision of the high quality tram service required to encourage modal shift from private car to public transport. The Tram Maintenance Contract covers vehicle maintenance services and vehicle spare parts.

7.95 The Tram Maintenance Contract has 30% of the annual maintenance services fee, subject to a mimimum payment of 85% of the monthly paymentas a performance related payment based upon a punctuality and availability monitoring regime. Deductions in payment are proportional to the number of late departing trams, compared to those timetabled to operate and tram availability, including a 'hot spare' offered for service each day. There are two elements which will be used to determine the amount of each Tramco Maintenance Services payment and incentivise the Tramco

Benefits and risk allocation

7.96 The key benefits of the vehicle procurement and maintenance strategy are as follows:
- It allowed choice of vehicle by **tie**; and
- Value for money of maintenance contract market tested through variant bids.
- Creates the opportunity to match the best tram vehicle supplier with the best infrastructure and system integration supplier.

7.97 Risks remaining with the public sector are as follows:
- Maintenance and lifecycle risks beyond the chosen maintenance contract period;
- Costs in excess of the liability caps specified in the contract; and
- Remaining risks associated with the cost (initial and ongoing) and on time delivery of the vehicles will pass to the private sector via the novation of the vehicle supply and maintenance contracts to Infraco.

7.98 The procurement phase for this contract is ongoing and the arrangements outlined above may be adjusted to achieve the optimum value contract arrangement with the successful Tramco bidder.

7.99 Whilst a preferred Tramco supplier and maintainer has been selected, the final integration of the Tramco and Infraco contracts is to be concluded during the Preferred Bidder period prior to the award of the contracts and the concurrent novation of Tramco to Infraco.

Infraco

Procurement approach

7.100 The principal attributes of the procurement approach for this contract are:
- Scope – Single point responsibility for detail design, construction, integration and commissioning into service of Phase 1a of the ETN (capital works) and its subsequent maintenance. Options included for subsequent Phases;
- Design liability and capability transferred by novation of SDS contract into Infraco;
- Tram vehicle supply, commissioning and subsequent maintenance liability and capability transferred by novation of Tramco contract into Infraco;
- Approximately three year contract duration for delivery into service of Phase 1a. Maintenance duration of up to 15 years;
- Lump sum price for delivery into service of the tram system. Thereafter lump sum payment each period for maintenance works, subject to performance adjustment;
- Maintenance price adjusted for inflation by applying RPIx (Retail Price Inflation index excluding mortgage payments);
- Maintenance prices include for market price reviews at yearly intervals over the duration of the contract;
- Milestone payment mechanisms for capital works with performance related payment mechanism for maintenance;

- Liquidated damages for delay to completion;
- Parent company guarantees, bonds and warranties to secure redress in the event of major default on capital works and maintenence; and
- Contractor's liabilities capped at predetermined but significant levels.

Introduction

7.101 The Infraco will be responsible for integrating the outputs of SDS and Tramco under the novated contracts, together with its own subcontracts. The Infraco will be required to carry out and / or manage a comprehensive turnkey contract, including the design (effectively only any remaining detailed design and installation / fabrication design), construction, installation, commissioning, vehicle procurement, system integration, infrastructure maintenance, vehicle maintenance and supply of related equipment and materials in respect of the tram system, the tram vehicles and related infrastructure. Certain aspects of the system performance obligations will persist for the duration of the maintenance contract period.

7.102 The evaluation of bids to construct the infrastructure have been undertaken based on the price for the delivery of the infrastructure, together with maintenance and lifecycle costs, as well as qualitative features. Unlike the vehicles contracts, **tie** proposes to procure the initial construction and the ongoing maintenance under a single contract with the successful bidder.

7.103 The maintenance element of the contract has been subject to variant bids with the reference case to provide infrastructure maintenance for an initial 15-year operating period. Shorter maintenance periods with the option to extend in three-yearly increments, up to a maximum of 15 years have also been considered. This approach both maintains flexibility in terms of future maintenance provisions, and tested the VFM of the reference case. However, the term of the maintenance agreement remains the subject of further discussion and development within **tie** and TEL prior to completion of the construction phase.

Infraco procurement progress to date

7.104 The current status of the Infraco procurement is:

- The Infraco bid document was issued on 3rd October 2006;
- Initial bids and subsequent further rounds of bidding culminated in negotiation with both bidders to obtain optimum proposals from both. The evaluation was then updated and a preferred bidder nominated; and
- Concurrent award of Infraco and Tramco is proposed for January 2008.

Payment mechanism and incentivisation structure – Capital works

7.105 Payment of Infraco for capital works is contingent on the completion of 'fine grained' programme milestones. The principal milestones are:

- Completion and approval of production design work;
- Completion of tram depot and test track section;
- Successful completion of commissioning and system integration prior to trial running of the system;
- Successful commissioning of the system into service; and
- Successful system reliability tests following commencement of revenue service.

7.106 The payment mechanism operates as follows:

- The contract defines programme related milestones for each element of the work. These are to be grouped into a Milestone Payment Schedule identifying a number of milestones to be achieved in relation to each Milestone Payment;
- An initial Milestone Payment of 20% is envisaged as being paid to the Infraco by April 2008 (possibly in two amounts from February);
- Thereafter payments will be made for each four weekly reporting period (i.e. 13 per annum);
- If the Infraco falls behind programme, payments are reduced accordingly;

- It the Infraco gets ahead of programme, payments are 'capped' at the level anticipated, thus avoiding **tie**'s inability to pay if the 'drawdown' of funds is exceeded; and
- Payments will 'plateau' around the commencement of system integration and a mixture of cash and 'retention bond' held and progressively released on successful commissioning of the network, following completion of trial running and successful completion of Systems Reliability Testing.

All as assessed by **tie**

7.107 This arrangement strongly incentivises Infraco to:

- Complete system construction, commissioning and delivery into service to programme, otherwise their cashflow and balance sheet is adversely affected (bonds count as a liability on companies balance sheets); and
- Delivery of the system to the required standard and performance, otherwise again their cashflow and balance sheet is adversely affected.

7.108 Additionally, as a further incentive, liquidated damages provisions are included in the contract. These represent the costs to **tie** of any delay to delivery and which may be applied in the event of default by the Infraco, including any default by Tramco or SDS under the novated contracts.

Payment mechanism and incentivisation structure – Infrastructure maintenance

7.109 The Infrastructure Maintenance Contract has 40% of the annual maintenance services fee as a performance related payment to incentivise the infrastructure maintainer to provide and present the tram system to a high standard. In addition, a team of inspectors, making qualitative assessments against established criteria, will check items such as cleaning, tram system repairs and maintenance, CCTV, passenger information displays, poster and information cases and signage and public address and help points. In order to incentivise timely fault correction for items of the tram system that are not covered by the punctuality or the qualitative regimes a part of the annual maintenance fee is made based upon actual fault correction against target correction times.

7.110 The regime allows for positive and negative performance points to be awarded each period in order to both incentivise good performance and penalise bad or deteriorating performance. The regime is based upon an existing arrangement on a tram system. The four elements used to determine the amount of each Infrastructure Maintenance Services Payment and incentivise the Infraco are:

- A guaranteed minimum payment – currently 60% of the Maximum Performance Payment, but subject to final agreement;
- Tram Service Punctuality Service Element – 30% of the Maximum Performance Payment, subject to a minimum payment of 85% of the monthly payment, measured electronically comparing actual tram departure times checked against scheduled departure times;
- Equal Service Element – 7.5% of the Maximum Performance Payment covering tramstops, the depot, car parks and / or any other part of the tram system (including areas adjacent to it) assessed against documented criteria by inspectors; and
- Fault Correction Service Element and Information Provision Service Element – together 2.5% of the Maximum Performance Payment. The Infrastructure Maintainer provides a record of faults reported, the action required and time taken to correct. If the time taken to correct the fault exceeded the correction time limit then a penalty is levied.

Poor performance 'ratchets' are included for repeated periods of poor performance and increased monitoring and remediation plans by the contractor.

Benefits and risk allocation

7.111 The key benefits of the Infraco procurement strategy are primarily through the award of a single turnkey fixed price contract and in the novation of the SDS and Tramco contracts and the transfer of risks to the Infraco. The benefits include:

- Single system integrator responsible for implementation of design and construction of the ETN and its subsequent maintenance;

- Full design risk passed to Infraco post contract award, including critically the deliverability of the design;
- Full vehicle risk passed to Infraco post contract award, including the deliverability of the vehicle design and compatibility with the infrastructure and systems;
- Reliability of Infraco supply chain and products to be supplied within it;
- Infrastructure and vehicle maintenance risk passed to Infraco ;
- Value for money of maintenance contract market tested through variant bids;
- Enables the Infraco bidders to minimise risk pricing; and
- Enables delivery of the tram system within the optimum programme.

7.112 Risks remaining with the public sector are as follows:
- Maintenance and lifecycle risks beyond the chosen maintenance contract period;
- Costs incurred above the Infraco contract liability caps in the event of default; and
- 'Political' risk associated with planning and Prior Approvals.

Novation strategy

Rationale for novation

7.113 A key element in achieving value for money through the Procurement Strategy is the disaggregation of the of the supply chain and procurement of the separate contracts required to deliver the tram into service. This enables:
- Early commencement of design for both utilities diversions and infrastructure thus reducing overall programme;
- Improved certainty of scope definition minimising risk pricing by Infraco bidders; and
- Selection of the optimum combination of vehicle and infrastructure providers.

7.114 However, **tie** also recognises the benefit of single point responsibility delivered by a consortium structure which would normally be achieved through a single integrated procurement process. Therefore, **tie** will retain as many of these benefits as possible by reaggregating the supply chain within the Infraco contract.

7.115 While novation carries risks, **tie** believes that these can be managed through the procurement process. This concept has been tested during extensive market consultation and with bidders during the procurement phase and received positive feedback. The proposed structure will transfer the systems integration and interface risks to the Infraco, with the exception of such risks associated with MUDFA, JRC and DPOFA, which remain with the public sector. This approach is entirely analogous to that taken on the DLR projects.

Novation of SDS to Infraco

7.116 The terms of the SDS contract provide for full novation of the contract to the successful Infraco bidder and consultation with Infraco bidders has been positive in this regard. **tie** retains the right, but not the obligation, to enforce the novation and there are a number of mitigating actions which can be taken in the event of difficulty. The benefits of novation of the SDS contract accrue in the main to the Infraco and this was reflected in the pricing of Infraco tenders.

Novation of Tramco (supply and maintenance contracts) to Infraco

7.117 During consultation with bidders it became clear that the Infraco bidders would have a strong preference for the identity of the vehicle manufacturer to be known prior to the tendering process for the Infraco contract being complete, as it could have a material impact on the integrity of the delivery of their contract obligations. In particular, the technical aspects, commercial terms and programmes of both the Infraco and Tramco preferred suppliers will need to be aligned and agreed prior to novation. This alignment is created by **tie** facilitating negotiations between the two preferred bidders.

7.118 Additionally, any issues that Infraco or Tramco bidders may have with each other which could prejudice a successful novation will be identified in the early stage of facilitated negotiations between SDS, Tramco and Infraco. These will either be practical issues capable of resolution through exchange of information or tactical commercial positioning, in which case **tie** will, at an early stage, apply pressure through negotiations to overcome this. This will mitigate the risks of the novation process failing due to material objections on the part of either the Infraco or Tramco preferred bidders. Nonetheless a risk remains that this novation could fail or become expensive to implement. **tie** will monitor this aspect closely through the early evaluation and negotiation phase of the tender evaluation process. To date, there are no indications that this risk will materialise.

Procurement process to financial close – Summary

7.119 The key steps to concluding the procurement process to financial close and award of the Infraco contract are:

- Release of detailed design information to preferred bidders for them to undertake due diligence;
- Mobilisation and advance works agreements to be placed with Infraco and Tramco to enable a swift start on site at Contract Award and to mitigate programme and cost risks;
- Facilitated Infraco / Tramco negotiations (facilitated by **tie**);
- Facilitated Infraco / SDS negotiations (facilitated by **tie**);
- Conclusion of various value engineering initiatives;
- Final negotiations with Tramco and Infraco;
- Conclusion of the basis for contract award with both Tramco and Infraco;
- Confirmation of contract award recommendations; and
- Award of Infraco and Tramco contracts and concurrent novation of SDS and Tramco to Infraco.

System integration strategy

7.120 The principal reason for procuring a consortium Infraco contractor is to provide a contracting entity with the demonstrable capability to deliver system integration. Bidders have provided a project specific integration plan as part of their bid. These plans have been reviewed and validated by **tie** and its technical advisers TSS to ensure robustness and reliability.

7.121 **tie**'s ERs, embodied within the Tramco and Infraco contracts, set out the requirements for proving the key stages of integration to conclusion of tram system delivery and particularly the testing required to prove effective integration and system operation.

7.122 These requirements include:

- Test and inspection plan requirements;
- Factory Acceptance Test Requirements;
- System Acceptance Test Requirements; and
- Commissioning plans and records.

7.123 These tests will need to be successfully completed and requirements complied with in order to commence the trial running phase. The trial running phase and the subsequent system reliability tests will prove the system in operation. The payment mechanisms for Infraco and Tramco incentivise the contractors to successfully deliver a fully integrated system.

7.124 The Employers requirements also contain key programme constraints for phasing the construction works which will be optimised with the preferred bidder.

Value for money assessment

7.125 The value for money case for adopting **tie**'s Procurement Strategy has been demonstrated through a qualitative Value for Money (VFM) assessment of the alternative option to procure

the Tram via a PFI route prepared during the spring of 2005 together with the subsequent further work consisting of:

- A comprehensive qualitative and quantitative **ETN Procurement Route VfM assessment** comparing the Procurement Strategy being followed by **tie** to a PFI route,
- Confirmation that the conclusions drawn in the above assessment are still valid in light of the truncation of the initial scope of the project and
- A series of value for money risk transfer mechanisms to be implemented for the Tramco and Infraco contracts to incentivise the private sector in a manner similar to PFI whilst minimising the funding costs and risk premia which might be borne by the public sector in a PFI arrangement.

7.126 The key driver for **tie**'s Procurement Strategy is the need to construct a procurement arrangement that delivers an affordable scheme cost with significant risk transfer to the private sector.

Value for money risk transfer mechanisms

7.127 Consistent with the principals of **tie**'s Procurement Strategy, value for money risk transfer mechanisms have been incorporated into the principal contracts, namely Tramco and Infraco. In summary these mechanisms are:

a) The creation of a single point contract, Infraco, with responsibility for the design, construction, system integration, commissioning and subsequent maintenance of the Edinburgh Tram system, including tram vehicles. This transfers the following responsibilities and hence risks to the private sector:
   - System integration – That all components, subsystems and systems are integrated together such that ETN delivers the specified performance and maintenance delivered such that level of specified performance is delivered during operation;
   - Design – That the design completed by SDS delivers the required tram network performance; and
   - Interface management – The effective management of the interfaces between suppliers and sub contractors to deliver the specified performance within the agreed programme;

b) The creation of the Infraco contract as a lump sum contract transfers the pricing risk to the private sector. Finalisation of certain 'Edinburgh specific' elements, such as structures, of the Infraco contract price on the basis of SDS Detailed Design significantly reduces their scope and performance risk pricing premium that would otherwise be necessary under conventional design and construct or PFI approaches;

c) Incentivisation to deliver the operating tram system into revenue service to programme and to the required performance and standard by:
   - 'Fine grained' milestone schedule payment mechanisms in Infraco and the two contracts novated into it. Critically in the Infraco contract:
     - Retention of the final 10% of value pending demonstrably successful completion of trial running and subsequent successful completion of system reliability tests on the operating tram network during revenue service.
   - Liquidated damages for over run on completion due to default by the contractor; and
   - An ongoing maintenance obligation of up to 15 years, such that any oversight or skimping on the quality of components and system integration is likely to result in a financial penalty during the operating phase;

d) Incentivisation to deliver maintenance services during tram operation via the performance payment mechanism in the Infraco and Tramco contracts. These will penalise the contractor financially should performance fall below the specified thresholds;

e) The Infraco's obligations are underwritten by bonds to the value of 15% of the underlying contract during the construction phase, stepping down during the operating phase, in line with confidence in the integrity of the tram network. In addition, the Infraco's obligations are underwritten by Parent Company Guarantees with each Infraco consortia party; and

f) Early involvement of the operator under the DPOFA contract ensures that the operator is content with the system proposed and delivered and provides operational expertise to the design and procurement phases and resources to support the commissioning and trial running phases.

7.128 The above mechanisms provide VFM through a prudent and affordable risk allocation to the private sector with the requisite incentivisation and sanctions. In addition, **tie**'s strategy of separate procurement of the principal elements of the supply chain, and their subsequent reaggregation, further improves VFM by reducing overall programme duration, and hence cost, plus avoiding the risk premia that bidders would inevitably otherwise include under PFI style arrangements. This is achieved by:

- Procuring the design early via the SDS contractor thereby reducing scope uncertainty at the close of the Infraco and Tramco bids;
- Procuring the tram vehicle separately enabling the optimum combination of vehicle and infrastructure suppliers and maintainers; and
- Procuring the utilities diversion work separately (predominantly under the MUDFA contract) avoiding the time delay whilst diversions are scoped and designed and prices agreed with utility companies.

7.129 In summary, **tie** firmly believe that the structure outlined above, as negotiated with the Infraco and Tramco bidders, will deliver the required risk transfer provisions to maintain a high level of incentivisation throughout the contract period. **tie** also believes that the cost of the incentives package will compare favourably to the cost of finance incurred in PFI projects.

8. Implementation

8.1 Revenue service for Line 1a is planned to commence in the first quarter of 2011. This is conditional on the procurement milestones being met, with contract award in early January 2008 and construction commencing immediately afterwards.

8.2 This section of the FBCv2 sets out the necessary approvals and consents, as well as the strategies and activities required for the implementation of Phase 1a of the ETN. The key strategies for successful implementation of the tram network cover traffic management processes, land acquisition, project management and plans in place to mitigate the impact of constructing and operating the tram network. This section should be read in conjunction with section 7, Procurement and section 12, Programme.

Approvals

8.3 The Edinburgh Tram (Line One) Act 2006 and the Edinburgh Tram (Line Two) Act 2006 (the Acts) gave the authorised undertaker (i.e. CEC) various powers, including the powers to construct and operate the tram lines or any part of them, either as a stand alone line or as part of a network. However, despite these wide ranging powers, various other consents and approvals are required to ensure that all of the works have the necessary consents and to ensure that the tram can operate successfully.

8.4 Many, but not all of the consents are required from the planning authority of the CEC. Other consents are also required from other statutory bodies, for example the Roads Authority or Scottish Natural Heritage and from other third parties. Table 8.1 lists the consents required, likely extent, consenting authority for each and an indication of the likely timescale for obtaining the consent.

8.5 The process of prior approval is explained below.

Table 8.1. Consents required.

CONSENT	LIKELY EXTENT OF REQUIREMENT	AUTHORITY	TIMESCALE	Status
Rail	ROGs and NR consents.	ICP. NR.	Iterative process through project phases: Preliminary and detailed design, construction, testing and commissioning.	HMRI approval is no longer required under ROGs, ICP instead. Ongoing consultation with NR.
Aviation	Aviation and BAA Approvals.	Planning Authority BAA.	Iterative process through preliminary and detailed design stages.	BAA conditions are captured within the design and the lease agreement.

CONSENT	LIKELY EXTENT OF REQUIREMENT	AUTHORITY	TIMESCALE	Status
Planning	Prior Approvals for buildings and OLE fixings. Listed Building Consent for OLE fixings. Advertising Consent. Full Planning Permission will be required for works not scheduled in the Bills. Conservation Area Consents - **not required.** Scheduled Monument Consent (eg Victoria Bridge).	Planning Authority. Scottish Ministers and Historic Scotland.	Eight weeks minimum Plus eight weeks – application can be dealt with through delegated powers or by Planning Committee Plus further time required if called in by Scottish Government.	Prior Approvals process is being progressed on a range of discrete and packaged submissions. Extensive consultation is already complete and some approvals are already in place.
Traffic	TROs. TTROs.	Roads Authority.	Minimum of 12 months Eight weeks.	See TRO strategy below. TTROs are in place for MUDFA, Infraco will apply as required.
	Road Construction Consent.	Roads Authority.	28 days.	
Environment	Water and Waste Water Connection Controlled Activities Regulations Compliance Controlled Activities Regulations Approval Controlled Activities Regulations License	Scottish Water. SEPA. SEPA. SEPA.	28 Days. Not applicable.	Captured as part of MUDFA process, Infraco will seek relevant approvals during construction as required.
	SPA Notifications / Consents. Protected species notifications / consents.	SNH / Scottish Government.	Not Applicable.	Ongoing during construction.
	Landscape and Habitat Management Plan.	Planning Authority.	Prior Approval of this is required in accordance with Acts of Parliament.	Being finalised within Detailed Design.
Structures and Construction	Building Warrant for Depots.	Building Standards.	Two weeks minimum.	To be sought on completion of design and Prior Approvals.
	Technical Approval.	CEC Building Standards, Roads, Bridges	Eight weeks.	Ongoing.

CONSENT	LIKELY EXTENT OF REQUIREMENT	AUTHORITY	TIMESCALE	Status
	Works to safeguard buildings.	Owner / occupier.	14 days notice.	
Radio	Business Radio License.	OFCOM.	None given.	Discussions with 3rd parties ongoing.
Agreements and Undertakings	Third Party Agreements entered into require to be met through design and construction.	Agreement between **tie** and party.	Details were passed to designers as tracked through the programme.	Agreements are passed down into the construction contracts.
	Parliamentary Undertakings require to be met.	Parliament.	Details passed to designers as tracked through the programme.	Undertakings are passed down into the construction contracts.
Survey Work	Access rights for survey purposes.	Owner / occupier.	First time for a site requires seven days notice, then three days thereafter.	Ongoing as required.

Planning Approvals

8.6 The bulk of the planning consents relate to applications for prior approval. Table 8.2 sets out the type of planning consents which may be required.

Table 8.2. Planning consents required.

Proposal (A-Z)	Type of Planning Application Required
Access Roads.	Prior Approval.
Advertisements on tram stops or other Buildings / structures.	Express Consent to Display an Advertisement required for commercial advertising. Directional signs and information notices enjoy "deemed consent" and so do not require express consent.
Advertisements on trams (inside and out).	No consent required.
Bridges (Erection of new bridges and extensions to existing).	Prior Approval.
Buildings (Erection of new building or extensions to existing).	Prior Approval.
CCTV within LOD.	May require Prior Approval (any building or pole on which they are fixed may require prior approval). Listed Building Consent where attached to Listed Building specified in Schedule 10.
CCTV outwith LOD.	None usually, but consent needed in Conservation Areas and consent also needed if preconditions contained in General Permitted Development Order are not met. Listed Building Consent likely to be needed to attach CCTV cameras to listed buildings.
Construction compounds within LOD or adjacent to LOD land.	None.
Demolition of buildings / structures within a Conservation Area.	Conservation Area Consent (unless only partial demolition, or the building or structure is very small - 115 m^3 or under – or was not in a conservation Area at the time the Bill was introduced to Parliament).

Proposal (A-Z)	Type of Planning Application Required
Fences (means of enclosure only – see below for "sound barriers").	None within LOD. Outwith LOD – consent required only in the conservation areas unless over 1m high (and other General Permitted Development Order preconditions).
Footbridges.	Prior Approval.
Embankments.	Prior Approval.
Landscaping – hard and soft.	None. However, link with Environmental Statements and the Landscape Habitat Management Plan for Roseburn Corridor.
Lighting.	May require Prior Approval if attached to a building or placed on a pole.
Listed Building alterations (for tram related works).	Prior Approval. Listed Building Consent where attached to Listed Building specified in Schedule 10.
OLE poles.	Prior Approval.
Overhead line fixings to listed buildings.	Prior Approval. Listed Building Consent where attached to Listed Building specified in Schedule 10.
Overhead line fixings to non-listed buildings.	Prior Approval.
Park and Ride site at Ingliston.	None (except for any formation or alteration of a means of access to a road used by vehicular traffic and any buildings / shelters).
Park and Ride sites – others.	Full Planning Permission.
Retaining walls.	Prior Approval (unless retaining wall is considered to be solely a means of enclosure).
Scheduled Ancient Monument.	Scheduled Monument Consent required for almost any type of work to Victoria Swing Bridge (including temporary storage on the surface of the Scheduled Ancient Monument). Application must be made direct to the Scottish Ministers. Dealt with by Historic Scotland.
Signs.	Traffic and other functional signs generally enjoy "Deemed Consent" providing any illumination is for purposes of warning.
Signalling.	Requires Prior Approval if attached *to* a building or placed on a pole. Listed Building Consent also needed if attached to Listed Building specified in Schedule 10.
Sound Barriers.	Prior Approval. Sound barriers by definition are not considered a means of enclosure. Hence they fall within the definition of "building" in the 1997 Act and require prior approval.
Street lighting.	None usually, but may need consent in Conservation Area with Article 4 Direction in force.
Substations.	Prior Approval - within definition of "building".
Trackside equipment cabinets.	None. Plant and equipment is exempt from the definition of "building" in General Permitted Development Order.
Trams.	None.
Tram tracks and associated surfacing within existing roads.	None.
Tram stops and associated equipment.	Prior Approval for those parts defined as a building (eg shelter). While not all parts of the tram stop require prior approval; applications are lodged for tram stops as a whole so that those parts which need approval can be judged in context.

Proposal (A-Z)	Type of Planning Application Required
Trees – removal of, or works to.	None.
Vehicle access to road used by vehicular traffic (formation of or alteration to).	Prior Approval.
Viaducts (Erection of new one or alteration to existing one).	Prior Approval.
Walls (means of enclosure only – see above for "sound barriers" and "retaining walls").	None within Limits of Deviation. Outwith Limits of Deviation consent required only in the conservation areas or if more than 1m high.

8.7 In addition to those consents identified in the table above, it should be noted that in some cases, for example in respect to the depot and substations, building warrants are also required.

Prior Approvals

8.8 In terms of Section 74 of the Edinburgh Tram (Line One) Act 2006 and Section 73 of the Edinburgh Tram (Line Two) Act 2006, the Town and Country Planning (Scotland) Act 1997 still applies to the works authorised by the Acts and, therefore, despite the general planning permission granted by the Acts, some elements of the works require prior approval under Class 29 in Part 11 of Schedule 1 to the Town and Country Planning (General Permitted Development, Scotland) Order 1992. As can be seen from the table above, these include:

- Any buildings or structures including substations, bridges, tramstops and poles; and
- Any extensions to buildings including any building fixings.

It should be noted that prior approval applies where these elements of the works are either within the ILOD or within the LLAU.

8.9 Any application for Prior Approval can be refused on the following grounds:

- The works ought to be and could reasonably be carried out elsewhere on the land designated specifically in the Act i.e. within the LOD; and / or
- The design or external appearance of the works would injure the amenity of the neighbourhood which is deemed to include the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. It should be noted that this second ground has been extended by virtue of the Acts in order to recognise that the tram runs through a World Heritage Site.

8.10 Under the SDS contract the obligation to obtain all consents and approvals has been passed to SDS and as part of the detailed design process, applications for Prior Approvals are made to the planning authority. While it is appreciated that neither **tie**, CEC as the promoter or TEL can fetter the discretion of the planning authority, SDS has tried to minimise the risk that the need for prior approval adds to the project.

8.11 The Tram Design Working Group, which include representation from Historic Scotland and the World Heritage Trust, is a forum where pre-application discussions can take place, again without fettering the discretion of the planning authority. This group was set up as part of the agreement reached with Historic Scotland to allow them to withdraw their objection to the Bills and is intended to minimise the risk of objections from Historic Scotland and the World Heritage Trust to the prior approval applications. It is also ensuring that CEC, Historic Scotland and the World Heritage Trust have an opportunity to participate in the delivery of a tram system which is integrated with the public realm and reflects the identity of Edinburgh. The Tram Design Manual is a key consideration in respect of each prior approval application.

8.12 Before the statutory application for Prior Approval is submitted, there is also an additional informal Prior Approval consultation with CEC Planning to show the finalised detailed package for final comment.

8.13 SDS has prepared an Approvals and Consents Management Plan (ACMP). It is recognised that the success of the design process is ultimately dependent on achieving the necessary approvals and consents and the ACMP provides an overarching strategic document that defines all approvals and consents. It also allows the applications for the approvals and consents to be tracked from design development and pre-application discussions to the conclusion of the approvals and consents process.

8.14 The Prior Approval process for tram submissions was approved, on 18 May 2006, as an addition to CEC's Scheme of Delegation by its planning committee. The report was approved by the full Council in June 2006. Further, SDS and the planning authority have agreed a protocol setting out the roles of both parties during the prior approval process. This includes the timescales for obtaining the consent, the deliverables and the criteria for referring an application to the planning committee for determination, rather than it being considered under delegated authority. Template submissions and committee reports have also been developed.

Planning permissions

8.15 Where any element of the works is to be constructed outside of the LOD, full planning permission must be obtained. In order to minimise the need to design outside the limits, SDS has been having ongoing discussions with the Planning Authority in relation to the planning applications. It is anticipated that given that the scheme is being designed within the LOD, there will be very few planning permissions required for the tram works. However planning permissions may be required for third party works, in particular the work required to the Wanderer's Clubhouse at Murrayfield.

Listed Building Consents

8.16 There are many listed buildings abutting the LOD. When the Bills were drafted, a balance was struck between protecting listed buildings and allowing the works to be constructed without the need for further consents. Accordingly, Schedule 10 Part 1 to each of the Acts lists the listed buildings / monuments and specifies the works which can be carried out to those buildings / monuments without the need for further consents.

8.17 In addition, it was recognised that affixing a building fixing to a listed building may be unavoidable, given the number of listed buildings with the city centre and down to the Foot of the Walk and Constitution Street. Schedule 10 Part 2 to each of the Acts lists those buildings to which building fixings cannot be affixed without Listed Building Consent. Building fixings also require building owner consent.

8.18 SDS has been carrying out the design in accordance with these constraints. However listed building consents will be required as the design is progressed and in some locations there may be no alternative to affix to a listed building.

8.19 The timescale for obtaining Listed Building consent is similar to the timescale for obtaining a Prior Approval. However the Scottish Government must be informed once a decision has been made and there is a further 28 days during which they may call in the application.

Scheduled Ancient Monument Consent

8.20 Any works which would mean physical works to a Scheduled Ancient Monument requires consent from the Scottish Ministers i.e. Historic Scotland, prior to those works being carried out, in accordance with the Ancient Monuments and Archaeological Areas Act 1979. Although there are two Scheduled Ancient Monuments that are affected by the tram route, it is not envisaged that any of the works will directly physically impact these. There are some obligations in regard to landscaping contained in the Landscape and Habitat Management Plan in the green belt section on Phase 1a between Edinburgh Park Station and Ingliston stops.

Roads Authority Approvals

TTROs

8.21 In respect of the TTROs, a strategy has been developed by **tie** to ensure that the necessary orders are in place for both the MUDFA and Infraco works. The strategy aims to maximise flexibility during the construction period and to minimise the impact on the public given the scale of the works.

8.22 Given that the construction methodology to be adopted by the Infraco was unknown and the detailed design for the utility diversions not complete, if individual TTROs for specific works on specific roads at specific dates had been obtained, it is likely that the TTROs would have required to be significantly altered, or even remade by CEC, in order to cover, and be in place for, both MUDFA and Infraco at the necessary time.

8.23 For this reason, one master TTRO was made for all tram works, including the utility diversion works. That order specifies:

- All of the roads likely to be affected;
- All of the measures likely to be imposed;
- That any particular measure will be in force when signed on street; and
- The date on which the order will come into force and that it may remain in force for more than 18 months i.e. it might cover both the MUDFA and Infraco works.

8.24 This master TTRO goes through the statutory process once rather than having a series of street specific orders going through the process over several months or even years. The master order covers all of the foreseeable required measures. This approach has already been used in Edinburgh by major utilities' companies. This approach is being and will continue to be underpinned by effective lines of communication between MUDFA, Infraco, **tie** and the Roads Authority. This allows a rolling programme of works to be agreed in advance, within the terms of the master order, and taking account of current circumstances, including other competing demands for road occupation or other utility works.

8.25 As the rolling programme and the necessary temporary traffic management measures are brought forward and agreed between the parties, details of the proposed works / measures are publicised in accordance with pre-agreed communication and publication protocols to ensure that the public had reasonable advance notice of all measures and diversions. That is, not too late or too far in advance to be useful. For instance, measures may be agreed in one month slots, two months in advance so that the public are given one month's notice.

8.26 An effective communication and publication process is an essential pre-requisite of this approach to ensure that road users are given adequate and reasonable notice of temporary road works and diversion measures in the interests of procedural propriety and road safety. Accordingly, there was a protocol developed as part of the tender process to deal with the communication strategy which is incorporated in the Infraco contract.

8.27 Experience with regards of MUDFA works confirms the success of this approach, as no significant negative feedback or publicity has been received on these issues to date.

TROs

8.28 The TROs are grouped to reflect the relevant issues and type of measure. There are discrete stationary, moving traffic and consequential measures. This has resulted in a suite of inter-related Orders which also distinguishes between core measures, direct consequential measures and indirect consequential measures.

8.29 The TROs have been developed taking account of the following relevant issues:

a	The relevant statutory procedure.	Some measures trigger a mandatory hearing. Greenway amendments (red regulatory lines) require ministerial consent.
b	The type of measure.	Defines which statutory procedure is applicable. Influences how the TROs should be grouped (static or moving traffic). Ensure that there is no duplication or inconsistency between measures on the same road.
c	Relationship of the measure to the project.	Identify those measures that are necessary to enable the tram to operate in accordance with the approved Business Case (***core*** measures). All other measures are classified as ***consequential***. The final identification and classification depends upon the finalised road design.
d	Categorisation of the Consequential measures.	(i) Direct Consequential – those within or adjacent to the LOD or have a direct causal link to tram; (ii) Indirect Consequential – those that are neither within or adjacent to the LOD but have a relationship to the project; (iii) Contingency measures that may be required post-operation but would be triggered by assessment of the actual wider network impacts of the project.
e	Location of the measure.	The measure might be within, adjacent to or outwith the LOD or within the wider network area. This helps to determine prioritisation of measures and the definition of contractual responsibilities.
f	The technical / design process.	Dictates the scope and duration of the design and traffic modelling process.
g	Prioritisation of measures.	Core measures are the first priority and will be processed to try to manage commercial risk and minimise the gap between the start of the on street Infraco works and the TROs coming into force. The prioritisation of consequential measures depends primarily on the outcome of the traffic modelling and when they should be processed.

8.30 During July 2007, the Scottish Government issued a consultation paper on a proposed amendment to Regulation 8 of the Local Authorities Traffic Orders (Procedure) (Scotland) Regulations 1999. The consultation closes on 15 October 2007 and, if approved by Scottish Ministers, an amendment would be made early in 2008. The effect of the proposed amendment is to replace the requirement for a mandatory public hearing of objections to certain traffic measures with the right to hold a discretionary public hearing of objections. The proposed amendment only covers traffic measures to be made 'in connection with matters already authorised by a Private Act of Parliament'. This means that CEC would be able to give due consideration to the appropriateness of a hearing process given that the tram scheme has the benefit of prior parliamentary scrutiny and approval through such an Act.

8.31 Irrespective of whether or not the Traffic Order Regulations are changed, all of the TROs for the Tram Project will be subjected to a formal statutory process, in line with the statements made by the project promoter during the parliamentary process. The statutory process will involve the Public Deposit of the draft orders to allow members of the public to consider the proposals and to lodge objections or representations with the Council. A formal report on the objections will be submitted to the Council to ensure that the objections are taken into account by the Council when they decide whether or not to hold a public hearing and whether or not to make the Orders.

8.32 The anticipated duration of the statutory process to make the Orders is between eight and 21 months from the time of the Public Deposit of the draft Orders. The anticipated Public Deposit date, following the statutory consultation and the approval of the Council to proceed, is mid May 2008. The date by which the Orders are expected to be made is therefore mid November

2009. However, this depends upon the number of objections to the proposed TROs and whether or not there is a public hearing.

8.33 In terms of the timing of the TROs relative to the commencement of the construction of the on-street sections of the tram, the advice of Senior Counsel has therefore been sought taking into account the Prior Approval of the tram scheme by the Scottish Parliament. The opinion of Senior Counsel is that there is no legal bar to commencing tram infrastructure works under a TTRO, even though the TRO is not yet in place. Senior Counsel has also advised that there is similarly no legal bar to commencing off-street tram infrastructure works in advance of the TROs for the on-street measures being made.

8.34 If, on the assumption that there is no change to the Regulations (para 8.30) and it was felt that accelerating some of the measures was beneficial for the project, it would be necessary to identify which measures could or should be advanced without a public hearing. That would depend on whether or not the measure triggered a mandatory hearing; the number and scope of objections to it and importantly, the decision of the Council as Road Traffic Authority on the need for a discretionary hearing.

8.35 The TRO proposed order suite is as follows:

TRO Ref	*Description*	*Purpose / comment*
1	Core Stationary Measures	(a) Revoke the existing waiting, loading, unloading and parking Orders (stationary measures) within the LOD; (b) Introduce no waiting at any time restrictions to those parts of the street within the LOD where waiting would otherwise interfere with the operation of the Tram and prevent it operating in line with the Business Case; (c) Prepare the way for the necessary new parking and loading restrictions to be introduced through Order 2; and (d) Will be subject to a mandatory public hearing unless an amendment to the Regulations is successfully promoted as described in Paragraph 8.31 above.
2	Parking / loading within LOD and adjacent streets	(a) Introduce new loading and parking measures to the available parts of the streets within the LOD that do not adversely affect the running of the tram; (b) Introduce new loading and parking measures to supplement those on the main traffic routes on streets adjacent to the LOD; (c) To avoid a gap between the revocation of the extant stationary measures (Order 1) and the re-application of new loading and parking measures (Order 2) this order should be taken forward in conjunction with Order 1; and (d) This Order is not subject to a mandatory hearing because no existing loading / unloading facilities are being removed.
3	CEC (Greenways) Amendment Order	(a) Order not required. In the interests of public transparency and the desirability of a single enforcement regime covering the entire tram route the 'Greenway' red lines will be revoked and replaced with yellow lines in Orders Nos 1 and 2.
4	Core Moving Traffic measures	(a) Revoke existing prohibitions within the LOD where these need to be replaced, modified or supplemented to allow the tram to operate in line with its Business Case; (b) Introduce new prohibitions (e.g. banned turns, no entries, exclusions of particular traffic classes etc.); and (c) A public hearing is not mandatory for these measures.

5	Consequential measures	(a) Introduce any required type of measure to deal with the consequential effects of the tram; (b) Appropriate contingency measures dealt with in second post-tram phase as explained in paragraph 8.36 below; and (c) Mandatory public hearing only necessary if new loading / unloading measures are required.

8.36 Order No 5 dealing with the tram consequential effects outside the LOD will have a second, post-tram implementation phase for any necessary contingency measures. This might be occasioned by traffic displacement occurring on a sustained basis in streets that are ill-equipped to deal with sustained significant increases in traffic. Traffic modelling may predict significant traffic changes that may not materialise, or disperses as the overall traffic network adjusts to the tram in the first few weeks and months of its operation. Also, precipitate action to curb perceived traffic intrusion (e.g. by a road closure) may have serious unintended consequences to other traffic routes. Therefore, it is essential to ensure that secondary measures act in the wider public interest. The wider public interests can only be balanced by ensuring that the second phase of the Order proposes measures that have been brought forward in the light of a clearly evidenced need.

Third Party Consents

Side Agreements

8.37 Throughout the Bills' passage through the Scottish Parliament, various agreement were entered into between CEC and either private individuals or commercial interests who had objected to the Bill, in order to give them sufficient comfort to allow them to withdraw their objections.

8.38 Some of these agreements give these third parties the right to agree or approve for example site specific method statements, the design, or the programme before the works commence. All of the obligations in the Side Agreements have been passed down to MUDFA and the Infraco as appropriate to ensure compliance with the Agreements.

Network Rail

8.39 As the Acts do not contain any provisions which would protect NR's assets, a position supported by the Scottish Parliament, **tie** agreed a set of protective provisions with NR. In common with other light rail projects that have interfaces with NR, the protective provisions were a prerequisite to NR removing their technical objection on the basis that they were satisfied that their assets will be safeguarded.

8.40 **tie** has worked closely with CEC and NR to progress the legal requirements of the project, including all necessary NR / **tie** / CEC agreements. The following agreements have already been entered into:

- A Protective Provisions Agreement and a Framework Development Agreement are in place; and
- Development Services Agreement (DSA) which engages NR in the process of reviewing and agreeing the tram scheme design in relation to interface with the railway network.

8.41 A comprehensive legal agreement framework has been set out and is being finalised currently. In addition to the above it includes;

- The license to occupy land for construction (prior to finalising the lease agreement);
- Bridge agreements for new structures crossing the railway;
- Regulatory consents; including revised depot, station and network change consents which will have input from ORR, NR, train operating companies, freight operating companies, and TS;
- Neighbourhood agreements and Operating Code of Practice; and

- The Asset Protection Agreement (APA) regulates the delivery of work during the project construction phase adjacent to NR infrastructure and which will be embodied in the Infraco contract.

8.42 **tie** is also finalising design and works agreements for NR to undertake:
- Line side equipment relocation affected by the "tram footprint"; and
- Immunisation of NR infrastructure.

Both of the above items are on the critical construction path for the project. This is being tackled directly with the engineering experts and the appointment of a specialist Project Manager to deal solely with this interface. Specific agreements are being put in place between **tie** and NR to govern this work including clear identification of the critical milestones.

8.43 NR possession requirements have been advanced as far as possible and progress on all of the above is subject of a monthly director level review between NR and **tie**.

8.44 There are four important issues which will require ongoing management in relation to NR:
- The time that it will take to finalise any decision, negotiation and agreement with NR if it deviates even slightly from NR's codified approach;
- The effect of any NR policy change;
- The generally risk averse nature of NR to all projects which affect their operations; and
- The interaction between the tram project and the various heavy rail schemes already committed or being promoted for example the Airdrie to Bathgate improvements or the Waverley redevelopment.

Scottish Government influence and oversight on these matters will be important, given the ongoing relationship between them (through TS) and NR.

First ScotRail

8.45 **tie** secured an agreement with First ScotRail not to object to the Bills in exchange for agreed protection of its interests at the Haymarket depot (primarily access during, and reinstatement after tram construction works). The physical reconfiguration necessary at Haymarket Station to accommodate the integration of the new tram stop is covered by the APA with NR. It is NR's responsibility to reach agreements in this regard with its tenants at the station. This involves not only ScotRail but other train operating companies: GNER and Virgin and freight operating companies.

BAA

8.46 An agreement was reached with Edinburgh Airport Limited, BAA's operating subsidiary in September 2005. In terms of this agreement, BAA requires to be consulted on various aspects of the project and have the right to approve some aspects, for example method statements. This has already been undertaken in relation to the surveys, the MUDFA contract and the Infraco ITN. There are regular meetings with BAA which are attended by both **tie** and SDS to ensure that all of the issues which require their consent, or in respect of which **tie** requires to consult are being dealt with.

Forth Ports

8.47 An agreement was reached with Forth Ports in June 2005. Forth Ports are entitled to be consulted on and agree on various matters including the construction programme, the site specific method statements and the finishes in the vicinity of Ocean Terminal. Again there is a good working relationship between the parties to ensure that all matters are dealt with timeously.

Building Fixing Agreements

8.48 As well as requiring Prior Approval from the Planning Authority, consent of the building owner, or in the case of a tenement building, the owners, is also required before a building fixing can be affixed to a building. Under Section 16 of the Acts, if the owner does not respond within 28 days of notification, it is a deemed consent. Consent cannot be unreasonably withheld. If it is

viewed that consent is being unreasonably withheld or issued subject to unreasonable conditions the method of determining the issue is by reference to the Sheriff Court.

Environmental Consents

8.49 Specialist ecological consents have been obtained through the auspices of the Environmental Management Plan and the LHMP. Licenses such as badger licenses were put in place prior to the works commencing and badger setts were successfully relocated. In addition, consents will be required from both SEPA and Scottish Water in order to control pollution and discharges.

Operation Consents

Her Majesty's Railway Inspectorate and Independent Competent Person

8.50 Previously, the tram system required a Case for Safety to be prepared for approval by HMRI. The responsibility for this fell to SDS. In 2006, the Railways and Other Guided Transport Systems (Safety) Regulation 2006 (ROGS) replaced the previous legislation. The impact of the ROGS safety approval regime for the project are:

- There is no requirement for the HMRI to give prior consent or approve a written safety verification scheme;
- A competent person has to be appointed to provide an independent safety verification of the project; and
- The Safety Case is replaced by a Safety Management System (refer to section 5 for details of the planned safety assurance regime).

HMRI will not approve or authorise any of the works undertaken through the ROGS safety approval regime for a tramway. The ICP, in their safety verification role, provides this function. The competent person has been appointed and HMRI have acknowledged the changed safety approval regime.

Third Party works

Side agreements

8.51 Some of the Side Agreements provide that certain ancillary works must be carried out, often in advance of the tram works authorised under the Acts. In some cases, these works are essential to allow the tram works to commence.

8.52 Work has been performed to establish the scale of these works and their likely cost. The critical path has been established so that the works are programmed to ensure that they do not hold up the Infraco works. In some cases these works have been required to be carried out in advance. However, others are able to be accommodated within the programme for the Infraco works.

Accommodation works

8.53 As part of the process of compulsorily acquiring land, some land owners require, by way of compensation, certain boundary treatment works. The precise extent of these works is dependent on the finalised detailed designs and the construction methodology adopted by the Infraco contractor. Provisional estimates are incorporated in the Infraco prices.

Land assembly

Powers under the Acts

8.54 The Acts confer rights on CEC, as the authorised undertaker, to compulsorily acquire land and rights in land, both temporarily and permanently, as required for the construction and operation of the tram. The powers under the Acts include the following:

- The right to carry out road works both within and outwith the limits of deviation;

- The right to take temporary possession of land, as identified in the Acts, and subject to giving the necessary notification as prescribed in the Acts for both survey and construction works;
- The right to permanently acquire land within the limits of deviation or the limits of land to be acquired or used respectively for the authorised works or for the purpose specified in the Acts;
- The right to affix building fixings; and
- The right to temporarily enter land to carry out maintenance works.

8.55 Notwithstanding the powers conferred by the Acts, Side Agreements have been entered into with various parties that limit these powers, either in respect of the extent of the LOD, or the timing of the exercise of these powers or which impose additional obligations on CEC, particular in relation to temporary possession of land.

8.56 Although **tie** is managing the land acquisition process, title in the land is being taken by CEC.

Key activities and assumptions

General

8.57 The Land Assembly team at **tie** had prepared a Land Assembly Management Plan (LAMP). It focuses on the procedures, processes and resources required for achieving requisite land ownership and rights (permanent and temporary). The LAMP was based on various assumptions and outlines key activities including the following:

- As land assembly is a design led process, the extent of land and rights required for the construction and operation of the tram is established through liaison between **tie** and SDS;
- A database has been developed based upon refreshed and updated books of reference for the whole of Lines 1 and 2;
- The value of land and rights acquired is being determined independently by the Valuation Office Agency of the Inland Revenue Service (known as the District Valuer or DV); and
- Full cognisance has been taken of the terms of Side Agreements, Letters of Comfort, Letters of undertaking and position statements entered in to between CEC or **tie** and the affected landowners. Agreements have been reached with NR, Edinburgh Airport Limited, Forth Ports, New Ingliston Limited and Waterfront Limited.

8.58 The recommended method of securing title was for CEC to use the General Vesting Declaration (GVD) Procedure and was agreed by both the TPB and the full Council. This allows the process to be completed within a minimum period of three month upon commencement.

8.59 The first set of GVD notices, which outline the intention to secure title under compulsory purchase powers, was sent out by the end of November 2006. Although it did not oblige CEC to purchase the land at that stage, it started the process which is now nearing completion. The first tranch of actual acquisitions was effected in April 2007 and all lands are anticipated to be obtained before the award of the Infraco contract.

MUDFA

8.60 All rights and wayleaves in relation to the diversion of utilities are being be secured in advance of works commencing. Where required, licence agreements are agreed in advance and taken up in line with the requirements of the MUDFA programme. This will be undertaken by **tie** and AMIS. It is anticipated that given the powers under the Acts and also under the New Roads and Street Works Acts 1991, it is unlikely that any additional wayleaves will be required in relation to the on-street sections. In relation to the on-street sections, the utilities designers are minimising the need for any wayleaves outwith the limits of deviation. If necessary wayleaves and servitudes can be acquired within the LOD by virtue of Section 24 of the Acts.

Infraco

8.61 The land assembly plan was based on the primary assumption that unencumbered title and other rights in relation to land and property, as well as vacant possession would be obtained in advance of the award of the Infraco contract or any advance works contracts. This process is nearing completion and it meant that the Infraco bidders have not factored in the risk of land availability into their pricing of the contract. In addition it gives the Infraco maximum flexibility when determining their construction programme as the land is available for all of the works.

8.62 Section 23 of the Acts provides the statutory basis for the exercise of compulsory purchase powers to acquire the land. Generally the GVD process has been used to acquire land. Any short term leases are being terminated using the Notice to Treat method which can be used along-side the GVD process.

8.63 Notwithstanding the fact that all other land is being acquired using the GVD Process, due to the terms of the Side Agreements entered into with Edinburgh Airport Limited and NR, any land to be acquired from these parties will be acquired by way of a long lease of 175 years, rather than by compulsory purchase.

Building fixings

8.64 Building fixings are required at a number of locations along the tram route. Consent from property owners, which is required under the Acts (Section 16 of the Acts), and Prior Approval (and where relevant listed building consent) will be required for each fixing. SDS are responsible for obtaining all these consents.

Compensation

8.65 A robust estimate of the compensation payable for land, whether acquired permanently or only possessed temporarily, had been compiled. Valuations of each parcel of land have been conducted by the DV. These valuations were factored up to add in **tie** management costs and land owner legal costs. Finally, all costs have been inflated to the appropriate time. Other aspects of compensation were accommodated in the cost estimates. The process of land acquisition is nearing completion and the updated DV valuations at the time of issue of the purchase order (GVD) comfortably confirmed the previous estimate totals.

Communications strategy

8.66 The acquisition of rights and title to land, especially through the use of compulsory purchase powers, was effectively managed through the use of "plain English" letters preceding all formal letters giving details of the process. This had also been done in relation to the surveys where all notifications required under the Acts were preceded by an information letter or briefing note, explaining the nature and extent of the surveys, the methodology and the likely impacts. Similar "plain English" letters were also sent in October 2006 to all parties who may have been affected by the GVD process. In addition, a plain English Guide to Compulsory Purchase and Compensation had been produced and is available on the **tramtime** website. There has been no significant negative feedback received from land owners, confirming the success of this strategy.

Environmental management plan

Background

8.67 When the Edinburgh Tram (Line One) Bill and the Edinburgh Tram (Line Two) Bill (the Bills) were submitted to the Scottish Parliament, each of the Bills was accompanied by an Environmental Statement in accordance with the standing orders of the Scottish Parliament, which require that projects approved by private act of Parliament must be subject to an Environmental Impact Assessment (EIA). In addition, a supplementary Environmental

Statement was submitted in June 2005 for each of the proposed route amendments to each Bill.

8.68 EIA in Scotland is governed by the Environmental Impact Assessment (Scotland) Regulations 1999. The EIA is a systematic process by which the environmental impacts of a proposed development, both during construction and operation, are assessed, reported in an Environmental Statement, made available for comment from statutory environmental authorities and the public, and taken into account in the decision making process. In addition, as part of the preliminary stage of the Private Bill process, the Environmental Statement and the supplementary Environmental Statement was subject to a peer review by Bond Pierce. In each case they were found to be adequate.

8.69 During Phase 2 of the Consideration Stage the Committee for each Bill amended the Bills to ensure that there was a statutory link between the Environmental Statement, the carrying out of the works authorised by the Acts and the likely residual impact of the works.

8.70 Accordingly, Section 67 of the Acts provides that the authorised undertaker is to employ all reasonably practicable means to ensure that the environmental impacts of the works are no worse than the residual impacts identified in the Environmental Statement and the supplementary Environmental Statement and that either the additional environmental mitigation measures identified in undertakings given to objectors or to the Committee are carried out, or that the environmental impacts of the construction or operation of the authorised works are no worse than they would have been had the mitigation identified in the undertakings been carried out.

Proposed mitigation

General

8.71 Various public documents have been developed in order to mitigate the likely impacts of both the construction and operation of the tram. These have either been subject to public consultation or tested and considered through the parliamentary process. Indeed, some of the documents were amended as a result of the evidence given to the Parliamentary committees to address concerns of the objectors.

Tram Design Manual

8.72 Given that the tram runs through various sensitive environments, including the World Heritage Site and conservation areas, the Tram Design Manual has been prepared by the Planning Authority. It was the subject of extensive public consultation and was subsequently approved by the planning authority in September 2005.

8.73 The Tram Design Manual is supplementary planning guidance which will be a material consideration in respect of each Prior Approval application. Both SDS and the Infraco are contractually required to comply with the terms of the Tram Design Manual.

8.74 In conjunction with the aims of the Tram Design Manual, the types of works which require Prior Approval was extended to give greater protection to the built heritage within the city centre and, in particular, within the World Heritage Site. For example, poles and building fixings require Prior Approval given their potential impact on listed buildings.

8.75 In addition, the grounds for refusing a prior approval, which are derived from the Town and Country Planning (General Permitted Development) (Scotland) Order 1992, are strengthened within the Acts again to try to give additional protection to the built heritage within the city centre. This recognises the sensitive nature of the World Heritage Site and the townscape of Edinburgh.

Code of Construction Practice

8.76 To minimise the likely adverse impacts of the construction, a Code of Construction Practice (CoCP) was developed and the Bills were amended to provide that the authorised undertaker must use all reasonable practicable means to ensure that the works are carried out in accordance with the CoCP. This obligation also includes any local construction practices which may be developed for particularly sensitive locations such as Murrayfield.

8.77 The CoCP governs many aspects of the construction including working hours, noise levels during construction, methods of minimising dust, vibration and other nuisance during the construction period, consultation requirements, how species and wildlife should be protected during the construction and traffic management.

8.78 Both the MUDFA contractor and the Infraco are contractually obliged to comply with the CoCP. In addition, while the Acts allow the CoCP to be amended, any amendments cannot reduce the standards of mitigation and protection contained in the CoCP dated 6 March 2006.

Noise and Vibration Policy

8.79 Again, this was developed during the parliamentary process and the Bills were amended to provide that the authorised undertaker must use all reasonably practicable means to ensure that the Noise and Vibration Policy (the Policy) is applied to the use and operation of the tram.

8.80 The philosophy behind the Policy is that, rather than relying on external mitigation like noise barriers, mitigation should be provided at source. Therefore the design of both the tram and the infrastructure should incorporate suitable measures from the outset to mitigate against noise and vibration, for example the type of track slab, the wheel / rail interface all require to be carefully considered and designed. The design work was also informed by noise and vibration surveys which were and are continued to be carried out at sensitive areas.

8.81 SDS, Tramco and Infraco are all contractually obliged to comply with the Policy. Further, the Tram Maintainer, the Infraco Maintainer and the Operator are also required to comply with the Policy.

Landscape and Habitat Management Plan

8.82 A Landscape and Habitat Management Plan (LHMP) was developed during the Parliamentary process and this will continue to evolve as the project progresses. This relates to the Roseburn Railway Corridor only and was developed in recognition of the likely significant environmental impacts on the Roseburn Corridor and the change in its character.

Badger Mitigation Plan

8.83 As the LHMP only applies to the Roseburn Corridor, a badger mitigation plan was developed for the badgers at Gogar. These badgers are now relocated and a new sett was constructed. This was done in consultation with both Scottish Natural Heritage and Edinburgh and Lothian Badger Group to determine the necessary mitigation. Further survey work was completed to establish the location of the setts, the nature of the setts and the foraging areas of the badgers.

Site Specific mitigation

8.84 There are various locations around the route which will require specific mitigation. The authorised undertaker is to consult with the residents at Baird Drive and is to try to ensure that the proposed landscaping and screening is as effective as practicably possible from day one.

8.85 At the depot, any landscaping has to comply with the guidance issued by the Civil Aviation Authority on planting in the vicinity of airports, so as to avoid bird strike. This is due to the proximity of the depot to the airport and the flight envelope. The agreement with Edinburgh Airport Limited sets out what is required by way of compliance.

Employer's Requirements in the Infraco contract

8.86 The ERs, which have been developed for the Infraco contract, include a section on the environmental requirements which are applicable to the construction and operation of the tram. Primarily, these requirements ensure that the Infraco complies with the documents mentioned above.

8.87 In addition, the Infraco must prepare the Ecological Design which builds on the ecological mitigation proposals set out in the Environmental Statements. It will include information on construction, aftercare maintenance and monitoring. In preparing this document, the Infraco will be required to update all of the ecological surveys prior to commencing the works in that area and the findings of these surveys will be incorporated in to the LHMP and the Environmental Management Plan.

8.88 The Infraco is also to prepare a Construction Environmental Management Plan including method statements, information on drainage, working times, noise reduction and abatement, pollution control, protection of retained vegetation, waste disposal, topsoil handling and site compounds. This will build on the CoCP and will reflect the Infraco's construction methodologies

Project management plans and controls

Project delivery strategy

8.89 The project will be delivered against a predetermined project lifecycle and assurance will be given at each phase review. Governance of the project dictates that certain activities cannot commence until appropriate levels of approval have been granted. For tram there are three types of gateway as follows:

1) Internal stage-gate review – this is determined by **tie** and relates to the lifecycle of the project. The procedure defines the type of information that should be available by the end of each stage of a project and the review process will check that these deliverables are in place before moving onto the next stage of the process;
2) Government Gateway Review – **tie**'s client body and the key funders demand that OGC (Office of Government Commerce) gateway reviews are carried out before significant release of funding or entering into contracts; and
3) Statutory approval processes – **tie**'s client and key funders have certain approval processes that must be met prior to the project moving from one stage to the next, or impose certain restrictions upon the project due to political reasons.

These gateways are fully aligned with the governance arrangements for the project as set out in section 6.

Project implementation and management plan (PMP)

8.90 **tie** have developed a Project Management Plan (PMP), which provides an overall framework for the management of the Edinburgh Tram Project (ETP) and is complemented by detailed functional plans, procedures and documentation. It covers the design, procurement, construction, commissioning and full integration of the tram network for Phases 1a (and potentially 1b) of the project.

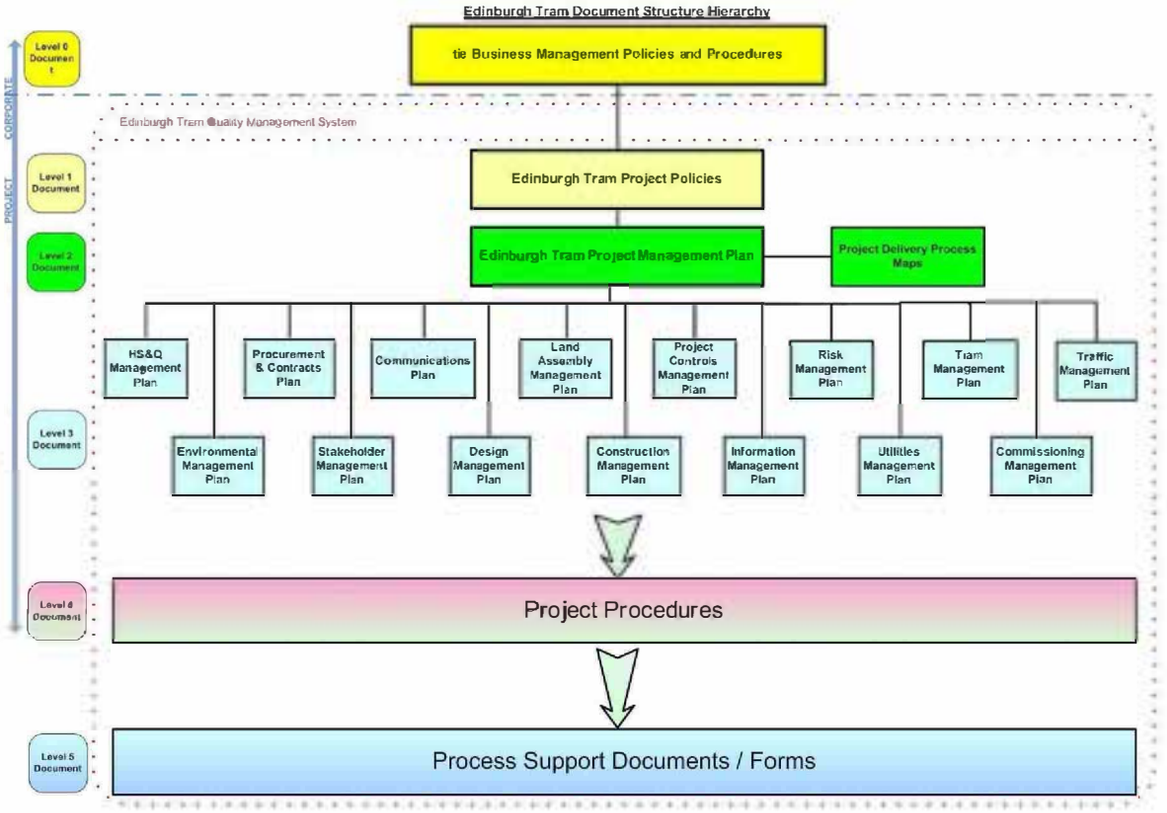
8.91 The PMP is the working tool for all involved in the project to ensure that that the project is being managed professionally, effectively, efficiently and consistently throughout the life of the project. It sets out the project organisation and governance, the roles and responsibilities of all project team members and the way team members will work together and communicate with each other. It also describes what documentation, processes and systems have been developed and adopted by the project and why.

8.92 The PMP is supported by detailed, inter-related procedures for the individual management functions which provide in depth control over each area, taking full cognisance of the complexity of the ETN. These are all documented and monitored using a sophisticated

information management system and they are reviewed at regular intervals to ensure they meet the specific requirements of each of the phases of the project.

8.93 Figure 8.1 demonstrates and explain the hierarchy for the policies, procedures and controls underlying **tie's** project management methodology.

Figure 8.1. ETP policy, procedure and controls hierarchy



8.94 Key processes and controls by which **tie** manages the successful implementation of the tram project are outlined below.

Project planning process

8.95 **tie**, along with its contractors, have developed an overall Master Project Programme. This master programme will fully reflect the agreed programme of construction from the Infraco. Each contractor is responsible for ensuring that services and works are organised and programmed to meet the overall requirements of the Master Project Programme. The programme is constantly monitored against predetermined project milestones that are reflected within the Master Project Programme. The purpose of linking all tasks to the programme ensures visibility to **tie** and individual contractors that the critical path is both defined and adhered to. Meeting the agreed programme dates is the responsibility of the Infraco, and the contractual payment mechanisms and incentivisation for Infraco places the risk firmly with the private sector, subject to pre-agreed contractual carve outs as described in section 7.

Cost management

8.96 Cost estimates which are fully aligned to the Master Programme, are developed to detailed workstream level, enabling the effective management of costs throughout the project lifecycle. These project cost estimates were and continue to be reviewed at principle points of the project as described in section 7 and they form the baseline against which the project manages expenditure. Detailed review and reporting of actuals against forecasts takes place on a 4-weekly basis through the defined governance structure for the project.

Risk management

8.97 Project risks are identified and their mitigation is managed in accordance with predetermined agreed risk management procedure. The approach to risk management allows **tie** to:

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

Human resource plan

8.98 The people strategy enshrined in the Human Resource (HR) plan underpins the PMP. **tie** will organise itself to ensure delivery of the requirements by the successful Infraco contractor and will do so by employing a philosophy for trams that will be one of "inspection not expectation". In essence, this means that **tie** will have a Tram Delivery team, resources and capability to manage the process required for good project and cost control and undertake sufficient inspection of what is being delivered. This will provide assurance to **tie**, and confidence in the end product delivery and quality to **tie**'s client and key stakeholders; TEL, CEC, TS and the Scottish Government.

Construction management plan

8.99 **tie** have developed a Construction Management Plan which will deliver the construction, testing and commissioning phases safely, within budget and programme and to the desired quality whilst minimising the disruption to the people of Edinburgh. The plan outlines the processes that **tie** will follow during the construction phase, detailing key responsibilities (proactive and reactive), performance indicators, tasks and deliverables.

8.100 Under the plan, **tie** is responsible for all aspects of audit, inspection, monitoring, measuring and checking against design, method statements, specifications, programme, regulations and applicable standards prior to signing off a test and commissioning certificate to the works.

8.101 The plan outlines and details, scope, responsibilities and tools required to deliver the project, and what the specific deliverables are throughout the lifecycle of the construction phase, from tender preparation and evaluation, through to construction, commissioning and finally project completion. Procedures have been determined and implemented to ensure that 'best industry practice' is followed at all times in order to ensure that the works that **tie** has procured, are of sufficient quality and standard to be fit for purpose and have been delivered to a standard and completeness, ensuring that the work has been satisfactorily completed to client specifications.

Health, safety, quality and environmental management

8.102 The health and safety and quality management plan has been developed to document how the project team manage health and safety and quality management on the ETP. The objective of the plan is to outline the overall strategy for health and safety and quality management and to provide adequate guidance from **tie**'s perspective to all those that require to work with the project team on the ETP.

8.103 The environmental management plan has been developed to achieve the overall Project Management Plan's environmental objective (to ensure that the ETP is designed, constructed and set to work with minimum environmental impact) within the timeframe specified by the Master Schedule. **tie** is committed to the provision of sustainable urban transport and reducing the impact of its activities on the environment. Accordingly, **tie** is implementing an

ISO 14001 Environmental Management System to continually improve its environmental performance both at its offices and in its various projects.

8.104 Both plans envisage a proactive approach to the review, monitoring, audit and improvement of contractors' health, safety, quality and environmental management systems and detailed implementation plans, in order to provide reasonable assurance to **tie**'s stakeholders that contractors are discharging their contractual obligations and achieve compliance with legal requirements.

Traffic management

8.105 The measures that will be implemented in the traffic management strategy, as described above (8.21-8.36), will cause some disruption to the people of Edinburgh and its visitors during the construction period. However, the project team is committed to carrying out the works in a way which minimises disruption. All roadworks and closures will be signposted and alternative routes will be advertised. Bus services will continue to operate and stops affected will be temporarily relocated. Alternative loading arrangements will be provided so as to ensure that affected streets remain open for business in as near as normal way as possible.

8.106 As well as avoiding busy times of the year (the Festival, Christmas etc.), works on any road section will be limited to 200m on one side of the road only. It is not currently anticipated that any roads or junctions will be closed and weekend work may be carried out at key junctions to minimise disruption.

Wide area impacts

8.107 The finalisation of traffic modelling will include any necessary changes to wider area traffic arrangements that are indicated as being beneficial to the public. Traffic modelling work is currently underway to inform the TROs required for the tram scheme, and this includes an analysis of the extent and implications of road traffic displaced from the tram route corridor as a result of the scheme.

8.108 Emerging results from the High Level VISUM traffic model (which covers the full extent of the city) indicate that whilst there will be a significant reduction in traffic volumes at key locations along the tram route, this traffic will be dispersed and diluted over a wide area, rather than being concentrated at one or two off-line junctions. Several locations where some form of intervention to improve the flow of traffic through off-line junctions, have been identified, and the final design will incorporate capacity improvements as necessary and these will be included within the definition of the TRO measures.

Public Realm

8.109 Tram design will be carried out in a way which allows future Public Realm improvements without affecting the operations of the tram. Initially, Leith Walk has been proposed as the priority for initial Public Realm improvements with the limited funds that will be available in the period to April 2010. Leith Walk is the focus of a vibrant community and commercial activity with a number of key conservation areas abutting the route. It is the principal linking route between the city centre and Leith, together with the new waterfront developments. As well as one of the most significant tram interchanges being located here, Leith Walk passes through, and connects, a number of spaces of great local importance, including the Foot of the Walk.

Test and commissioning management

8.110 As part of the design process, a test plan is developing in parallel, which will be implemented after construction has been completed. The purpose of the tests will be to verify that the requirements and functionality of the design have been successfully delivered. Testing will take place in a series of levels; factory acceptance tests (FAT's) prior to equipment delivery to site, site acceptance tests (SAT's) when equipment is installed, or delivered on site in the case of the trams, and type testing in respect of the first tram delivered to site before systems level testing commences.

8.111 The systems level testing commences with the energisation of the tram depot, followed by the commissioning of the section of line between the depot and the airport stop, before the full completion of Phase 1a to Newhaven. Training of the operational staff will be synchronised with these stages, firstly in the depot, then off-road and finally on-road driving. The control room staff will be trained and gain familiarisation in parallel.

8.112 It is likely that elements such as traffic signal timings and sequencing will need to be optimised during the testing to achieve the balance between tram runtime through junctions and impacts to other road users.

8.113 When the system testing achieves a certain stage, a three-month shadow running period will commence, during which a system performance demonstration test will be performed. This period allows for the operational and maintenance staff to become familiar with the system prior to commencement of operations, as well as the opportunity to practice emergency drills with and without the emergency services and failure recovery procedures.

Operational management

8.114 Throughout the development of the project, TEL will, in conjunction with the operator, the maintainers and CEC, mobilise their operational organisations to gain familiarisation and ownership of the Edinburgh Tram system assets. The start of shadow running will mark the transition of responsibility to the operational management regime, easing into the commencement of passenger operation at a lower level frequency of tram service which will be increased progressively as demand and familiarisation of the public and staff grows.

Ingliston Park and Ride

8.115 During the construction period there will potentially be a greater demand for the existing Park and Ride facility at Ingliston. The planned extension, in anticipation of tram operations, will be completed by April 2008. This will enable up to 1,315 vehicles to be parked, reducing congestion and disruption caused by the construction of the tram.

Stakeholder communication strategy

8.116 The communications strategy ensures that communication is ingrained into the project and that communication opportunities are identified. A detailed communication strategy was approved as integral part of the DFBC and, where applicable, has been implemented throughout 2007.

8.117 Given the size and complexity of the project, the communication management process must be suitably flexible to respond to any changes throughout the project lifecycle whilst maintaining core functionality, robustness and reasonable assessment of all identified project communications. It follows that, as the project progresses, this plan will be revised, where necessary, to reflect the present and future needs of the project at any particular time. The most recently revised strategy can be found at Appendix IV.

Open for Business

8.118 To support businesses affected by the tram construction works, **tie** will be producing advertising and marketing material to help ensure that the 'Open for Business' message is communicated clearly. Part of this programme is to ensure that information on construction works, including details on any diversions and road closures, is freely available to the public and businesses. This is communicated through face to face meetings, media, advertising, telephone helplines and the internet.

Business compensation

8.119 As part of the package available to support businesses affected by the construction works of the tram, a compensation package has been developed. This scheme has been put in place

to help mitigate the effect of the tram construction works on small businesses through the provision of a mechanism to give additional financial help to affected small businesses.

8.120 The scheme will be distributed in two ways:

i. The Primary Support element – available to all small businesses based on turnover criteria; and
ii. The enhanced support element – available to businesses operating in construction 'hot-spots'.

9. Operational plan

9.1 As an integral part of the preparation of the DFBC, TEL prepared a Strategic Business Plan which details the Company's objectives, its modus operandi, its relationship with CEC and **tie**. It analyses the opportunities and threats TEL will face in operating an integrated tram and bus business.

9.2 For the DFBC, sensitivity testing was undertaken to assess the impact of EARL on TEL's patronage and revenue forecasts. These confirmed the premise that EARL and tram would serve different patronage markets and that, although without EARL, tram would gain some small market share, overall TEL revenues are net neutral as the absence of EARL results in an overall smaller public transport market within Edinburgh. Therefore this section has not been updated for the detailed impact of no-EARL.

9.3 The work undertaken for the DFBC also identified separately the impacts of operating Phase 1a of the tram without Phase 1b in terms of passengers and revenue. This data forms the basis for this section.

9.4 As part of the preparation of this FBCv2, a review of the key assumptions and projections for the TEL Business Plan was undertaken. This review confirmed that the outputs from the previous work remained valid and there were no indications of external events with a negative impact on the TEL forecasts. This Business Plan is under constant review and will be updated in due course.

9.5 At the core of the TEL Business Plan is an assessment of how TEL will integrate the tram into its operations and a detailed assessment of TEL's prospective revenues and profitability operating with Phase 1a of the tram in place. This analysis is firmly grounded in TEL's involvement in the development of prospective integrated service patterns for tram and bus for the JRC models and validation of the patronage and revenue projections which have flowed from the modelling process. What follows is a summary of the TEL Business Plan included at Appendix I.

Rationale for TEL

9.6 Experience gained from a wide range of tram schemes has shown that integration with other modes of public transport, particularly bus, will greatly contribute to the success of trams as part of an integrated transport network. The principal bus operator in Edinburgh is Lothian Buses (LB), which is wholly owned by the public sector and 91% owned by CEC. LB's operations are currently very successful, holding a share of approximately 85% of Edinburgh bus patronage and having experienced patronage growth of more than 25% since 1998.

9.7 CEC has charged TEL with the delivery and management of an integrated bus / tram network that optimises service provision while maximising operational synergies. With the establishment of TEL, CEC are implementing their commitment to continuing to provide first class public transport in Edinburgh.

9.8 The approach to integration of the key local public transport modes, bus and tram, sets Edinburgh apart from other UK tram schemes. The integration of high quality bus and tram services will improve the attractiveness of the combined network to something greater than the sum of its constituent parts. The levels of demand projected by the JRC transport model (an increase of **61**% (1.8% p.a.) between 2005 and 2031) indicate a significant profit potential for TEL operating with Phase 1a of the tram. This places TEL in a unique position of strength to capture and provide for the predicted overall growth in the travel market.

Financial forecast highlights

9.9 Table 9.1 provides a summary of the financial highlights from the forecast of TEL's profitability operating with bus and tram. This summary reflects the following:

- The overall operational cash flow profile will be positive once the tram and bus patronage has stabilised after a "ramp-up" period. On this basis the requirement to demonstrate that, over time, the integrated service will not require subsidy has been fulfilled;
- The financial forecast reflects the increase in pension contributions required to meet the recommendations contained in the 2006 actuarial valuation of the LB pension scheme. This has the effect of eliminating the £20m net deficit and predicted future service costs and is unrelated to the introduction of the tram; and
- The financial forecast includes taxation on forecast profits calculated at the prevailing rate of corporation tax. However, TEL will continue to examine opportunities for tax efficient cash flow planning.

Table 9.1. TEL profitability with Phase 1a of tram (All £ figures inflated).

	Pre-tram		Phase 1a Only				
Tram in service							
Tram service pattern	n/a	n/a	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2012	2016	2021	2031
Patronage (m Pax)							
Bus	108	117	113	115	125	133	150
Tram	-	-	11	13	19	21	25
Total TEL Patronage	108	117	124	128	144	154	175
Total TEL Revenues	88	109	119	128	167	216	356
Total TEL operating costs			120	126	156	194	312
Pre-tax operating profit / (loss)			(1)	2	11	22	44
Tram lifecycle costs			-	-	1	2	2
Notional taxation			-	-	3	6	12
Dividend payment			-	-	3	3	5
Net TEL cash surplus / (deficit)			(1)	1	4	10	25

9.10 Table 9.1 reflects that following an initial period of tram patronage build up, the TEL business as a whole will be profitable after one year of tram operations and will thereafter experience significant growth in profits. The forecast has been developed using the patronage forecast for both tram and bus developed under the JRC contract. The key assumptions used to develop this forecast with respect to fares strategy and the development of cost estimates are detailed throughout this section.

9.11 The forecast of patronage and revenues presented above remains very sensitive to the quantum and timing of new development in North and West Edinburgh, as detailed in section 4. The sensitivity of the forecast to this and other factors is considered at 9.104 below.

TEL's objectives

9.12 The public sector ownership of TEL presents opportunities and challenges that are different to most public transport organisations. In particular, its ownership structure provides a unique opportunity, in the UK context, of delivering a truly integrated tram and bus network, such as has not been achieved in other UK tram schemes. Although achieving profitable operations and payment of dividends are key objectives, profit maximisation is not the primary objective. The majority shareholder, CEC, seeks a 'social dividend' in terms of fare and network / service strategies. CEC requires TEL to maintain lower fares and a more comprehensive level of service provision than would normally be the case for a transport operator seeking to maximise profit

9.13 CEC promotes alignment of TEL's corporate objective to return sufficient post-tax profits to meet its investment and dividend obligations, with CEC's planning objectives and the Government's five key objectives for transport as detailed in the STAG2 report at Appendix II. These can be broadly summarised as:

- To support the local economy by improving accessibility;
- To promote sustainability and reduce environmental damage caused by traffic;
- To reduce traffic congestion and encourage mode shift;
- To make the transport system safer and more secure; and
- To promote social benefits.

9.14 The future challenge for TEL is to integrate the tram into its business in a manner which maintains long-term profitability, thereby allowing the economic, environmental, development and urban regeneration, social inclusion and transport objectives of the tram scheme to be achieved. The measure of success for TEL will be the overall performance in commercial, social, customer and financial terms of the integrated bus and tram network.

Parameters under which TEL operates

9.15 The statutory parameters under which TEL will operate are prescribed by the Transport Act 1985. TEL will carefully monitor any developments in the regulatory and legislative environment between now and 2011 which could impact on LB's (and thus TEL's) market position. TEL, with its integrated bus / tram system and public ownership, is be in a unique position to mitigate the risks or maximise the opportunities arising from such regulation.

9.16 Fares and route planning are currently determined by LB with reference to its financial targets and the 'social dividend' objectives outlined above. TEL will continue this approach in the form of integrated ticketing for bus and tram under a common fare structure. With the introduction of the tram, TEL will carefully consider the varying requirements of its patronage base, bearing in mind the specific customer service responsibilities which flow from the high level of public transport demand experienced in Edinburgh to date and forecast for the future. The JRC modelling output predicts that 79% of year 1 (2011) tram passengers will have transferred from existing public transport, predominantly LB, with the remaining 21% being new to public transport, transferring predominantly from car. To meet this requirement, service integration plans have been developed and the structure created for bus and tram to operate within a single economic entity in which both modes play complementary roles.

9.17 Building on LB's current market position, the common control of LB and tram means TEL will hold a majority share of the public transport market in Edinburgh. This provides a solid basis for capturing significant portions of the projected demand increases. The JRC modelling suggests that, in a non-regulated market, the proposed bus / tram service integration plan limits opportunity for a commercially viable competitive challenge. LB services in the period prior to the introduction of tram and the envisaged TEL bus and tram services thereafter will be continuously reviewed and optimised to meet emerging demand and passenger requirements. This is especially so in light of the significant growth projected to arise from West Edinburgh and the airport and development areas in Leith Docks, Western Harbour and potentially Granton Waterfront if Phase 1b is built.

TEL governance structure and operational arrangements with CEC

9.18 Governance and operational arrangements for TEL have evolved since its inception in 2005. The process is driven by the desire to establish a strong leadership function for TEL and the need to clarify and codify the roles of the principal parties involved in the development of the tram project (CEC, TS, TEL, **tie** and LB). Details of how governance will evolve during the phases of the project are detailed in section 6 of this FBCv2.

9.19 TEL has appointed a Board of Directors including two independent non-executives (including the Chairman). The Chief Executive of LB has been appointed as Chief Executive of TEL. The governance structure of the Tram project has now been amended, such that TEL has

clear accountability for planning and implementing the integrated transport business with tie (advised by Transdev) charged with delivery of the tram project. The central forum of project governance is the TPB on which TEL directors sit alongside representatives of CEC. This structure has been implemented such that clear and full accountability to the Council as Promoter of the tram project and majority owner of LBs is sustained.

9.20 The role of the TEL Board is focused on its statutory stewardship function and its overall responsibility to deliver an integrated public transport network for Edinburgh. In this role, the board has fiduciary duties to its shareholders and stakeholders with clearly defined responsibilities to fulfil these. They include matters relating to board membership, statutory reporting, internal controls, health and safety, and oversight and management of operational risks.

9.21 The operational relationship between TEL and CEC will be governed by an operating agreement between these two parties. The focus of this agreement will be the continued cooperation of CEC and TEL to further the integration of bus and tram services. It will emphasise the need for TEL to act commercially within the framework of its public ownership and sets out the parameters for CEC's support to TEL in terms of policy implementation.

Patronage targets

9.22 Public transport patronage is the key driver for TEL's revenue forecasts. The projected patronage is fundamentally dependent on growth in the existing public transport market and the assumptions about future residential and commercial developments at key regeneration sites in Edinburgh. In addition, certain aspects of the service provision that affect the transport experience of the travelling public will also impact on the levels of patronage that can be achieved.

9.23 Significant residential and commercial development is planned at key sites in North and West Edinburgh. Assumptions about scale and rate of these developments, developed in consultation with CEC, underpin the JRC model, which allocates the resulting travel demand to the most appropriate mode of transport. Based on this allocation, forecasts for TEL patronage were estimated. Using the geographical analysis of where this forecast demand is likely to originate / terminate, TEL has developed a flexible service integration plan, reflecting planned tram services and bus services beyond the introduction of the tram.

9.24 The patronage forecasts have been reviewed, in light of historic public transport patronage growth, and an economic assessment of the uptake of planned developments. The starting position for the patronage projections has been validated against LB's recent experience which has been consistently above 2% growth per annum.

9.25 The JRC's forecasts for the period 2011 to 2021 reflect demand arising from planned developments, as per the CEC Structure Plan. The assumptions for the phasing of this new development have been reviewed by independent commercial property advisors. The CEC Structure Plan covers the period to 2021. The period from 2022 to 2031 is based on an assumed growth rate of 2% pa, which is in line with LB's historical experience and with a reasonable expectation of future economic growth for the city as validated by Scottish Government economists. Given the inherent uncertainty of growth in demand, especially with a relatively distant planning horizon, the TEL Business Plan assumes 1.5% per annum growth in patronage from 2031 to 2041. However, recent experience of economic growth in Edinburgh and actual experience of LB passenger growth shows these assumptions to be conservative.

9.26 Table 9.2 summarises the projected TEL patronage levels for key years.

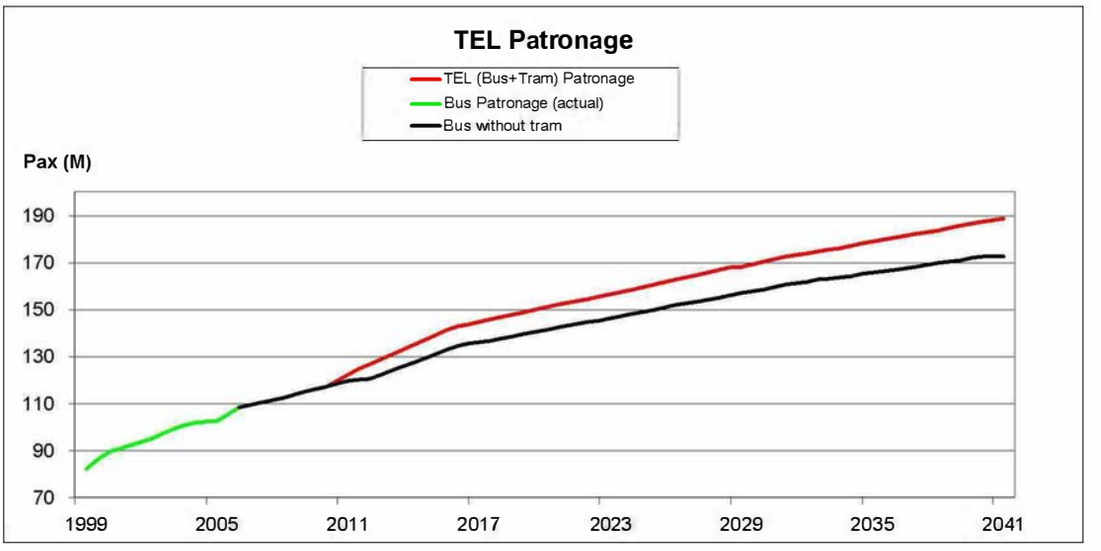
Table 9.2. TEL patronage projections with Phase 1a of tram.

Tram in service	Pre-tram		Phase 1a only				
Tram service pattern	n/a	n/a	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2012	2016	2021	2031
Patronage (Pax m)							
Bus	108	117	113	115	125	133	150
Tram	-	-	11	13	19	21	25

9.27 A considerable proportion of the projected tram patronage is expected to come from those not currently using public transport. In 2011, 21 % of total tram patronage for Phase 1a (rising to 26% in 2031) is anticipated to arise either through mode shift from car or from new trips generated as a result of the improved opportunity to travel. Experience with other UK tram schemes, and more recently Dublin, has shown that such a level of modal shift can reasonably be achieved, even within the context of Edinburgh's already high public transport usage. Mode shift from car is directly linked to reducing congestion and associated environmental benefits, and is one significant benefit associated with the introduction of the tram. TEL's tactical, operational and marketing strategies are all aligned to facilitate achieving the predicted targets for patronage and mode shift.

9.28 Ultimately, the introduction of the tram, and its integration with LB's bus services, will result in greater numbers of passengers than either bus or tram could hope to achieve independently. Figure 9.1 shows the predicted levels of patronage in a "with" and "without" tram future.

Figure 9.1. TEL patronage with and without tram.



Service patterns and interchange

9.29 A key element of the strategy to realise the above patronage forecasts is the implementation of optimised service patterns for both bus and tram and maximising the opportunities for effective interchange between bus and tram and between other modes of transport.

Tram service patterns

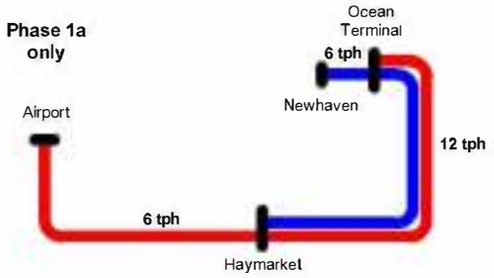
9.30 The tram network will serve major high-volume transport corridors in Edinburgh and thus build upon on existing high levels of public transport usage. Providing sufficient capacity to meet

the demand is vital, especially to ensure overcrowding does not dissuade passengers from using public transport or lead to longer journey times and reduced reliability.

9.31 The planned service patterns for opening of the tram are detailed in section 5. In summary, these services, depicted in Figure 9.2 below, are as follows:

- From opening in 2011, 6tph in each direction between the airport and Leith plus 6tph in each direction between Haymarket and Leith. This will provide 12tph in each direction between Haymarket and Leith.

Figure 9.2. 2011 tram services for Phase1a.



9.32 The demand forecast indicates that, after the initial five years of growth, tram services will require to be increased to provide sufficient capacity, primarily to serve demand on the Leith to Haymarket section. Therefore the TEL Business Plan assumes that from 2016, the 6 / 12tph service patterns above will be increased to 8 / 16tph. A further strengthening is likely to be required after the year 2027 to provide sufficient capacity to serve demand on the Haymarket to Edinburgh Park section of the tram network.

9.33 Being able to identify the routes and frequencies of services necessary to cater for demand is fundamental for TEL's success. The JRC modelling work, in conjunction with the service integration plan, provides patronage forecasts for the tram network and for TEL, in terms of geographical area and peak / off-peak requirements. This allows the tram and bus service plans to be validated and adjusted to ensure sufficient capacity is provided at an affordable level throughout the network.

9.34 The first and last tram services and initial frequencies for 6 and 12tph are based on the following assumptions and conditions;

- The provision of a total of 12tph in 2011 is required during the daytime to match demand on Leith Walk;
- Short workings between Edinburgh Airport and St. Andrew Square are dependent on the ability to turn trams at York Place. The precise location and feasibility of the turnback is currently under review;
- Service proposals are based on the requirement of always having a tram present at the airport; and
- Operating hours for the tram result in a maximum overnight servicing window of 3hrs 45min. Future demand on the early and late services will be reviewed to allow greater optimisation of this service window.

Bus service patterns

9.35 Full details of the planned bus service patterns operating in an integrated manner with Phase 1a of the tram are provided in the TEL Business Plan at Appendix I. Where the tram runs parallel, or close to, an existing bus route, amendments are envisaged to bus services to prevent unnecessary overlap of services. Where the tram route follows a different alignment, with no bus routes running parallel, or in close proximity, no reductions are anticipated. The principle being that bus service reductions are only applied where the tram offers an acceptable alternative level of travel. This approach allows TEL to match the most effective

mode of transport to levels of demand and avoid competition between bus and tram, while the travelling public continues to benefit from high quality public transport provision.

9.36 Key areas where bus services are planned to change are:

- Foot of Leith Walk to St Andrew Square –significant reduction planned. However, services are retained to cater for those passengers for whom interchanging and the greater distance to the tram stop pose a deterrent to using public transport;
- St. Andrew Square to Haymarket – limited reductions as the tram route does not offer an alternative to most cross-city links provided by bus;
- Haymarket to airport – significant reduction on Airlink although some service will be retained for the intermediate stops not served by tram; and
- Saughton to Broomhouse, including Fastlink section – some frequency reduction, while maintaining services where no tram in parallel or stop is too far to walk.

Interchange between bus and tram

9.37 In order to achieve TEL's objective of providing a truly integrated public transport system a small number of bus / tram interchanges are essential. It is TEL's aim to protect its patronage by offering as near seamless a journey through the network as possible. By minimising the requirement for interchange for the maximum number of passengers making short to medium length journeys, the inconvenience of interchanging where necessary, will be eliminated. Further, the integration plan for bus and tram seeks to achieve optimal alignment of service patterns at interchanges making interchanging as simple as possible. This will ensure that entry to, and use of, the TEL network is as easy and convenient as possible and the risk of loss of patronage is minimised.

9.38 The design of first class interchange facilities is critical to minimising any potential negative impact of interchange. The JRC has analysed the sensitivity of the patronage and revenue targets to the provision of effective bus / tram interchange (in 2005 prices). It is forecast that the impact of optimising the interchanges can improve revenue by approximately £0.5m in 2011, rising to £1.1m by 2031. The following locations have been identified as requiring first class interchange to allow TEL to meet these aims:

- Foot of Leith Walk – Key to allow the curtailment of buses from Great Junction Street or Duke Street; and
- St Andrew Square – Required to accommodate buses reaching the city centre from points west and south of the West End.

Interchange between air travel and TEL services

9.39 Edinburgh Airport provides the opportunity for interchange for passengers arriving and departing by air with local public transport. Tram, together with a reduced frequency Airlink bus, will provide air passengers with a first rate option for travelling to and from the city centre, promoting a favourable first impression of Edinburgh. Further, enhancing the option to use public transport to and from the airport reduces the reliance of air passengers on taxi and private car travel.

Interchange between heavy rail and TEL services

9.40 Facilitating easy interchanges between heavy rail with bus and tram supports national and local objectives of reducing the reliance on private car travel. Rail patronage has increased significantly over the last few years, which offers a great opportunity for TEL to increase revenues by providing onwards travel to rail passengers. Key opportunities for integration between heavy rail and bus / tram are:

- Haymarket;
- Edinburgh Park;
- Princes Street / Waverley; and

- A future potential for an interchange at Gogar for Edinburgh Airport, (not part of this Business Case).

9.41 In the absence of EARL, a proposal may be developed be developed to link heavy rail with tram at an additional stop at Gogar, confirming trams strategic position as the fixed rail link to Edinburgh Airport and providing additional interchange opportunities for people travelling from wider areas in Scotland.

Park and Ride

9.42 Interchanges between private car and bus / tram are vital to the patronage and revenue projections for TEL, especially in terms of modal shift. With the right facilities, park and ride can offer an attractive alternative to bringing cars into the city. Such facilities include information provision, public safety features and comfortable customer amenities, as well as frequent and reliable public transport services to and from the sites. All new park and ride sites in Edinburgh (existing or planned) will feature high quality facilities which support the current positive achievements and future success expectations.

9.43 Key park and ride sites for TEL services are currently located at Hermiston and Ingliston. These sites are ideally situated to cater for cars travelling to Edinburgh from West Lothian, where significant residential growth it predicted. There is also an interchange between private car, rail and bus at Newcraighall, managed and maintained by ScotRail and CEC, and additional park and ride sites are under development at Sheriffhall (opening December 2007) and Straiton (opening late 2008). CEC are currently assessing the opportunities for additional potential park and ride sides, particularly at Hermiston Gait Retail Park and Saughton House. Further potential sites are also under investigation.

Information provision

9.44 Integrated transport needs integrated information; the right information, provided at the right time, by the most appropriate means, putting the needs of the user first. TEL will ensure that the information it makes available to the public results in reliable and straightforward travelling experiences. Well presented information is of essential value to transport users – it helps them to complete their journey efficiently and in greater comfort. Well informed customers will ultimately lead to increased patronage and revenues.

9.45 Multi-operator information is provided by telephone and internet through Traveline, the national travel information system. TEL will also maintain its own in-house telephone and web-based information services. LB existing travel shops will provide information, not only on TEL products and services but, on One-ticket and services provided by other public transport providers. Further opportunities for the combination of road-side information in the form of real time information, passenger information displays and other information at stops are reviewed at the regular integration meetings with public transport providers in Edinburgh, ensuring that any future benefits that may arise from a more integrated approach are captured.

Integrated ticketing with other operators

9.46 TEL is committed to promote wider use of public transport within Edinburgh, a key to which is integration with other operators. Aside from TEL's fare and ticketing strategy for 'red buses' and 'red trams', a number of product offerings exists to facilitate integration of public transport throughout Edinburgh, and across Scotland. Key ticket products offering an element of integration are:

- One-Ticket – South-East Scotland region-wide ticket offering travel on FirstBus, TEL, Stagecoach, most smaller bus operators and on rail services; and
- Plus Bus and Tram – Rail+Bus ticket currently available from any UK rail station, combining special rail tickets to / from Edinburgh with unlimited travel on TEL services on day of validity.

3rd party responses

9.47 Good relations between TEL and 3rd party operators are considered essential. Integration with 3rd party operators will offer potential opportunities for TEL if the combined network is perceived by the public as part of a wider public transport provision within Scotland.

Revenue targets

9.48 TEL's target revenue levels are directly correlated to the outputs from the JRC model in terms of patronage on TEL services. JRC have prepared revenue forecasts based on the current yield per passenger being achieved by Lothian Buses, discounted to take account of an increased risk of fare evasion on trams (compared to buses) and inflated in accordance with the principles of TEL's fare and ticketing strategy, as explained below. The fares underlying the yield calculation are based on a flat fare structure; the same fare applies regardless of the distance travelled. A pro-active management of the revenue yield per passenger will provide further opportunities for increased profitability for TEL in the future. Table 9.3 summarises projected TEL revenue levels for key years.

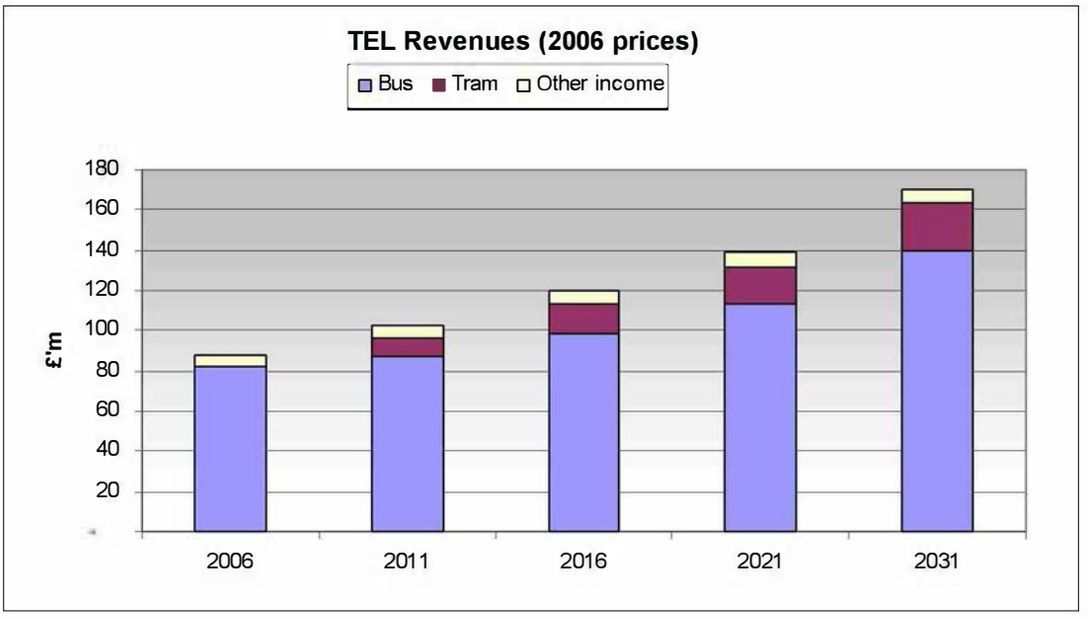
Table 9.3. TEL revenue projections with Phase 1a of tram (All figures inflated).

Tram in service	Pre-tram						
Tram service pattern (see below for explanation)	n/a	n/a	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2012	2016	2021	2031
Patronage (Pax m)							
Bus	108	117	113	115	125	133	150
Tram	-	-	11	13	19	21	25
Total TEL Patronage	108	117	124	128	144	154	175
Revenues and costs (£m)							
TEL Revenues	88	109	119	128	167	216	356
TEL operating costs			120	126	156	194	312
Pre-tax operating profit / (loss)			(1)	2	11	22	44
Tram lifecycle costs			-	-	1	2	2
Notional taxation			-	1	3	6	12
Dividend payment			-	-	3	3	5
Net TEL cash surplus / (deficit)			(1)	1	4	10	25

NB All £ figures inflated

9.49 The forecast patronage and revenues for 2011 to 2014 have been reduced to take account of a ramp-up period, as it is common practice to assume that new services will take some time to be fully adopted by users. However, it may be expected that a significant proportion of the forecast patronage discounted in the ramp-up adjustment would otherwise travel by bus. Therefore, the effect of ramp-up on tram revenues may be slightly understating the potential total TEL revenues during those years. Figure 9.3 outlines how revenue contributions from tram increase in total over time as well as in percentage terms of the total TEL revenue.

Figure 9.3. TEL revenues with Phase 1a of tram (2006 prices).



Fares and ticketing strategy

9.50 TEL's fare and ticketing strategy is driven by its objective to achieve a balance between the attractiveness of price, flexibility and simplicity of use. This planned degree of integration between tram and bus is rare in the UK, outside London, and the exceptional experience it offers will further enhance the public transport image in Edinburgh.

9.51 TEL will set fares at a level necessary to allow it to cover network operating and lifecycle costs and pay any required dividends to shareholders. The fare structure will be a single, fully integrated, flat fare, regardless of the distance travelled (with the exception of journeys to and from the airport and night services) and will be common to both bus and tram. The principles of the existing LBs fares structure, which will migrate to form the TEL combined network fare structure are:

- Child, adult and concessionary travel categories;
- Fares products paid for at time of travel, pre-purchased from pavement mounted ticket machines or Ridacards purchased in advance; and
- Premium fares levied for journeys when the value of service provided is discernibly higher, or the cost of service provision is discernibly greater.

9.52 The yield per journey resulting from this fare structure forms the basis of the revenue projections for TEL. The yield will be managed by TEL to achieve revenue targets based on patronage projections and the current assumption is that the average yield for TEL will be increased at the rate of the RPI +1% growth per annum, which translates into average annual fare increases of no more than RPI + 1%. This is in line with historical increases in fares by LB, meets political and stakeholder expectations, and supports TEL's aim to provide transport services at an affordable price. The impact on individual fares will vary year on year due to necessary considerations of public demand of specific tickets, practicality of applying specific fare increases, and the history of increases on a particular ticket product.

9.53 TEL's ticketing strategy is based on the principle of providing services through a single ticketing system, where all tickets are fully inter-operable on TEL bus and tram. This means no additional costs of travel arise from any interchange between bus and tram, or vice-versa, and will enhance the perception of a fully integrated transport network. Tram tickets are intended to be purchased off-board primarily and ticket machines will be provided at all trams stops and a number of bus stops. The only tickets to be sold on-tram by the inspectors are to

be adult and child single tickets which will be priced at a premium above the price from ticket vending machines.

9.54 The ticket machines themselves are based on a parking meter style, which are simple to use and have been shown to be very reliable and possess high resilience to vandalism. Initial ticket machines are currently being trialled for bus tickets. Reliable ticket machines are essential for TEL to promote customer confidence and to the principle of enforcing on-board premium fares. Administration of the ticketing system, including collection, counting and banking of the revenue is part of TEL's forecast overhead costs.

9.55 LB current ticketing strategy encourages wide use of pre-paid and / or multi-journey types of tickets, by offering discounts to the standard fare, and TEL is committed to continue and further enhance this approach. Advance payment for ticketing products has benefits from a financial perspective (income is secured, risk of fare evasion / ticket fraud is reduced), whilst improving customer loyalty and delivering operational benefits, such as reduced boarding times.

9.56 It is a fundamental assumption that TEL bus and tram will both participate in the national concessionary ticketing scheme. The relevant agreement has not yet been finalised, although TS have given support for this assumption in the preparation of the TEL Business Plan. Under the terms of the scheme, operators receive payment of 73.6% of the price of an adult single for each journey by concessionary travel holders and this currently applies to c20% of LB patronage. This level of recompense is assumed to continue.

9.57 LB currently participates in multi-operator ticketing schemes 'PlusBus' and 'One-Ticket'. These products encourage greater use of public transport through ticket integration across a number of operators and modes (bus and rail). The TEL Business Plan assumes that both products will be expanded to include tram in due course and the current level of recompense received by LB will be receivable by TEL.

Revenue protection

9.58 In devising a revenue protection strategy, TEL aims to achieve a balance between attractiveness of price, flexibility and simplicity of use. Applying a strict and consistent fare enforcement policy will allow TEL to provide a safe, secure, positive and equitable travelling environment, encouraging increased patronage through modal shift and minimising the revenue loss arising from fare evasion.

9.59 Fare evasion and fraud on the existing LB network has been limited following the decision to remove centre doors from buses, the introduction of smartcard period tickets, the simplification to a flat fare, regardless of journey length, and the elimination of cash handling by all but Airlink drivers and travel shops. Trams, with multi-door boarding, require active processes in place to limit the opportunity for fare evasion, and fraud in general, as well as the particular need to enforce the premium airport fare.

9.60 The principal elements of the revenue protection regime which will be adopted by TEL for the trams, is a combination of placing inspectors on each tram and providing ticket machines at all tram stops, with a significant price incentive to buy a ticket off-tram. This provides the advantage of achieving a high level of ticket compliance, supported by the necessary infrastructure for providing passengers with both the opportunity, and financial incentive, to pay before boarding the tram.

9.61 In addition to the quantified benefit associated with ticket inspection, the presence of a member of staff on board has been shown to promote a sense of security for passengers and be an effective deterrent to anti-social behaviour. The additional costs of providing inspectors on all trams is therefore off-set, not just by increased revenues, but also by reduced costs for graffiti / vandalism damage repairs and increased patronage, due to a heightened sense of

security in passengers. The revenues reflected in the TEL Business Plan have been adjusted to reflect an assumed 3% fare evasion rate.

Other income opportunities

9.62 The experience of LB and other UK transport operators, including existing UK tram schemes, is that attractive additional income may be derived from other activities in addition to patronage driven revenues. TEL with its combined bus / tram network offers attractive opportunities to generate additional revenues in the following categories:

- Advertising;
- Small scale commercial development; and
- Marketing and tourism driven revenues.

9.63 A key target for the tram and TEL is to achieve modal shift away from cars through the provision of an efficient, affordable and high quality public transport system. A system which takes account of the demands of its users will stand a better chance of being successful. TEL will assess any opportunities for other income sources, being mindful of the added customer service benefits they may provide. In pursuing these opportunities, it is recognised that TEL's first and foremost purpose is to provide public transport services and, as such, TEL will only engage in activities which are complementary to its core-activities. Consequently, operational requirements for all activities are limited and carry minimal operational risks.

9.64 The financial projections in the TEL Business Plan include a prudent assessment of the income which might be earned from these additional sources, based primarily upon the existing experience of LB.

Benefits realisation plan

9.65 The benefits realisation plan is concerned with the way TEL will contribute towards realising both the financial and wider benefits associated with the introduction of tram, where TEL is able to exert an influence. TEL's corporate focus is determined by its unique ownership structure, as well as by the commercial environment in which it operates. Considering how these benefits can be realised at the planning stage is sound business practice, as it promotes alignment of operational strategies with the goals of the business.

9.66 Many of the benefits associated with the introduction of tram and the establishment of TEL essentially depend on achieving the target patronage levels, particularly through mode shift from car and the generation of new journey opportunities. This is true of the financial and operational benefits, as well as the wider benefits such as social inclusion, support to economic development and environmental benefits as outlined at 9.12.

9.67 Closely aligned to the provisions of the Operational Performance regime below, the benefits realisation plan outlines the strategies and practical measures which TEL will adopt in order to achieve the highest levels of patronage. Specifically, this relates to how TEL will ensure:

- The highest quality of transport offering in terms of frequency, affordability, reliability, cleanliness and comfort;
- Comprehensive geographical accessibility;
- Optimal physical accessibility for all passengers;
- Maximum integration of modes, services, fares and tickets; and
- Enhanced actual security of the TEL public transport network and passengers' perception thereof.

9.68 KPIs will be adopted with which the success of TEL in realising these benefits can be measured. These KPIs will be incorporated into the relevant contracts and operating agreements with service providers to TEL, primarily with Transdev the operator of the trams and with the maintenance providers for the infrastructure and tram vehicles.

9.69 The benefits realisation plan is strongly supported by TEL's strategic marketing, communications and stakeholder management strategies. Effective initiatives in these areas will foster dialogue and, most importantly, ensure that the integrated bus / tram services are understood by the travelling public. The strategic marketing approach will raise and cultivate awareness of the TEL network through advertising and promotional initiatives. These will be combined with targeted communications and stakeholder management activities which will pro-actively engage Edinburgh's public, media and stakeholders at every opportunity. Effective communication will have significant influence over the public perception of the integrated services and will be critical in creating a positive image to assist increasing patronage, particularly from those who are not currently users of public transport.

9.70 TEL will not be a brand visible to the general public. Instead, TEL will be the background legal entity, fulfilling its legal and statutory obligations as a public transport provider whilst all branding, marketing and communications activities will focus on **"Trams for Edinburgh"** and **"Lothian Buses".**

9.71 The approach to strategic marketing and communications builds on the successes of the existing marketing function within LB and the comprehensive and consistent strategies developed by **tie** for media, stakeholder and community engagement. In the period leading up to and post commencement of tram operations, TEL will provide integrated marketing and communications support for both tram and bus to ensure consistency of messages and to maximise synergies.

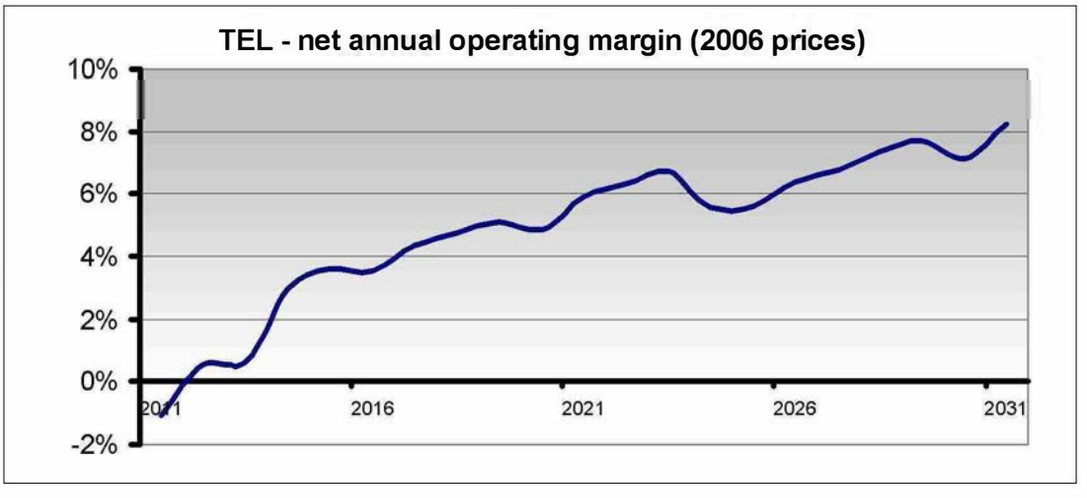
Operational targets and strategies

9.72 TEL's operating cost projections are based on

- The current experience of LB, scaled for the planned future level of bus services with the tram and the number of bus vehicles that will be needed;
- A detailed assessment of tram operating costs based upon the planned service patterns and required number of tram vehicles, validated by Transdev, and subjected to a thorough review and benchmarking process; and
- Updated information from the Infraco and Tramco bidders confirm these cost estimates.

9.73 The forecast combined operating margin for TEL (figure 9.4) reflects the significant opportunity which TEL has to operate as a highly profitable business.

Figure 9.4. TEL annual operating margin with Phase 1a of tram (2006 prices).



Operational performance regime

9.74 Transdev, the future operator of the tram under DPOFA, will operate the tram and, ultimately, will be in day to day control of the quality of service provided to the public. Similarly, the day

to day management of LB will rest with its management team. However, certain elements, such as fare and ticketing strategies, as well as strategic marketing, will be retained by TEL as the overarching body.

9.75 To address performance issues for the tram, the DPOFA contract incorporates a payment mechanism which offers the operator an appropriate risk / reward balance. In summary, the operator will be incentivised under a regime based upon clearly defined and understood KPIs set against the required service specification.

9.76 The reliability and availability of the tram fleet are crucial to provision of the high quality tram service required to encourage modal shift from private car to public transport. Maintenance of the tram vehicles is being procured under a tram maintenance contract which covers vehicle maintenance services and vehicle spare parts. This contract provides that 30% of the annual maintenance services fee is a performance related payment subject to an 85% minimum payment, based on a punctuality and availability monitoring regime.

9.77 An infrastructure maintenance contract is currently being tendered which covers the infrastructure maintenance services, including lifecycle maintenance. Similar to the tram maintenance contract, it provides that 30% of the annual maintenance service fee is at risk based on performance in relation to punctuality and availability. To incentivise the service provider to maintain high presentational standards, an additional 7.5% of the annual maintenance fee is calculated based upon inspectors making qualitative assessments against established criteria, such as cleanliness, display presentation, CCTV functionality, public address and help points. A further 2.5% of the annual maintenance fee is dependent on fault correction times and performance reports being delivered in a timely manner

9.78 Detailed requirements of the operational performance regime are included in the relevant reference bids currently being tendered and are detailed in section 7 of this FBCv2.

Operating costs

9.79 Table 9.4 summarises TEL's projected operating costs with Phase 1 of the tram in operation

Table 9.4. TEL operating cost projections with Phase 1 of tram (2006 prices).

		£m (2006 prices)				
			Phase 1a			
		2006	2011	2016	2021	2031
OPERATING COSTS						
	Bus	68.4	88.4	97.2	105.2	127.7
	Tram	0.0	14.8	15.5	15.9	17.1
	TEL total operating costs	**68.4**	**103.2**	**117.2**	**125.3**	**149.1**
Bus costs / mile		2.76	3.76	4.12	4.29	4.94
Tram costs (equal capacity) / mile		-	4.23	3.82	3.92	4.22
Tram costs (absolute) / mile		-	11.00	9.94	10.19	10.96

9.80 Effective control over all aspects of operating costs is essential for TEL to achieve its profit objectives. However, the public's perception of the quality of services translates directly to patronage and revenue generation. Therefore, TEL must balance opportunities for cost savings against the impact this may have on the quality of services provided.

9.81 Operating cost projections have been developed for TEL's bus and tram operations based on current experience and benchmarked against other schemes. The primary driver for these

estimates has been the capacity required to meet demand, based on the patronage growth projected by the JRC modelling. An iterative review process has allowed TEL to take an overarching view of the projections, avoiding cost duplications in the operational set-up and a number of opportunities for synergies have been identified. The resulting cost projections are a reflection of the integrated system which TEL will operate, and an attempt has been made to merge activities where possible. Areas where significant synergies may be further explored include administration, marketing, cash collection and security, as well as other back office functions.

9.82 The majority of tram operating costs have been estimated by Transdev, based on the cost model prepared for the DPOFA contract. Key operating costs outside the scope of that model, which must paid by TEL, include electricity, insurance and marketing costs. All of the estimates have undergone an iterative process of evaluation, involving input from TEL, and are benchmarked against other schemes to gain a high degree of confidence in their reasonableness. Tram operating costs include an element of regular, annual maintenance of the trams and the infrastructure. The updated information received from the bidders confirms the costs included in the cost estimates for this are conservative.

9.83 Bus operating costs projections are based on LB experience and take into account the requirements of the service integration plan for the introduction of tram, from which reductions in bus services are assumed to flow. Bus patronage is a variable in the cost projections that will flex the with the peak number of bus vehicles, operating hours and miles required to meet demand.

9.84 LB management and administration costs are combined with TEL's overheads and reflect the assumption that most of TEL's corporate management activities will be performed by the current LB head office functions.

Human resources, industrial relations and succession planning

9.85 TEL has created an outline human resource strategy to maintain and develop the bus operating division, to meet the resource requirements of TEL itself and to develop the tram operating division in partnership with Transdev.

9.86 The recruitment plan and terms and conditions are one of the primary drivers of the labour cost contained within the individual tram and bus operating costs. Maintaining and developing good industrial relations is essential to ensure the ongoing success of the TEL business. The TEL Business Plan assumes that recruitment within the bus division can be readily scaled down prior to the introduction of the tram, so that natural staff turn-over will result in appropriate staffing levels.

9.87 The human resources (HR) strategy has further identified a number of areas where inclusion in common training of tram staff with bus staff would be beneficial, from an integration perspective, as well as offering opportunities to secure cost savings.

Safety management and quality assurance

9.88 TEL will implement a SMS to assume its duties in relation to health and safety requirements as the majority owner of LB, and to monitor the health and safety and quality management of the tram operator, Transdev. TEL's responsibilities, with respect to monitoring health and safety management the tram and infrastructure maintenance providers, will depend upon on the final contractual arrangements with those entities, but it is anticipated that the tramway operator will play a pivotal role in determining the safety of the tramway system at all times during the operational phase.

Risk and insurance provision

9.89 Appropriate risk allocation is fundamental to achieving value for money for the tram system. As part of the risk management approach developed by **tie** during the design, construction and commissioning phases of the Tram Project, risks are being allocated to the parties best placed to manage and / or bear them and can be used as a basis to incentivise the private sector to help ensure that CEC's objectives for tram and TEL are met.

9.90 The risk analysis has considered the historical risks affecting light rail schemes, as identified in industry best practice and government guidance. A comprehensive risk management strategy has been developed by **tie**, which will be carried forward during the project phases and into commencement of operations of tram. The aim is to combine approaches to risk analysis and management for the tram and LB, providing TEL with a sound foundation from which to assess and, where possible, mitigate risks to the business.

Capital assets and investment strategy

9.91 The proposed legal ownership structures for the tram assets are quite distinct from the operational use of these assets in the integrated system. Important drivers for the decision on the optimum ownership arrangements are the direct and indirect tax implications during and post construction of tram for TEL, CEC and **tie**. These are balanced with the legal obligations arising from the creation of the tram assets and the subsequent operational implications. Investigations are currently underway to identify opportunities to minimise future tax burdens, while maintaining operational flexibility. The financial projections in the TEL Business Plan assume that corporation tax will be payable at the prevailing rate on TEL's forecast operating surpluses.

9.92 It is intended that ownership of CEC's majority shareholding in LB will transfer to TEL prior to the commencement of tram operations. Upon the transfer of ownership of LB from CEC, TEL will acquire LB assets which consist primarily of passenger vehicles and properties. All of these are fully utilised in the operations of LB business and the day-to-day management of these assets will remain with LB executive management team.

9.93 The assets created during the construction of the tram will not be legally owned by TEL, but remain in the ownership of CEC, at least initially. This includes all compensation paid in respect of land and properties acquired, as well as the tram vehicles and infrastructure assets. In effect, this means that CEC will hold the assets on their books and account for depreciation according to local authority rules, whereas TEL will account for maintenance expenditure as and when it is incurred as part of its ongoing business. Operational management of the assets will lie with TEL and its contractors. This area is particularly important to achieve an optimal taxation position and is currently under review.

Lifecycle costs and replacement costs

9.94 The capital investment and lifecycle costs provided for in the TEL Business Plan relate primarily to the purchase of new buses to renew and / or expand the existing bus fleet and to the heavy maintenance expenditure on the tram (infrastructure and vehicles) necessary to ensure the tram assets reach the end of their useful lives.

9.95 Based on LB current experience, bus fleet renewals and additions range between £7m - £8m per annum (2006 prices), which represents approximately 10% of total bus costs in any given year. This cost reflects TEL's targets to maintain an average fleet age of six years.

9.96 The projected life of the elements of tram system will vary. Replacement of many of the major elements, including the tram vehicles will be required soon after it has been in operation for 30 years. The TEL Business Plan provides specifically for the expenditure required to achieve the life expectancy of the system over the first 30 years of operation and to ensure the system performs effectively throughout. During this period, regular heavy maintenance and renewals

must be implemented and will take place at pre-determined time intervals dictated by the specified performance criteria for the individual elements of the system. These costs are significant and, particularly the half-life refurbishment of tram vehicles after approximately 15 years, will require careful planning to balance cash flow availability with servicing needs.

9.97 The TEL Business Plan does not specifically provide for the major replacement expenditure which will be needed after 30 years, including replacement of the tram vehicles. The options for funding this expenditure will need to be kept under review, in light of the operating surpluses which TEL achieves and in consultation with CEC and TS.

Distribution policy

9.98 CEC currently receives a dividend of c£2m per annum in respect of its 91% shareholding in LB. The TEL Business Plan adopts the payment of this level of dividend by TEL as a continuing requirement in the period beyond the commencement of tram operations when TEL will become the majority shareholder in LB.

9.99 The TEL Business Plan assumes this dividend policy will be applied prudently and that the annual dividend might be reduced or foregone for short periods in response to lower profits or short-term demands on TEL's cash-flows. In such circumstances, the dividends for future periods would be adjusted upwards to ensure the shareholders receive the target dividend on a cumulative basis.

Risks to patronage and revenues

9.100 In consultation with TEL, **tie** and other stakeholders, JRC has carried out a series of tests on the sensitivity of the forecast TEL patronage and revenues to changes in key assumptions. The results are detailed in the Revenue and Risk report (Appendix III) and are summarised below.

Development and economic growth

9.101 The tram is an investment to encourage and facilitate the new development planned in North and West Edinburgh and to stimulate economic growth in the city. However it is important to recognise that the forecast of future TEL patronage and revenues, both for bus and tram, is highly sensitive to the level and timing of new development and the underlying level of economic growth. Two tests for Phase 1(including Phase 1b) were carried out as part of the work for the DFBC as follows (Table 9.5):

- **Lower and delayed new development** – New development at Granton is 25% of that in the central case and in other areas, including Leith and Edinburgh Park, is delayed by 5 years; and
- **Lower underlying economic growth –** Long-term background patronage growth is 50% of that reflected in the central case.

Table 9.5. Sensitivity of TEL revenues to development and economic growth (2005 prices).

2005 Prices	2011 Shortfall		2031 Shortfall	
	£m	%	£m	%
Lower and delayed new development				
- Reduction in total TEL revenue	3.1	3%	20.7	13%
- Reduction in revenue uplift due to tram	0.4	16%	4.0	54%
Lower underlying economic growth				
- Reduction in total TEL revenue	7.2	8%	40.0	25%
- Reduction in revenue uplift due to tram	0.6	22%	4.6	61%

9.102 In the event of slower than expected development or a general economic downturn, TEL would plan and implement services to match the reduced demand.

9.103 On the Phase 1a corridor, where there is already a high level of demand, the opportunities to implement revised integrated service patterns for buses and tram, with commensurate savings in operating costs, would significantly mitigate the risk of failure to meet annual operating profit targets.

- Approximately 30% of forecast demand between Leith and Haymarket will be directly dependent on new development; and
- Approximately 50% of forecast demand between Haymarket and the airport will be directly dependent on new development, although there is potential to adjust bus and tram service provision to mitigate shortfalls in demand.

Other risks and sensitivities

9.104 Other sensitivities tested included:

- **Attractiveness of tram to the public** – To realise the incremental revenue and wider economic benefits from the introduction of tram, TEL will strive to meet and exceed targets with regard to travel times and environment, comfort of seating, accessibility and reliability of the tram. These factors represent an opportunity as well as a risk and the analysis shows that tram revenues could be influenced by as much as +/- 10% by relative success or failure to achieve these targets; and
- **Revenue yield** – TEL will have the same opportunity as any other public transport operator to influence its revenues by managing its revenue yield per passenger in a relatively inelastic market. Increasing the target revenue yield per passenger by RPI + 1.5% each year (instead of RPI + 1% used as the base assumption in the revenue forecasts) results in an uplift of £4.3m (3.4%) of total TEL revenue forecast for 2012. However the TEL Business Plan reflects TEL adoption of the fares strategy at 9.50 above.

10. Financial analysis

Background

10.1 Section 3 of this FBCv2 details the analysis which has been carried out to demonstrate that each of Phases 1a and 1b of the tram can deliver significant economic benefits in return for the proposed investment.

10.2 However, it is still necessary to demonstrate the affordability of the Tram Project in the context of existing visible funding and the risks being borne by CEC and TS as the principle funders. Specifically, following the ministerial announcement in mid-2007 to cap government grant funding at a maximum of £500m, the risks of potential cost overruns would have to be borne by CEC. Therefore, consideration is given to what constitutes a prudent level of headroom over the cost estimates, bearing in mind CEC's limited resources, as well as the specific allowances for contingencies already included in these estimates.

10.3 It is also sensible that decision making remains flexible and can consider prospective additional sources of funding and the evolution and confirmation of capital cost estimates.

10.4 The tender processes for the Tramco and Infraco contracts are close to completion and disclosure in this FBCv2 must respect the commercial sensitivity of the tender process. Reference to cost estimates is restricted to totals only and certain other sensitive commercial terms are described in summary terms only. The full detail of the submitted and negotiated bids has been discussed with Council officials and has been subject to the project governance and approvals processes. The cost estimates set out in this section reflect the terms of the anticipated preferred bids for the Infraco and Tramco projects.

Cost estimates for Phase 1

Evolution of cost estimates for the project

10.5 The original estimates of capital costs for Line 1, Line 2 and for the full network of Lines 1 and 2 were prepared by **tie**'s technical advisors in 2003 and formed the basis of the submissions to Parliament in 2003. In common with the presentation of costs on other capital projects, these cost estimates were base dated to a particular point in time (second quarter of 2003) and did not include inflation.

10.6 In 2005 the estimates were reassessed and found to be robust for the stage of development of the project. Extensive work was done to support the robustness of the underlying cost estimates, which were predicated on the execution of the Procurement Strategy being followed by **tie**. At that time, the costs were re-presented to include estimated inflation, such that the total reflected the estimated cash which would be spent on the project. The inflated estimates as reported to CEC in January 2006 were:

Line 1 plus line 2	**£715m**
Leith to airport plus Roseburn to Granton (Phase 1)	**£570m**
Leith to airport (Phase 1a)	**£484m**

10.7 These estimates were presented concurrent with the adoption of Phase 1 as the first phase of construction of the tram, as described in section 3. They included contingencies (allowances for risk) at 24%, calculated in accordance with HM Treasury guidelines for considering the impact of 'Optimism Bias (OB) on required funding. The requirement to address OB has arisen from a historical trend of underestimating the cost of public works in the UK. CEC and the Scottish Executive (now operating through TS) determined that there should be visible funding in respect of OB when assessing the affordability of Phase 1 of the project.

November 2006 cost estimate

10.8 In November 2006, **tie** and its advisors completed a further detailed review of the cost estimate for the project to reflect the agreed scope of Phase 1, as described in section 5, and to reflect a programme for delivery of Phase 1 into service by mid 2011.

10.9 The 'updated estimate' was reflected in the DFBC, as follows :

Phase 1 in total	**£592m**
Phase 1a only	**£500m**
Phase 1b incremental cost	**£92m**

10.10 The estimated total inflated cost of Phase 1 had increased by approximately 4%, compared to the estimates reported in January 2006, reflecting clarification with regard to scope, progress on design and the inflationary effect of an extension to the target opening date.

10.11 Based on the estimating methodology used, the level of certainty and confidence associated with the updated estimate was considered to be relatively high. Nearly 98% of the costs were estimated based on rates and prices from firm bids received, known rates applied to quantities or based on market rates applied to quantities derived from Preliminary Design. The level of confidence was reinforced by the benchmarking exercises completed and the relatively high allowance for risk included in the estimate, as explained below.

10.12 The updated estimates comprised base costs and an allowance for risk and uncertainty. As part of the project estimate update, the Project Risk Register was updated with cost impacts and risks re-assessed. As explained in section 11, a rigorous quantitative risk analysis (QRA) was then applied to the risk and cost impacts to derive a risk allowance for a very high level of confidence (statistically at a 90% confidence level, meaning that there is a 90% chance that costs will come in below the risk-adjusted level).

10.13 The level of risk allowance, so calculated and included in the estimate at that time, represented 12% of the underlying base cost estimates. This was considered to be a prudent allowance to allow for cost uncertainty at that stage of the project. It reflected the evolution of design and the increasing level of certainty and confidence in the costs of Phase 1 as procurement had progressed through 2006.

10.14 **tie** continued to comply with the HM Treasury recommendations for the estimation of potential OB and had determined, in consultation with TS, that no allowances for OB were required in addition to the 12% risk allowance above.

10.15 The base cost estimate comprised:

- External costs borne under contract with third party contractors and suppliers, the principle elements of which are utility diversions (mostly under MUDFA), the tram vehicles (Tramco), infrastructure works (Infraco) and compensation payments for land; and
- Internal costs including management, supervision, design and legal costs, accommodation and support costs.

The base cost element of the updated estimate was derived using robust management and estimating tools to optimise the certainty of the estimate and to ensure that due allowance was made for all elements of the scope of Phase 1.

10.16 The MUDFA contract was awarded in October 2006. Tender pricing was based upon drawings from the utility companies and Preliminary Design drawings and specifications prepared by SDS. The MUDFA contract was based on re-measurement and the rates, prices and allowances in the contract were used as the basis for the updated estimate.

10.17 Certain utilities works are outwith the scope of the MUDFA contract, including high pressure gas, high voltage electricity and some aspects of telecoms. Price estimates were obtained from the utilities and form the basis of the updated estimate.

10.18 Tenders were received for the tram vehicles (Tramco) in October 2006 and the updated estimate reflected an appraisal of the prices received.

10.19 The system designer (the SDS contractor Parsons Brinckerhoff) had prepared quantified estimates for the infrastructure works (the Infraco contract) and the utilities works based upon their Preliminary Design submission which formed the basis of the Tramco and Infraco ITN's. Cyril Sweett produced independent estimates for both the infrastructure and utilities works. Estimates from both parties were reviewed and reconciled by the TSS consultant (Turner and Townsend).

10.20 Previous cost estimates for the Edinburgh Tram were established on the basis of a "first principles" approach, as well as benchmarking against other comparable tram schemes. This enabled a greater degree of certainty and confidence to be obtained in respect of the infrastructure (Infraco) element of the updated estimate. The tender documents for the Infraco contract were issued in October 2006.

10.21 Land compensation estimates were provided by the DV.

10.22 Internal costs were estimated on the following basis:

- **tie** project management – A project management team structure and management plan was developed for the duration of project, from which a resource schedule was prepared. The cost allowed in the updated estimate was built up by applying known resource rates to this resource schedule. These costs included those relating to the support of Transdev as part of the DPOFA contract;
- Design costs – SDS design costs were included on the basis of the SDS contract sum adjusted for known changes; and
- Legal costs – Procurement costs were largely complete with the exception of those related to the negotiation phase of the Tramco, Infraco and maintenance contracts. Costs to support land acquisition and the TTRO and TRO consent processes were assessed using resourcing plans and rates.

10.23 The Tramco contract cost and MUDFA contract rates were stated at fixed prices at outturn cost levels. The base estimate costs for remaining items were estimated at 2nd Quarter 2006 price levels and were then inflated over the duration of the works at an annualised rate of 5%, with a further 1% allowed for in the calculation of risk allowances given the uncertainty of forecasting future market price levels. This allowance was consistent with the forecasts assessed by the RICS Building Costs Information Services (BCIS) and indices prescribed by TS.

10.24 The approach to the preparation of the November 2006 updated estimate was thorough and rigorous. The following section sets out the most up to date position on all key areas of the project capital cost.

Final cost estimate and anticipated Preferred Bidder terms

10.25 Since November 2006, all of the critical aspects of the project have progressed and revisions made to the cost estimates as necessary. The progress made and the impact on final costs is summarised below.

Design

10.26 Design work has continued to refine the requirements of the utilities, Infraco and Tramco contracts. The utility design work has been used as the utility work has been implemented since summer 2007. During the tender process in 2007, the Infraco and Tramco bidders were provided with details of the emerging designs for the main price-critical items which allowed them to incorporate these in their final bids, as well as to develop proposals for value engineering. Although the final acceptance of the design is subject to bidders' due diligence and final negotiations, the consultative approach taken will have reduced the scope and pricing risks normally included in bid prices under a traditional procurement approach. In overall terms, the design work is being completed within the aggregate allowed for in the November 2006 estimate, plus approved changes.

Utility diversions

10.27 Commencement of physical utility works was delayed following the Scottish Parliamentary elections in May 2007. The project team is working to minimise the consequential additional costs for the MUDFA contractor and the impact on programme and budget by progressing advance works at the Gogar depot, undertaken by AMIS. Utility work commenced in summer 2007 and excellent progress has been made, including commencement of diversion work in some of the most critical and high risk parts of the tram route. It is too early to conclude definitively, but no increase in the November 2006 estimate for the utility works is currently believed to be necessary.

Impact of EARL

10.28 As explained in section 4, the tram project financial projections assume no introduction of a rail link to Edinburgh Airport from central Edinburgh (EARL). The most significant impact of this assumption has been to improve the BCR for the project, as set out in section 4. The effect on capital cost was broadly neutral. Some costs previously allocated to EARL are now required to be absorbed by the tram project. However, cost savings were developed relating to the design, which previously accommodated EARL, offsetting the increased cost allocation. No allowance has been made in this business case for the possible introduction of an interchange with heavy rail at a new station at Gogar, a proposal for which was presented by the Scottish Government in September 2007.

System construction and vehicle contracts

10.29 The contractual structure for the Infraco and Tramco contracts effectively creates one legal relationship, improving risk transfer from the perspective of the Council. The negotiations on the bids submitted during 2007 have resulted in an aggregate capital cost from the anticipated Preferred Bidders, which is in line with the November 2006 estimate.

10.30 The final aggregate cost remains subject to finalising the terms of the contracts in the period to Financial Close. A risk relating to late cost escalation is normal in these circumstances but the extent of the risk is assessed as minimal. The risk is being managed through the creation of detailed deal packages which confirm the principal agreements reached during the competitive tender stages. The resulting draft deal ensures that the Preferred Bidder status has legal standing and commits the bidders to the obligations agreed to during negotiations. Additionally, the main price critical design elements have been incorporated, with provisional allowances for final roads, paving and structures designs.

Value engineering

10.31 In arriving at preferred bids within the cost band described above, substantial effort has gone into the process of value engineering. As part of this process, a thorough analysis was performed to identify and select the best value alternatives for designs, materials, processes, systems and programme without compromising quality or functionality of the resulting system. In close collaboration with SDS, CEC and TEL, a significant number potential opportunities has been identified relating to the following categories:

- Buildings;
- Depot;
- Highways;
- Land and property;
- NR;
- OLE;
- Structures;
- Supervisory and communications;
- 3rd party;
- Trackform;
- Traction power;
- Tramstops; and

- Trams.

10.32 The bidders have been fully informed of all opportunities and have put forward a number of initiatives of their own. The majority of the VE items currently identified are expected to be crystallised by the time of Contract Award. It should be understood that the process of value engineering will continue well into the life of the project and that fresh opportunities will continue to be identified.

Land

10.33 Nearly all of the land required to construct the tram has now been acquired and the latest valuations provided by the DV for compensation costs are comfortably in line with the November 2006 estimate.

Project management costs

10.34 Project management costs, including management, supervision, design and legal costs, insurance, accommodation and support costs, were thoroughly re-examined and reconfirmed since the November 2006 estimate. These costs are estimated based on the detailed PMP and team structure. The composition of these costs has changed from the DFBC, reflecting the success of **tie**'s strategy to enhance its in-house expertise and reduce reliance on external advisors.

Risk

10.35 A risk contingency sum has been retained in the final cost estimate. The level of contingency reflects the reduced risk attaching to project costs, in the light of the further work described above and, in particular, the conclusion of negotiations on the Infraco and Tramco contracts. This allowance provides an uplift of 15% on the construction period base cost estimates of Phase 1a, calculated using the QRA at this point in time. Added to the balance of the committed funding available for the tram, this allowance currently provides a headroom of 29% over the future Phase 1a costs. This is considered a very reasonable allowance for headroom.

Total final cost estimate

10.36 The final cost estimate for Phase 1a is £498.1m compared to £500m in the November 2006 estimate. The following factors should be noted:

10.37 The programme leading to award of Preferred Bidder and Financial Close has been impeded during 2007 by substantial uncertainty about the ultimate delivery of the project arising from the change in Holyrood administration. The final funding arrangements are set out in the next section, but the hiatus in early summer 2007 adversely affected bidder confidence, risk perception and programme, all of which have exerted upward pressure on cost.

10.38 The bidders have confirmed in their bids that there is a cost penalty in a programme which constructs Phases 1a and 1b in sequence rather than simultaneously. As explained in section 10.47 onwards, affordability constraints dictate sequential construction. Accordingly, the bidders have ensured that all fixed costs of construction will be borne by Phase 1a, increasing the cost of that phase with a consequent potential cost saving in Phase 1b.

10.39 The final cost estimate for Phase 1b is £87.3m, compared to £92m in the November 2006 estimate.

Measuring affordability

Existing funding package

10.40 In January 2006, and in conjunction with the adoption of Phase 1 as the first phase of the project (as detailed in section 3), CEC made an in-principle commitment to make a

contribution of £45m towards the capital cost of Phase 1, to be structured in a manner which minimises financial risk. This contribution was re-confirmed in December 2006.

10.41 In early February 2006, Scottish Ministers announced an increase, in line with indexation, of the £375m grant originally offered in March 2003, up to £500m. This sum has been confirmed by TS as the maximum available to the tram project so that, in the event of cost overrun, CEC is the funder of last resort.

10.42 The commitment by both parties remains an in-principle commitment subject to approval of this FBCv2. The terms of the funding will be documented in a grant award letter between TS and CEC.

10.43 The Government Grant will be applied to the construction of Phase 1a in priority to Phase 1b. Surplus Grant beyond that required to construct Phase 1a, if any, may be applied to the funding of Phase 1b, subject to certain conditions.

10.44 The award letter will be finalised in tandem with the other contractual documents as at Financial Close. The letter will incorporate all of the detailed issues applicable to the Grant Award, including those relating to project monitoring and governance.

10.45 Funding from TS and CEC is for capital expenditure only. All operating and lifecycle costs in relation to the tram will be borne by TEL. This means that CEC in its capacity as sole shareholder of TEL, is explicitly bearing all risks in relation to revenues, operating costs and the long term maintenance of the tram, insofar as these risks are not wholly or partly passed contractually to the private sector.

10.46 CEC must balance its desire to support the project with its fiduciary responsibility and limited resources. Therefore, CEC's contribution comprises only such amounts as could reasonably be expected to be funded from future tram related development income and receipts, rather than from general funds or from Council Tax. The anticipated sources of such receipts include:

- Land contributions by CEC;
- Anticipated development gains accruing to the Council on Council owned sites in the vicinity of the tram;
- Section 75 planning agreements already negotiated and anticipated future agreements;
- Third party developments around the tram route; and
- Anticipated capital receipts from tram related Council owned sites.

Phased 1a then 1b approach

10.47 Based on the estimated costs, there is £47m of headroom in the committed funding for Phase 1a. Bearing in mind that the capital cost estimate for Phase 1a contains adequate risk contingency at 15% on future costs, Phase 1a, at a cost of £498.1, is affordable. In fact, in context of the committed funding of £545m, the risk allowance of £49m denotes a headroom between base cost estimates and available funding of £95.9m which equals 29% of future costs.

10.48 However, a complete Phase 1, at a cost of £585m, is £40m in excess of the committed funding, with no additional headroom, although including a risk allowance of £9.6m (12% of the incremental expenditure). This also assumes that the balance of grant funding is available for Phase 1b and this will require to be finally evaluated by all parties in the event that a decision in favour of proceeding with Phase 1b is reached.

10.49 In considering the affordability equation, there are a number of variables which may increase available funding:

- Examination and execution of opportunities to secure contributions from property developers over and above the levels of contribution which were assessed by CEC as necessary for the delivery of their existing £45m contribution; and
- Further consideration of financing options such as an element of tram vehicle or other asset leasing, prudential borrowing by CEC, borrowing against future cash flows of the

integrated tram and bus system and additional capital asset sale receipts generated by CEC.

10.50 Additional funding secured from third party sources increases the funding available to support Phase 1b. Additional funding which requires borrowing (or equivalent mechanisms) will require careful cost:benefit evaluation. The means to assess and secure additional funding are under review.

10.51 As a response to the affordability constraints described above, the programme at section 12 assumes that a phased approach is adopted such that construction of Phase 1a proceeds with a target opening date of first quarter 2011. The construction of Phase 1b, if approved, would commence in mid 2009 with a target opening of Phase 1b in Quarter 4 2012.

10.52 The principal advantages of adopting the phased approach are:

- Phase 1 is maintained as the preferred first phase of the tram as supported by the tests of economic viability in section 4 and financial viability in section 9. The economic benefits to be derived from Phase 1 are diluted by the adoption of the phased approach. However, Phase 1a is economically viable in its own right and carries greater certainty of financial viability;
- If approved, the construction of Phase 1a as the 'spine' of Phase 1 can commence immediately, as it is comfortably within the affordability envelope of £545m;
- Phase 1a will be delivered into operation earlier – by first quarter 2011 – and with greater certainty;
- It reflects a prudent, risk-controlled approach to managing the financial impact on TEL if the scale of development assumed for Granton, in particular, does not materialise in the timescales currently envisaged. In addition, this approach would provide TEL with an increased focus on the integration of Phase 1a with the bus services in advance of integrating Phase 1b; and
- Decisions regarding the timing of commitment to Phase 1b can be made with the benefit of greater clarity with respect to the funding variables which still exist, as explained above. In addition, there would be significant construction progress on Phase 1a providing greater capital cost certainty for that phase and, therefore, the whole of Phase 1

10.53 The contractual terms agreed with the bidders accommodate the phased approach. Fixed prices have been agreed for Phase 1a and an option arrangement has been negotiated which will allow the Council to commit to Phase 1b by March 2009 for commencement of construction in July 2009.

10.54 The phased approach does have drawbacks. The redevelopment at Granton, which is facilitated by Phase 1b, is very likely to be delayed as a result of a later introduction of the improved transport infrastructure, which is required to encourage and serve the new development. The wider economic benefits which can be delivered by Phase 1b, as detailed in section 4, would be realised later, even if they not significantly reduce in total but would be realised later.

10.55 In addition to the economic impact of the phased approach, a delay to commit to Phase 1b means economies of scale are lost. Some of that risk is addressed in the option negotiated as part of the Infraco and Tramco contracts. However, the later the decision is left outstanding, the greater the potential cost impact on Phase 1b. Nevertheless, in the given circumstances, the phased approach represents a prudent approach to a large and complex project, delivering the benefits from Phase 1a (airport to Leith) and leaving the option to extend to Granton fully under the control of the Council.

Application of available funding

Expenditure profiles

10.56 Payment for capital costs will be made by **tie**, in accordance with principles of the contractual payment mechanisms for each contract as detailed in section 7. Table 10.1 presents **tie**'s

current best estimate of the profile by which expenditure will be incurred based upon a phased approach to the implementation of Phase 1a (opening at the start of 2011), followed by Phase 1b (construction starting in 2009 and opening at the end of 2012). The programme is detailed at section 12.

Table 10.1. Estimated capital expenditure profile (fully inflated).

Estimated capital expenditure [1]	**Phase 1a**	**Phase 1**
Cumulative expenditure to March 2007	£44.2m	£45.2m
April 2007 to – Financial Close	£58.9m	£60.3m
Cumulative up to award of Tramco and Infraco	**£103.1m**	**£105.5m**
To financial year end 2008	**£137.2m**	**£140.3m**
Year to March 2009	£161.6m	£161.6m
Year to March 2010	£160.6m	£193.7m
Year to March 2011	£35.0m	£81.0m
Year to March 2012	£3.6m	£8.8m
Total capital expenditure	**£498.1m**	**£585.3m**

[1] The profile reflect the current understanding of the bidders milestone profile and will be updated following final negotiations on Phase 1b.

10.57 The following should be noted with regard to the expenditure profile outlined above:

- The profile represents incurred and committed expenditure and not cash flow, which will lag behind commitment;
- The cumulative incurred expenditure at any point in time does not include the payments which would be required to extinguish outstanding contractual obligations in the event that the project was cancelled. These costs would include compensation payments to contractors, costs of disposing of any land acquired, redundancies at **tie** and other associated costs of closing down the project; and
- The profile for Phase 1a does not include the expenditure incurred on design development for Phase 1b of £2.7m. This expenditure was incurred in the years 06/07 and 07/08 in line with approvals from the two funders, TS and CEC.

Lifecycle costs and funding of major renewals

10.58 As detailed in section 9, TEL (and therefore CEC) will assume responsibility for paying for the regular heavy maintenance and renewals in respect of the tram vehicles and infrastructure during the first 30 years of operation. These costs will be incurred at pre-determined time intervals dictated by the specified performance criteria for the individual elements of the system and will include the half-life refurbishment of tram vehicles after approximately 15 years. The nature of this expenditure is to protect the investment by TS and CEC by ensuring the tram assets reach the end of their useful lives and that the tram system will operate effectively throughout.

10.59 The TEL Business Plan does not specifically provide for the major replacement expenditure which will be required after 30 years, including replacement of the tram vehicles, and the options for funding this expenditure will need to be kept under review, in light of the operating surpluses which TEL achieves and in consultation with CEC and TS.

11. Risk Management

Introduction and background

11.1 Appropriate risk allocation is fundamental to achieving value for money for the tram system. Risks are being allocated to the parties best placed to manage and / or bear them, allowing significant risk transfer to the private sector while maintaining scheme affordability. The purpose of this section of the FBCv2 is to address the following aspects of risk analysis:

- Types of risk that needed to be considered from development to residual value for the tram system;
- Extent of identification, analysis and management of risk undertaken;
- Effect of **tie**'s procurement strategy and risk allocation achieved; and
- Overall contingencies and their consideration in the cost estimates for the tram project.

11.2 **tie**'s approach to developing the tram project has been heavily focused on the identification and management of risk. The methodology applied to the risk analysis is set out in more detail below. **tie** have maintained a full register of risks identified in respect of the project throughout its development. This section outlines the development, assessment and current status of risks related to the project and the risk allocation between the public and private sector. The risks affecting the economic case had been examined and reported on within the updated STAG2 appraisal submitted as part the DFBC.

11.3 **tie** has developed a sophisticated approach to risk management. Central to this has been the appointment of a Risk Manager, and the establishment of a comprehensive risk management process including both a highly detailed risk matrix for the overall project, and detailed risk matrices for the individual contracts within the procurement strategy. These risk matrices were used effectively to influence the development of the procurement strategy and they underpinned the contract negotiations with the Infraco and Tramco providers as detailed in section 7.

11.4 The background to risk analysis in terms of historical risks affecting light rail schemes has been identified in various industry reports. Risk analysis for the Edinburgh tram scheme can be traced to the original Feasibility Study published in July 2001 and continues on the project to date. Industry best practice and government guidance from HM Treasury, National Audit Office, Department for Transport, Audit Scotland and the Holyrood Inquiry have been considered by **tie** during the development, to ensure the application of risk management best practice.

11.5 A review by Audit Scotland in summer 2007 confirmed that the procedures in place to actively manage risks associated with the project are sound.

Project risks

11.6 The risks to the scheme have been allocated to the following four principal risk categories.

- **Development risk**: design and development, scheme approvals and procurement of all scheme components and activities to be concluded prior to commencement of construction of the network;
- **Construction risk**: advance works including utility diversion, main infrastructure construction and integration, project management and commissioning related risks and trial running;
- **Performance risk**: standards, defects and delays related risks occurring during and post-construction; and
- **Operation risk**: repair and replacement risks impacting the scheme during operation of the system (outwith DPOFA Operator risks).

11.7 Many of the Development and Construction risks are now either crystallized, superseded or effectively mitigated, through management action or transfer to the private sector. They are retained in this section to provide a clear audit trail from the DFBC and as evidence of the

comprehensive approach to risk management taken by the project. The key project risk areas are detailed in Table 11.1 below.

Table 11.1. Key risks relating to tram project.

Development risk	Construction risk	Performance risk	Operation risk
• Failure to acquire land. • Delays in obtaining Temporary Traffic Regulation Orders, Traffic Regulation Orders, Prior Approvals, etc. • Cost and delays due to utility diversions. • Poor contractual interface between infrastructure contractor, vehicle supplier and system integrator. • Incomplete definition of scope to implement the operational tram system. • Failure to design to brief. • Continuing design development. • Delays in advance works . • Changes in design required by the Operator. • Changes in design required by stakeholders. • Insufficient powers. • Low market appetite for procurement approach. • Final acceptance by Infraco bidder of procurement approach (novation). • Staff retention.	• Incorrect cost estimates. • Incorrect time estimates. • Unforeseen ground / site conditions. • Unforeseen ground / site conditions under existing buildings / structures. • Failure to build to design. • Delay in gaining access to the sites. • Responsibility for maintaining on-site security. • Responsibility for maintaining site safety. • Third party claims. • Compensation events. • Delay. • Force Majeure. • Termination. • Legislative / regulatory change. • Changes in taxation. • Changes in VAT. • Contractor default. • Poor project management. • Contractor / Sub-contractor industrial action. • Adverse weather. • Protestor action. • Changes in inflation during construction. • Incorrect time and cost for commissioning new tram.	• Competition. • Latent defects to infrastructure. • Performance of sub-contractors. • Default by sub-contractors. • Industrial action. • Failure of system integration. • Failure to meet performance standards. • Incorrect choice of tram vehicles. • Availability of tram infrastructure. • Relief events. • Force Majeure. • Termination. • Failure to upgrade to new technology resulting in obsolescence. • Poor Publicity.	• Legislative / regulatory change. • Changes in taxation. • Changes in VAT. • Incorrect estimate of maintenance costs. • Incorrect estimate of lifecycle costs. • Residual value. • Service integration. • Wage inflation. • Quality of equipment. • Accidents. • Vandalism. • Terrorism. • Major incidents. • Poor publicity.

Impacts of Project Risks

11.8 The risks identified in each of the four principal risk areas have been categorised as to their primary impact as set out in table 11.2.

Table 11.2. Categorised impact of project risks.

	Capital costs	Operating costs	Revenue	Programme	Quality	Functionality	Approvability
Development Risk	✓	✓	✓	✓	✓	✓	✓
Construction Risk	✓		✓	✓	✓		✓
Performance Risk	✓	✓	✓	✓	✓	✓	
Operations Risk	✓	✓	✓	✓			✓

11.9 **tie** have assessed the multiple primary and secondary impacts of the identified project risk register entries. Although the impact of each risk is being assessed against these impact areas, it is considered that the primary potential impacts for consideration are in relation to capital expenditure, operating expenses and profit and achieving delivery programme. Each of the identified risks is allocated to the most appropriate Functional or Project Manager in the tram delivery team who have the responsibility for developing and implementing a risk mitigation strategy.

11.10 The risk allocation between **tie** and Infraco and Tramco is defined by the contract agreements. These provide for significant risk transfer to the private sector and are summarised below.

Overall Project Risks

11.11 In the DFBC, **tie** recognised a number of overall project risks that required to be considered. These included the project affordability, approvability and market appetite, any of which could have led to suspension, curtailment or significant delays being imposed. **tie** mitigated these risks through development of robust cost estimates and adopting a plan to phase the introduction of the tram. Additionally, through application of the Procurement Strategy, the risk relating to market appetite was mitigated. The positive market feedback at the tender stage and the competitive bid process that resulted in the selection of the preferred Infraco and Tramco contractor, affirms the success of the mitigation strategy. The risk of project affordability is addressed as part of the Financial Analysis in section 10.

11.12 **tie** have significantly mitigated risks affecting the quality of the scheme through regular consultation with the CEC as the Planning Authority. The potential of delay and cost increases due to planning requirements have been actively managed during the Preliminary Design and Detailed Design phases of the SDS contract. An integrated team approach involving experts from **tie**, SDS and CEC continues to mitigates design related risks in obtaining Prior Approvals. **tie** and CEC have further mitigated the quality risk through the development of a Tram Design Manual that identifies principles of the tram system design, provides supporting design guidance and states the design requirements for the main components of the tram vehicles and infrastructure. These have been incorporated in the project scope (section 5), which sets out the specification for the tram system, which in turn inform the ERs for the Infraco and Tramco contracts. The Infraco bidder will undertake a due diligence exercise on the SDS designs and tram designs as part of the procurement process. Finally, **tie** is supported by the TSS contractor and other specialist personnel who undertake reviews on behalf of **tie** to ensure that SDS and the Infraco will comply with project specifications and performance requirements. This provides a significant risk mitigation role.

11.13 Service integration risk is significantly mitigated by the delivery of a TEL Business Plan. TEL and **tie** continue to consider the influence of other transport initiatives. The risks arising from the following factors are being managed throughout construction period:

- Waverley and Haymarket Station developments;
- Inclusion of other transport schemes;
- Ticket integration; and
- Future phases and potential future expansion of the tram system.

11.14 A number of key areas with potential to delay the project programme (with consequential cost impact) have been identified. The following bullet points outline the risks identified at the DFBC stage and beyond and sets out their current status and mitigating actions:

- Lack of political will to implement the scheme: is being mitigated through intensive communication of the benefits of the scheme to politicians and intensive stakeholder engagement. In addition, a well managed publicity campaign under the slogan "Trams for Edinburgh" is ongoing to generate public anticipation for the scheme;
- Failure of **tie** to deliver required resource plan leads to missed project milestones: This has been mitigated by securing key resources with knowledge and experience of delivering similar projects;
- Competing local and national projects for resources: The project team has been successfully resourced during the development through to the current phase. **tie** now has the support of a highly experienced Human Resources Director who is implementing a strategy to secure the necessary resources to manage construction. The resource deployment proposed by contractors has been closely scrutinised during the tendering process and **tie** will continue to monitor the implications of market activity;
- Possibility of delays in funding availability or of an unexpected affordability concern: The DFBC mitigated this risk through robust financial modelling and continuing communication with the funders, CEC and TS. Additional mitigation was applied by benchmarking the capital cost estimates for Phase 1 of the project against other tram schemes. At this stage, the risk of funding availability is mitigated by the terms of the funding agreement between CEC and TS. This is supported by internal funding draw-down process which is based on the Infraco milestone payment schedules and the project's working capital requirements;
- Poor project governance resulting in unclear decision making or poor planning of procurements and project controls leading to cost creep: This has been mitigated by forming a TPB, initially with representation from principal stakeholders – CEC, TS (until 2007) and TEL, together with the development and agreement of project governance arrangements that includes the protocols for approving additional expenditure. These arrangements have been successfully been implemented to date, resulting in a positive statement from Audit Scotland on the robustness of the cost estimates. Following the ministerial announcement in mid-2007, the governance arrangements are under review as set out in section 6. However, no changes are anticipated impacting on the agreed protocols to maintain control over costs, programme and scope;
- Possible consequences of poor communications with TS: These were mitigated through ongoing liaison by project staff at all levels with TS and their representation at the TPB and its sub-committees. Following the announcement, TS withdrew from the formal governance processes (TPB and sub-committees) in favour of a monitoring regime based on regular reporting and meetings with CEC, supported by audit processes and issue of regular compliance certificates in relation to grant award letter terms;
- Lack of market appetite for the scheme: This risk was mitigated through frequent consultation with potential bidders for the Infraco contract and response to their concerns (the MUDFA utilities diversion contract had already been awarded and tenders for Tramco (vehicle supply and maintenance) had been returned and were being assessed). In light of the nomination of Infraco and Tramco Preferred Bidders and anticipated Contract Award in January 2008, this risk is no longer relevant;
- Protracted bidder negotiation: the risk was mitigated by building a significant in-house team of experienced personnel with the ongoing support of advisors. The practical skills necessary to negotiate effectively and avoid delays had been demonstrated through closure of the MUDFA utility diversion contract, the negotiation of improvements to the Tramco tender process and continual enhancement of the Procurement Strategy. The

results of the Infraco and Tramco negotiations will confirm that this risk was successfully mitigated, subject to the acceptance of the SDS novation following due diligence review of the design;

- Infraco tenders are unaffordable, bidders withdraw or bids are late requiring delays to the approval process: Affordability risks were being mitigated at the DFBC stage by developing and updating the estimate of capital costs for Phase 1 of the project with independent validation of the estimate by TSS and benchmarking of costs against those of other comparable tram systems. The revised cost estimates in section 10 now fully incorporate the negotiated prices from the Infraco bidders. As the negotiations are nearing completion, this risk is less significant;
- Uneconomic and / or unrealistic levels of risk transfer to the private sector. At DFBC, the bidders had been consulted in respect of the procurement approach and **tie** has considered the utility of risk premiums compared to the value of risk transfer during the tender evaluation and negotiation phase. Details of the risk transfer to the private sector are achieved are set out below (Section 11.45 onwards);
- SDS deliverables are below the desired quality levels leading to delays to approval of Planning Consents and issue of design information to Infraco bidders: This is mitigated by independent validation of the design, as it emerged, supported the issue of price-sensitive information to the bidders throughout the bid process. Further, the Infraco bidder will perform a due diligence exercise before accepting the SDS design. Therefore, this aspect of the risk is mitigated. However, the risk of delays to approvals of planning consents remains. This is being mitigated through the measures described above;
- Obtaining planning consents: the development of the Tram Design Manual and Construction Code of Practice, in conjunction with CEC Planning, had significantly mitigated this risk. A joint working approach between CEC and **tie** regarding the preparation of the design packages for approval, together with an enhanced review process, was implemented in spring 2007 to further mitigate this risk. However, as the ultimate approval of planning consents remains with the statutory planning function, this concern remains as a risk on the project's risk register;
- Successful commissioning and obtaining a licence to operate the tram: **tie** has examined this risk through the evaluation of Infraco tender returns and ongoing assessment of programme with input from TEL and Transdev. The Infraco milestone payment mechanism and liquidated damages regime incentivises performance in this regard, backed up by escalating scale of liquidated damages;
- Ineffective integrated service patterns for tram and bus: has been significantly mitigated by the testing of planned service patterns through the JRC modelling and by the preparation of the TEL business plan;
- Land and property acquisitions and utility diversion (MUDFA) delays impacting the planned dates for commencement of Infraco activities: Following some delay caused by the political uncertainty about the delivery of the project after council and parliamentary elections in Spring 2007, the land and property acquisitions commenced with the issue of GVD notices in April 2007. The programme of acquisitions is now almost complete and no issues have arisen to prevent Infraco to commence on programme. MUDFA works commenced in July 2007 with significant work being progressed on target to date. The programme for these is under continuous scrutiny and although it is recognised that there will most likely be an overlap of MUDFA and Infraco works, this is unlikely to delay Infraco activities;
- Archaeological finds: investigations are now complete and trial works identified that a more detailed dig at Gogar is required. This can be accommodated within the current programme and budget;
- Failing to reach agreement with NR on necessary license, lease, APA and subsidiary legal agreements: This is being closely managed by a dedicated Project Manager with close support from specialist legal advisors, including those of CEC. Detailed engagement has been underway for many months and this process is reaching closure prior to Contract Award;
- Failing to reach agreement with NR on necessary technical approvals: This has been managed through a design submission and approvals process which has been established and is being managed and will ultimately lead to final approval of the design; and

- Failing to reach agreement with NR on the scope and implementation of any necessary equipment relocation and immunisation works: This is being tackled directly with the engineering experts and the appointment of a specialist Project Manager to deal solely with this interface. Specific agreements are being put in place between **tie** and NR to govern this work including clear identification of the critical milestones. NR possession requirements have been advanced as far as possible. Additionally, progress on the above items is subject of a monthly director level review between NR and **tie**

11.15 As the Development Phase of the project comes to an end and construction of the tram takes place over the next four years of the project, the majority of the above risks that are inherent in the development and construction process arise during the early stages of the Infraco contract and will have been resolved or become actual costs by end of commissioning.

Risk impacts - Capital costs

11.16 Although the cost estimate is based on the negotiated contracts for Infraco and Tramco, a number of capital costs risks remain. The most significant capital expenditure risks are in the areas listed below as the eventual cost is largely determined by third parties and they may significantly impact the total outturn cost of the scheme:

- Finance charge costs if insufficient public sector capital;
- Utility diversion costs;
- Land costs associated with acquisition, temporary disruption during construction and compensation;
- NR costs for interchange design, immunisation of equipment, possessions, compensation costs to train operating companies, information supply, liaison and development of agreement;
- Ground conditions which cannot be foreseen from ground investigations undertaken for currently accessible and inaccessible areas;
- Poor interface and integration management of the scheme;
- Compliance with Planning Authority requirements;
- Contractor resource shortages resulting in increased premia for staff; and
- Stakeholder initiated changes to the scheme specification.

These risks have been significantly mitigated through the considerable amount of work undertaken to date by **tie**'s Project Team to generate a robust cost estimate including prudent contingencies. Further mitigation is proposed through the 'phased' construction methodology adopted to ensure deliverability of a feasible core network.

11.17 Risks have been identified in relation to the progress of Detailed Design and the progression of TROs which could affect the overall programme. **tie** have mitigated these risks as follows:

- Progress of Detailed Design – through a staged release of design information to Infraco bidders, the project maintained the flexibility for Infraco to take a greater role in design development and by applying effective project and contract management to the design process. Further, the acceptance of the SDS design by the Infraco is dependent on the outcome of their due diligence of the design;
- Progression of TRO's – by consultation with CEC on detailed traffic modelling and close alignment of TRO programme with the construction programme. A detailed TRO strategy has been developed by **tie** as set out in section 9.

11.18 The main risks that have been analysed relate to third parties. Of these the majority relate to development and construction risks. The majority of risks which are inherent in the development and construction process occur over the first four years of the project.

Risk impacts - Operating costs

11.19 The most significant operating expenditure risks which will require to be managed with the support of CEC are those set out below:

- Inclusion of potentially loss making sections of route;

- Slower run-times than anticipated;
- Lack of priority to schemes in rail / road network with proposed transport developments;
- Robustness and detail of modelling along tram corridor;
- Specification issues including staffing levels;
- Variability of global market conditions impacting on insurance costs;
- Long term increases in operating costs e.g. energy, labour escalation and insurance;
- Maintenance and lifecycle replacement costs; and
- Stakeholder initiated changes to the scheme specification.

It is noted that these have been significantly mitigated, through proceeding with early operator involvement and the leading role of TEL in service integration planning and the preparation of a robust and prudent TEL Business Plan.

11.20 The Infraco and Tramco maintenance contracts are currently planned to be fixed price contracts with a performance related payment element for planned, preventive and lifecycle maintenance activities of the trams and infrastructure. The DPOFA operator contract is a fixed price contract with a performance element that covers the operating risks relating to operation and cleaning of the network. **tie** consider that these risks will be appropriately transferred to, or shared with, the private sector.

11.21 Maintenance and lifecycle replacement costs had been estimated for the DFBC by **tie**'s technical advisers. These have been confirmed as per the negotiated maintenance agreements for Infraco and Tramco, with maintenance costs risks being shared primarily by Infraco, and partly by TEL, where it affords the best value for money option.

Risk impacts – Revenue

11.22 A robust revenue analysis for Phase 1 (and Phase 1a on its own) of the tram had been conducted at DFBC stage, using the JRC modelling and in the context of an integrated service network with LB and the planned phasing of the project. The JRC is responsible for supporting analysis of ticket integration and fare strategy for the purposes of the TEL Business Plan. Revenue yield has been shown to be both underestimated and overestimated in previous light rail schemes. Benchmarking of revenues demonstrated the credibility of the estimates in the DFBC. The following key risks are being actively managed by TEL, **tie** and their advisers including the JRC, whose report on Revenue and Risks is included at Appendix III:

- Quality control and reliability of model development including interchange design;
- Slower run-times than anticipated making the system less attractive;
- Lower level of bus / tram integration than expected including different revenue apportionment;
- Customer attractiveness including fare strategy;
- Emerging competitive responses from bus operators;
- Public response during early years (i.e. slower than planned ramp up in demand);
- Failure of ticket machines or vehicle breakdowns; and
- Unplanned long-term demographic, lifestyle or land use changes.

11.23 **tie**'s advisors have additionally taken account of the above risks which have previously resulted in an overestimation of tram revenues on some other light rail schemes. TEL have examined the balance and sensitivity of costs and revenues in the development of service integration plans in conjunction with JRC. The timing of the above risks is annual throughout the operational period of the project. There will be ongoing analysis to examine the reliability of forecasts and thereby refine service specifications and traffic management plans to further optimise the system.

11.24 A risk exists that the revenue predictions may not be achieved as a result of poor system performance. The mitigation for this risk is the RAMs (Reliability, Availability and Maintainability) of the system and the performance regime leading to the potential for

deductions due to poor performance against a number of KPIs and impacts 4-weekly against payment of operating costs for system availability and tram punctuality.

Procurement Strategy risks

11.25 The Procurement Strategy had number of key objectives, including the following:

- To deliver a performing tram system for Edinburgh;
- Meet run-time and capacity performance requirements;
- Achieve effective (economic) risk transfer to market within affordability;
- Minimise market risk pricing through de-risking, including advance utility diversion, prioritised design to minimise design and performance risk uncertainty and to achieve key consents;
- Assemble a large design and build contract responsible for system integration; and
- Set operation and maintenance criteria to incentivise system performance in the operating phase.

11.26 The objectives are achieved through the assembly of contracts as summarised below:

- Procure SDS to develop Requirements Definition, Preliminary Design, Detailed Design, traffic modelling and deliver planning consents all of which contribute to achieving the specified project functional requirements (run time, capacity etc);
- Procure Tramco and Infraco concurrent with design and modelling;
- Progressively pass design information to Infraco bidders through the tender and negotiation process to enable the Infraco bidders to refine their pricing and thus minimise design and performance risk pricing through negotiation;
- Novate SDS and Tramco to Infraco at Financial Close to create a single design, construct and maintain contract;
- TSS and other specialist personnel have reviewed that SDS design will deliver the tram system performance requirements (run-time and capacity etc) to ensure that SDS and **tie** discharge their duty of care to stakeholders; and
- Separately procure utilities diversion contracts (principally MUDFA) to enable **tie** to directly manage the utilities diversion risks and complete diversions in advance of Infraco works commencement thus avoiding the impact of diversions risks on Infraco delivery performance.

11.27 The Procurement Strategy has a number of features which import risk and this has required close management as further explained in section 7:

- Detailed programme to reach financial close;
- Novation of SDS and Vehicle contracts at Infraco award;
- Clarity of scheme definition for Phase 1;
- Default, expiry or early termination;
- Partial handovers and staged commissioning due to incremental construction;
- Calibration of payment mechanisms and potential retentions / compensations; and
- Change control.

Stakeholder risks

11.28 Management of the following stakeholder risks is recognised as critical to progression of the tram scheme. Risk owners have been identified and monitoring of the mitigation progress on these matters is taking place at TPB level:

- Political and stakeholder support for the scheme reduces due to other sector priority;
- FBC is not approved / accepted due to affordability or financial / economic viability- affordability, financial and economic viability had been established in the DFBC and is confirmed in this FBC;
- CEC / TS Funding Agreement (including bearer of any potential cost over-runs) is not delivered and / or funding package reduces in real terms – this risk is fully mitigated through the new funding arrangements;
- Negative public relations (PR) results in reputational damage;

- Infraco programme and price is above DFBC estimates – risk is mitigated in the negotiated contract price;
- Challenge by unsuccessful Infraco / Tramco bidders to the procurement process; and
- Sections of the scheme implementation are delayed due to adverse TRO hearing.

Insurable risks

11.29 **tie** has developed a schedule of potentially required insurances for the main stages of the project lifecycle in conjunction with Heath Lambert Group, their insurance advisers, as shown in Table 11.3. The final decisions on the tram insurance portfolio including scope, cover and deductibles has been subject to value for money, affordability and overall risk appetite of the parties concerned.

Table 11.3. Insurable risks.

Development	Construction	Operational
tie and contractor's own Required Insurances		
• Employer liability • Head office insurances • Professional Indemnity for design and construction	• Employer liability • Head office insurances • Professional indemnity for design and construction • Marine cargo including loading and unloading • Contractor plant and equipment • Motor road traffic Liability • Engineering Inspections	• Employer liability • Head office insurances • Continuing professional indemnity until expiry of defects liability • Directors and officers liability • Employee benefits • Fidelity guarantee • Money in transit • Motor road traffic Liability
Owner Controlled Insurance Programme covering all interested parties		
	• Third party liability ** • Products liability ** • Construction all risks ** • Defects liability under construction all risks ** • Offsite storage ** • Goods in transit ** • Delay in start-up including suppliers extension **	• Third party liability ** • Material damage ** • Defects liability under construction all risks ** • Engineering • Business interruption (including customer and utility extensions) **

11.30 The construction phase includes manufacture, supply, construction and testing. Traditionally, even on major construction projects, individual contractors have procured project insurance or the main contractor will insure on behalf of all. Such an arrangement would lead to a multitude of different policies provided by the individual contractors expiring on the contractual completion date of the each contract or annually renewable. This would leave **tie** with a complicated task of gradually insuring or being responsible for all handed over contracts until a permanent insurance programme could be put in place.

11.31 It is now common practice that a project of this type is covered by a project-specific bespoke policy wording that is negotiated between the broker and his client, in this case **tie**. The advantages to **tie** of procuring insurance directly for the whole project are that **tie** receive the best value for money afforded by scale and direct procurement, consistency of cover throughout the project period and receive the benefit of an expiry date which coincides with the end of construction, testing and commissioning and with the start of tram operations.

11.32 **tie**'s has procured and effected an owner controlled insurance programme (OCIP) and has reflected this provision in all key construction contract documents. The OCIP strategy has been successfully used on the majority of UK Light Rail Projects. Dockland Light Railway including all its extensions, Manchester, West Midland, Sheffield, Croydon, Nottingham and Dublin were all insured using the OCIP approach. Croydon also included the first two years of operational insurances within a five year project programme, as is being applied by **tie**.

11.33 OCIP Insurance has also become the popular choice of many owners including BAA generally and specifically for Terminal 5, London Transport's Jubilee Line, London and Continental Railways for the Channel Tunnel Rail Link and NR for the West Coast Main Line refurbishment. Evergreen 2 (Laing Rail), the first Design Build Finance and Transfer rail project, which is currently being constructed, is insured by an OCIP programme.

tie published an OJEU Notice for the commencement of the procurement of the OCIP programme on 27 October 2006 comprising professional indemnity (PI), construction all risks (CAR), delay in start-up (DSU), construction 3rd party liability (CTPL), operational material damage (MD), business interruption (BI) and operational 3rd party liability (OTPL) insurances. The negotiation of the construction phase insurances, including policy terms, cover, excess levels, limits, inclusions and exclusions, was concluded and insurances effected on 23 July 2007.

Terrorism and security risks

11.34 **tie**'s advisers have recommended that an investment in security systems is made as part of the overall approach to system security including CCTV coverage to evidential standards for all stop platforms, passenger emergency / help points linked to an operations and control centre (OCC), together with public telephone facilities and appropriate levels of illumination via dedicated lighting. The tram vehicle costs include provision of CCTV coverage to evidential standards, passenger / driver communication facility and driver radio link to the OCC. Sums are included within signalling and communication costs for an automatic vehicle recognition system linked to the OCC.

11.35 Physical measures to protect the infrastructure, vehicles, interchanges and depot during construction, testing and commissioning are part of the supply requirements set by the output specification for the tram vehicle and infrastructure contracts, including, the responsibility of the infrastructure provider to carry out system surveillance. This responsibility transfers when the system becomes operational to the operator to undertake system surveillance.

11.36 **tie** have considered the merits of insuring key tram assets to provide MD and BI coverage arising from the specific peril of terrorism. As part of the OCIP, terrorism insurance cover was placed with Pool Re, a government backed reinsurance pool, for the value of the construction works.

11.37 **tie** recognise that the confidence in the security of the tram system will have a direct relationship to the overall quality of the system and, therefore, potential patronage. **tie** appreciates that the risk of terrorism exists both during construction and operation. However, it should be accepted that the tram could continue to operate, albeit in a reduced capacity, if part of the line or depot were damaged due to a terrorist event.

11.38 Under DPOFA, terrorism is treated as a Force Majeure event. However, the operator is contractually responsible for the security of system operation, including incident management and security management under plans which are presented to, and agreed by, **tie** prior to system commissioning.

Risk contingencies

Specified contingencies

11.39 For the DFBC, cost estimates were built up by the SDS contractor based upon their completed preliminary design information. These had been verified by cost consultant inputs from the TSS contractor, as well as confirmation through an independent review by Cyril Sweett. Estimates had been provided without contingency and these are now being confirmed via the negotiated contract prices. Specified contingency were calculated from standard industry techniques using **tie**'s detailed Project Risk Register.

11.40 The Project Risk Register has been developed since the instigation of the project. Each item in the risk register contains a probability of occurrence and the range of minimum, most likely and maximum financial impacts, where appropriate. The financial impacts are over and above costs included in the base estimate. This allows a quantitative risk analysis (QRA), using Monte Carlo simulation, to be undertaken.

11.41 Analysis showed that a 'very high' confidence that the outturn of the project costs will be derived from the inclusion of risk contingencies as shown below. **tie** has extended this analysis in the period through the current stage of negotiations and conditional award recommendation. **tie** will continue to apply this analysis through to final negotiation and award of the Tramco and Infraco contracts in January and include inputs from the continuing design negotiation and MUDFA progress.

Table 10.4. Risk allowances.

Probability	Increase to base cost – DFBC	Increase to base cost estimate for future costs at contract Award – FBCv2
Very high confidence – P_{90}	**12%**	**15%**

OB contingencies

11.42 By the time of the DFBC, OB was effectively eradicated, as per the findings explained in the Mott MacDonald Review of Large Public Procurement in the UK. This was in view of greater scheme certainty and the mitigation of factors built into the procurement process, as well as project specific risks and environmental and external risks. Instead of using OB, TS and CEC adopted a very high confidence figure of 90% (P90) in the estimate of risk allowances to cover for specified risk, unspecified risk and OB.

11.43 There are no proposed increased allowances for OB in addition to the above estimated risk allowances.

11.44 The level of risk allowance represents a significant proportion of the project estimate value. In addition, there remains £47m headroom between the project estimate and maximum funding available. This provides comfortable headroom of 29% over base cost estimates for future costs of Phase 1a at Contract Award.

Risk allocation

11.45 The development of the Procurement Strategy was one of the key elements of risk mitigation for the tram project. Risk has been quantified following a detailed assessment process performed by **tie** and its advisors in accordance with industry best practice and experience.

11.46 There is no standard contract for use in tram schemes which embodies a settled approach to responsibility for risk and its financial implications. Bespoke forms of contract have been prepared to meet tram requirements and the proposed risk allocation, and bring consistency to the legal framework on key terms e.g. dispute resolution. **tie** and its advisors have used experience from previous tram schemes and the proposed risk allocation as a basis for settling contractual provisions where appropriate.

11.47 In the development of the contracts, **tie** and their advisors have designed risk allocation matrices to reflect the allocation of risks to private sector, public sector and those that are effectively shared. This is in order to construct the contracts, with clarity of those risks which the private sector will take (and allow for within their bids) and those risks which the public sector will need to manage.

Allocation during the Development Period

11.48 Set out below are the key risks that **tie** is responsible for managing up to award of Infraco.

- Model development, ticketing and fare strategy;
- Tram priority in highway;
- Land acquisition and compensation;
- Detailed Design development;
- Agreements with heavy rail parties;
- Public utility diversions;
- Consents and approvals;
- Project Management; and
- Programme and Cost Management.

11.49 During this period, **tie** has actively managed these risks both directly and through a number of key contracts identified comprising TSS, SDS, JRC and MUDFA. In addition, **tie** has been advised by the Operator, Transdev and **tie**'s legal team (namely, Dundas and Wilson and DLA Piper), procurement specialists (Partnerships UK) and insurance and risk advisers (Heath Lambert Group) on issues affecting risk.

11.50 Table 11.5 sets out the general allocation of risk during this period, and this is discussed further below. Where the table indicates risk allocated to the public sector, the risk is under the management of **tie**, but with consequences of risks being reaslised, impacting on both **tie** and its supplier.

Table 11.5. Development period risk allocation.

Risk allocation during the Development Period				
Risk	**Public sector**	**MUDFA contractor**	**SDS designer**	**Utilities**
Land acquisition	✓			
Planning (Prior Approvals)	✓		✓	
Temporary and permanent TROs	✓		✓	
Design risks	✓		✓	
Major utility diversion quantity	✓		✓	✓
Major utility diversion cost	✓	✓		✓
Major utility diversion delay	✓	✓		
Delays to utilities agreement	✓			✓
NR related delays	✓			
Required approvals from HMRI	✓		✓	
Incorrect cost estimate	✓			
Incorrect timetable assumptions	✓			

11.51 Of the above, land acquisition, cost estimates and timetable assumptions were clearly driven by **tie** and CEC. **tie** has managed these risks through the experienced in-house team that it has assembled. The near-completed process of land assembly to budget, negotiated contract prices and agreed timetable for the project confirm the success of the mitigation approach.

11.52 Ultimately, the SDS contractor is responsible for planning consents being appropriate for the scheme, and there are sanctions under the SDS Contract for poor performance. However, the fundamentals of the success of planning applications will be determined by CEC's and **tie**'s preferences for the specification of the system. Therefore, the risk of the success of the planning process must remain at least partially with the public sector, albeit with some of the financial risk of increased costs passed to SDS, and ultimately to Infraco, during the Implementation Phase.

11.53 Design risk covers risks of failures in the design affecting the ongoing scheme. During the development period this could manifest itself as a problem with a planning matter, a utility diversion design or the instructions to bidders for the Infraco contract. This risk is partially transferred to the SDS contractor through their contract, although it is likely that some of the consequences of a significant problem with a design failure would be borne by the public sector. Up to Financial Close, **tie** is managing and mitigating this directly with the help of TSS and other advisors.

11.54 Risk for the execution of utilities diversions has been transferred under MUDFA. The scope of work has been specified by the utilities and designed by SDS and the risk that these are significantly greater than anticipated are covered by the public sector. **tie** had carried out detailed survey works under SDS to get a view of the quantity of works to be required. Additional survey and trial hole works have now been undertaken by AMIS to obtain greater clarity of both quantity and accuracy of the location. Together with the significant allowances included in the risk register, this approach mitigates the exposure of the public sector.

11.55 Should MUDFA fail to complete in time to allow Infraco on to the site, then the public sector will be responsible for delay to Infraco works. However, in certain locations, utility diversions will be undertaken by the Infraco contractor, as this provides practical advantages for construction works or traffic management reasons. **tie** is mitigating the risks to programme arising from delays in MUDFA by incentivisation of the MUDFA contractor to complete on time. This risk further minimised by:

(i) The early involvement of the MUDFA contractor during design development with SDS;
(ii) The early scheduling of utilities diversion works which are anticipated to be significantly advanced, by the time that the Infraco contract is signed; and
(iii) Release to Infraco, as staged handovers, of completed sections.

11.56 Cost estimates and timetable estimates were developed by the Project supported by TSS and the SDS Contractor and have been informed by the tender returns from Infraco and Tramco. The responsibility for the consequences of increases in cost and programme will be borne solely by the public sector up to the date of Financial Close. **tie** has used the TSS Contractor, the operator Transdev and its internal resource to challenge assumptions and potential cost creep throughout this process and validate scheme deliverability within affordability limits as set out in section 10, Financial Analysis.

11.57 In summary, the public sector is exposed to significant, but diminishing and manageable, risks during the remaining period of scheme development. The introduction of the SDS contractor and MUDFA contractor in the procurement strategy reduced risk to an extent. However, as in all projects of this type, the major responsibility for identifying and managing potential risks during this period remained with the project team and their advisors. **tie** has assembled a team with significant experience in the tram industry and rail sector and, together with the TSS contractor, the operator, and its other advisors, has demonstrated that it has the necessary skills to manage risk during this period.

Allocation during the Construction Period

11.58 The financial risk that the Infraco contractor will be exposed to at any point in time is the amount of money that it has expended, less the amount it has been paid, along with bonding and warranty requirements, including relevant sectional liquidated damages. The payment mechanism will be against fine grained milestones and, subject to the achievement of those milestones, there will not be a large exposure for the contractor based on the difference between income and expenditure on the contract. The specific proposals for the payment mechanism under the Infraco contract are given in section 7. Table 11.6 shows the risk allocation in the Construction period.

Table 11.6. Construction period risk allocation.

Risk allocation during the Construction Period				
Category	**Risk**	**Public sector**	**Infraco contractor**	**MUDFA contractor**
Design	Changes in fundamental design and performance requirements.	✓		
	Changes in construction design and failure of design post award of Infraco.		✓	
	Award of Prior Approval consents.	✓		
	Provision of adequate submissions necessary to obtain Prior Approval and TRO consents.		✓	
Utilities	Major utility diversion quantity.	✓		
	Major utility diversion unit cost.	✓		✓
	Major utility diversion delay.	✓		✓
	Minor utility diversion quantity.		✓	
	Minor utility diversion cost.		✓	
	Minor utility diversion delay.		✓	
Construction	Force Majeure.	✓	✓	
	3rd party claims.	✓	✓	
	Ground condition.	✓	✓	
	Archaeology.	✓	✓	
	Site safety.	✓	✓	
	Technology risk.	✓	✓	
	Compliance with street possessions.		✓	
Commissioning	System integration failure.		✓	
	Failure to meet standards.		✓	
	Inappropriate vehicle.		✓	
	Required approvals from ICP, HMRI and others.		✓	
Contractual / Financial	Weaknesses in contractual interfaces.	✓		
	Incorrect cost estimate.		✓	
	Incorrect programme assumptions.		✓	

11.59 **Design** – Changes in design which are required by the public sector after the signing of the Infraco contract will be at the risk of the public sector. The progress of detailed design has somewhat mitigated this risk. However, a significant failure in the agreed design will effectively be transferred to the Infraco contractor following novation. Provision of consents for Prior Approvals and Temporary and Permanent TROs by the statutory authorities remains a public sector risk, but provision of the necessary information in the required format and timescales will be at the risk of SDS and / or Infraco.

11.60 **Utilities diversion** – As discussed above the risk associated with utilities diversion under the swept path of the tramway remains with the public sector. The risk of the impact of any delays caused by incomplete utility diversions at the time of commencement of on-site work by Infraco will be carried by the public sector (but it is expected that they will be complete in key areas).

11.61 **Construction risks** – The strategy transfers all of the typical risks transferred under a construction contract, including the:

- Requirement to construct a scheme that complies with the Employer's Requirements;
- Risk of gaining required approvals and consents (Prior Approvals and TROs excepted);
- Risk of integrating an co-ordinating work with sub-contractors;
- Risk relating to interpretation of the provided information;
- Risk relating to non-performance; and
- Risk relating to 3rd party interfaces.

11.62 The financial consequences of failure by the Infraco contractor are covered either by OCIP or are borne by Infraco, up to a capped level as is usual in contracts of this nature. There are further sanctions in the unlikely event that such caps are exceeded.

11.63 **Commissioning risks** – These risks represent the situation whereby: once all of the assets have been delivered, they do not work properly together and need to be changed. Under the enhanced conventional approach these are transferred to the private sector by the institution of a robust regime of acceptance tests aligned to the payment mechanisms described in section 7.

11.64 **Contractual risks** – It is imperative that **tie** ensures that the risk of problems arising at the interfaces between contracts is minimised. This risk will be significantly reduced by **tie**'s decision to novate the SDS and vehicle contracts to the Infraco contractor, the principle of which has been agreed by the Infraco Preferred Bidder, subject to the conclusion of due diligence on the design.

11.65 **Financial risks** – If significant supply cost increases emerge these will be absorbed by the Infraco contractor other than those arising from certain statutory changes.

Allocation during the Operating Period

11.66 Under the Procurement Strategy, **tie** has sought to manage the infrastructure risks during the operating period based on contractual obligations as described in section 7. Table 11.7 shows the risk allocation during the Operating period.

Table 11.7. Operating period risk allocation.

Risk allocation during the Operating Period			
Risk	**Public sector**	**Infraco contractor**	**Tram operator**
Revenue	✓		
Operating costs	✓		
Maintenance unit cost		✓	
Maintenance quantity		✓	
Latent defects		✓	
Failure of warranties on subcontracts		✓	
Supply chain failures		✓	
Operation resource provision			✓
Failure to meet standards		✓	✓
Operational safety		✓	✓
Inflation risk	✓		
Service running times	✓	✓	✓
Failure to provide promised tram priorities	✓		

11.67 Maintenance and latent defect risks are key risks which are effectively transferred under the payment and incentive mechanisms as explained in section 7. Allied to these are risks associated with the supply chain and failures in warranty provisions (e.g. due to bankruptcy of original subcontractors). For a significant system maintenance period of at least six years and up to 15 years from commencement of revenue service, it is intended that the Infraco contractor will bear not only the costs of correcting defects, but also performance deductions

for the period during which the system is unavailable. There are also bonuses / penalties associated with the qualitative performance of the contractor.

11.68 A key driver for the eventual success of the system will be the delivery of the required service run-times. The risk of the tram system being capable of achieving the required 'laws of physics' run times is passed completely to the Infraco, whereas the delivery of the planned junction priorities is the responsibility of CEC and TEL supported by the operator, who must also make available trained drivers under DPOFA. All other major risks associated with running times, are transferred to the Infraco contractor during the time it has a commitment to the project, save for standard contract carve outs which are covered through the OCIP insurance (e.g. interference).

Risks retained by Public Sector

11.69 The extent of public sector retained and shared risks has been assessed by **tie** and **tie**'s procurement advisors and has been reviewed by CEC officials. This has identified the risks that will be retained through the proposed contractual arrangements and will need to be vigorously managed by the public sector. At the DFBC stage, the principal retained risks were associated with:

- The acquisition of land to allow construction to commence;
- The design development and advance utility diversion works;
- Granting of Prior Approvals and Temporary and permanent TROs;
- The completion of all necessary advance works prior to commencement of main construction works;
- The procedures for processing of potential stakeholder instructed changes during design development;
- Care in the selection of tram vehicle supplier in achieving compatibility with infrastructure (albeit integration risk is to be taken by Infraco); and
- Potential future VAT, tax and legislative changes that could influence the scheme.

11.70 At the current FBCv2 stage, a number of the above risks have been either effectively mitigated or considerably reduced in their significance. This relates particularly to land acquisition, which is near complete, and the successful execution of some of the required advance works, currently progressing ahead of programme. Although agreement has been reached via established governance arrangements on stakeholder changes during design development, a risk remains if further changes are instructed. The risk relating to the selection of the tram vehicle supplier is mitigated through the programme of facilitated negotiations between Infraco and Tramco following section of the respective preferred bidders and the novation of Tramco following contract award.

11.71 The following risks remain relevant as risks retained by the public sector as their exposure period extends beyond the timing of this FBCv2:

- Granting of Prior Approvals;
- Granting of permanent TROs (risk of obtaining Temporary TROs is transferred to Infraco);
- The design and implementation of utility diversion works
- Delays to design approvals for reasons outside the control of the Infraco
- Stakeholder instructed design changes; and
- Potential future VAT, tax and legislative changes.

11.72 In addition to the above 'development' and 'construction' related risks, it is noted that the public sector will need to consider:

- The loss of project momentum and additional costs that may be incurred through delays to the consideration and approval of the Business Case;
- Underestimated management costs associated with the scheme;
- The financial governance arrangements to ensure timely and appropriate release of funds; and
- Procurement delays.

Risk management strategy

11.73 The following section briefly summarises the risk management strategy in the 'short', 'medium' and 'long term' including planning engagement, co-ordination of risks, the approach used achieve market commitments for deliverable packages of work and reaching financial close to commence Infraco construction activities.

Key Milestones for Risk Management

11.74 The key material risk to **tie** post contract signing relates to requests for changes to the scheme that result in cost increases. However, **tie** has significantly mitigated the risk of operator requested change through the early involvement of Transdev, through the DPOFA, and through early design work by SDS. As discussed above, four potential risk areas remain with CEC and **tie**, relating to utilities diversions, highways work, planning and service integration.

11.75 **tie** is confident that the scheme development work undertaken to date and the procedures it has to adopted on design sign-off captures design innovation and cost reduction but also minimises the potential for any change which will exceed planned overall expenditure.

11.76 **tie** continues to ensure that the appropriate governance controls are applied to the remaining stages of the development of the tram system. **tie** have identified the principles and commercial implications of the Procurement Strategy for Phase 1a of the tram with details of the consequential elements of management, design, procurement and construction activities that effectively de-risk the main infrastructure contract. The key project needs for risk management and the solutions proposed are summarised in Table 11.8.

Table 11.8. Risk management solutions.

Project needs	Solutions
Continued technical support.	**TSS** – technical reviewer, management and support to **tie**.
Early system design.	**SDS** – infrastructure and system designer novated to Infraco.
Refine revenue projections.	**JRC** – assessor and estimator of revenue generation from the operating tram network.
Control of infrastructure cost risk.	**SDS** – Advance survey works and design development.
Obtaining necessary consents.	**SDS** – Advance design development and modelling and agreement of process protocols with CEC by the project.
Reach agreement with key 3rd parties.	Ongoing stakeholder management and Agreements e.g. NR, BAA.
De-risk the main infrastructure works.	**SDS / MUDFA** diversions – Advance design and utility single framework diversions .
Select an appropriate tram vehicle.	Vehicle manufacture, design and maintenance contract(s) novated to Infraco after negotiations between preferred Tramco and Infraco bidders to

Project needs	Solutions
	resolve all issues prior to novation.
Ensure system integration .	**Infraco** – implementation company, responsible for construction, integration and maintenance of the tram system.

11.77 A number of other potential supporting contracts and agreements are required in relation to planning supervisor, property and land acquisition, Roads Authority, NR, power and policing. A large number of these contracts are either implemented or at an advance stage of drafting. The risk profile of the project changes significantly when the commissioning of the system is complete and the operations commence. The Infraco contractor's role as integrator for the system means that significant elements of the project risk will transfer to it.

Deliverables to support risk management

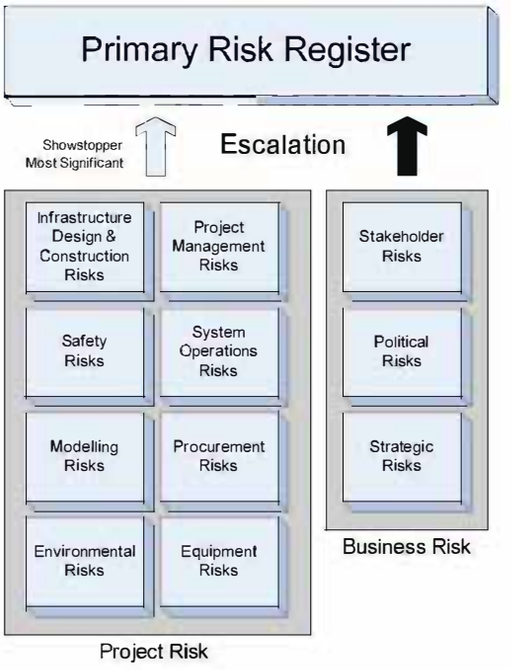
11.78 **tie** continue to hold risk management as a core value and have reflected this in the service provider contracts which include obligations to provide risk management deliverables including the following:

- **Project Risk Management Plan** to confirm the objectives, roles and responsibilities, definitions, risk management process and application throughout scheme development, procurement and construction phases;
- **Assumption Register** to record all capital, operating and lifecycle costs, revenue, programme, quality, functionality and approvability assumptions and consequent risks to the project throughout scheme development, procurement and construction phases;
- **Project Risk Register** to summarise all capital, operating and lifecycle costs, revenue, programme, quality, functionality and approvability risks to the Project and proposed mitigation;
- **Risk Progress Report** on status of risk management and mitigation indicating summary of new risks identified, new assumptions, key matters to be resolved and achievements; and
- **Project Estimate Reports** indicating the estimated capital cost and programme contingency allowances to be considered.

11.79 **tie** holds risk workshops and one-to-one meetings with those responsible for mitigating project risks. Regular risk management meetings and workshops have been held and **tie** will continue to do so during the remaining development and planned construction phases. The allowance for this in supporting the above deliverables has been included in all service provider remits.

11.80 **tie** reports on the emerging Tram Primary Risks to the TPB. This comprises Stakeholder Risks, based upon the severity of risk to project viability and immediacy to mitigate risks e.g. project affordability, availability of funding, approval of business case; and Project Risks based upon the magnitude of impact to cost and programme e.g. NR interface costs, late submission of TRO information, unforeseen ground conditions. Figure 11.1 summarises escalation drawn from the Project Risk Register.

Figure 11.1. Project risk register and escalation.



Key risk mitigation underway

11.81 **tie** will continue to identify, analyse, categorise and implement the planned mitigation for each identified and emerging risk. All of the risks identified have been discussed in detail between **tie** and their advisors and CEC, and are each subject to a risk mitigation strategy to minimise, where possible, their likelihood and severity of impact on project delivery and operation.

11.82 Further substantial risk mitigation will be effected through the ongoing involvement of Transdev, TSS, other specialist personnel and close liaison with CEC through all the planned phases of the project. **tie** is mitigating risks arising from tram funding issues and delay to the scheme through preparation of this FBCv2 and its engagement with NR and public utility providers. The continued refinement of the integrated service strategy with TEL effectively mitigates these revenue risks.

11.83 **tie** have mitigated the risks associated with the potential market interest for the construction of the tram system by undertaking market sounding with potential Infraco consortia members; commencement of enhanced revenue model development; development of an integrated service plan with LB; commencing early design of critical areas of the system to achieve greater price certainty; engagement with the Planning Department; procuring advance survey works under SDS; and early involvement of MUDFA contractor. The successful progress to conclusion of the negotiated Infraco and Tramco contracts confirms the success of the risk mitigation approach.

Risk management process responsibilities

11.84 The project management responsibilities at Project Level are summarised in Table 11.9 below in a RACI chart.

Table 11.9. Risk management responsibilities.

Activity	Functional roles						
	Finance Director	Commercial Director	Risk Manager	Programme Manager	Estimating Manager	Procurement Manager	Project / Functional Managers
Development, implementation and maintenance of Project Risk Management Plan		A	R	C	C	C	C
Development of the risk management system including risk register and QRA		A	R				
Identification and assessment of risk to the Project	C	C	A	C	C	C	R
Development and delivery of risk mitigation plans	C	C	A	C	C	C	R
Update of the Project Risk Register		C	A	C	C	C	C
Quantitative QRA on estimated cost impact	I	A	R	C	C	I	I
Programme Risk Analysis	I	C	A	R	C	I	C
Allocation of risk and allowances to risk owners	I	C	A	C	R	C	C
Update of Project Estimate for Updated QRA	I	C	A	C	R	C	C
Update of Project Programme for Updated QRA	I	C	A	R	C	C	C
Reporting on Management of Risk – workstream review	I	I	A	C	C	C	R
Reporting on Risk – Project Overview	I	A	R	C	C	C	C
OB Estimate on Cost Estimates and Works Duration	I	A	R	C	C		C
Preparation and update of Contract Risk Allocation Matrices		A	C	C	C	R	C
Monitoring on Risk Management progress by Risk Owners	I	A	R	I	I	I	C
Quarterly / Milestone Risk Reviews – Risk Management Plan and Framework	I	A	R	C	C	C	C

RACI is an abbreviation for:
R = **Responsible** – owns the delivery of the activity
A = to whom "R" is **Accountable** – must sign-off (approve) the output of the activities
C = to be **Consulted** – has information or capability to contribute to the activity
I = to be **Informed** – must be notified of results

12. Programme summary

Programme development

12.1 The original programme for the delivery of Line 1a of the tram was initially developed from a combination of SDS design and construction programmes, which in turn were based on past productivity and construction rates on other schemes in the UK, Europe and the US. To this, **tie** have added and integrated activities driven by the Procurement Strategy and key procurement dates, other stakeholder and 3rd party influences and the time allocation for other elements of the project. These were developed in conjunction with industry experience to provide a robust overall master programme. This process has then continued to evolve with the inclusion of AMIS agreed construction philosophy for utility diversions and a clearer understanding of the Infraco bidders construction programmes, aligned with the commencement of advanced works in the Gogar depot area, and of other works such as invasive weeds eradication.

12.2 The result of this continuous programme evolution is a robust schedule that is confidently supported by the fact that the submitted programmes from the Infraco bidders reflect almost identical timeframes.

12.3 The programme has been developed using standard work breakdown structures that can be aligned to the project cost breakdown structure to facilitate good project control and management application, providing data manipulation to detailed levels. This programme is built on the Primavera P3e software, generally regarded as the industry standard.

12.4 Many key criticalities and dependencies have been used to identify the critical path for the scheme. The criticality of much of the design activities mean the need for on-time delivery is particularly true for SDS design work and, although the delivery of design may be slower than desired, the progress on the ground is being maintained through a process of micro-management by the project team and prioritisation of the required data and information with design and construction teams to meet the execution programmes.

12.5 The critical path is the sequence of programme activities which add up to the longest overall duration. This determines the shortest time possible to complete the project. Delay on activities on the critical path directly impacts the programme float and potentially the planned project completion date (Q1 2011). There are a number of critical path items on the project programme. These items will be reviewed with Infraco during the Preferred Bidder stage and prior to contract award:

- Completion of all critical Contract Award activities and CEC and TS approval processes necessary to achieve Financial Close;
- Early Infraco and Tramco mobilisation;
- Completion of certain critical design activities including: Section 5a Roseburn Junction to Gogar, particularly structures such as the Balgreen Road bridge and the Baird Drive retaining wall;
- Timely completion of scheduled Prior Approvals and Technical Approvals by CEC;
- NRI immunisation works may become critical as the final stages are tied to pre-booked possession dates in late December 2008 and early January 2009. This work has to be completed prior to the depot energisation in November 2009;
- MUDFA works between Ingliston Park and Ride and the airport;
- The depot building and access bridge (see below); and
- Section 5a around the structures at Murrayfield and section 7 test track activities are classified as near critical.

12.6 In order to have the depot built and commissioned ready for 1st tram deliveries in December 2009 an advance works contract has been awarded to allow for enabling works and mass excavation prior to Infraco commencement. The first two phases of this work have now been completed – some six weeks ahead of schedule.

12.7 Key risks are delivery of design for construction for the utility diversion works and traffic modelling and junction designs, which form the basis of the TRO process. Also essential is the timely delivery of Detailed Design for structures to allow these key items in the Infraco contract can be de-risked and priced competitively. Other critical items identified in the schedule relate to NR activities associated with immunisation works and relocation of existing lineside equipment. The risks associated with these items are described in section 11. The full master programme is included at Appendix V to this FBCv2.

12.8 The programme is dependent on achievement of the programmed approval dates by the TPB, TEL and **tie** Boards, CEC and TS and is built on the staged delivery of Phases 1a and 1b, in line with the current affordability limits.

12.9 The programme identifies a number of key milestones, as detailed below, and assumes a staged delivery with Phase 1a entering revenue service in the first quarter of 2011. The programme for Phase 1b entering revenue service in Q4 2012.

Milestone summaries

12.10 The summaries of milestones and programme assumptions below are shown on a work package basis and are fully integrated in the master schedule. Below each set of work package milestones are some of the key assumptions used, and decisions required in order to successfully deliver this programme.

Business Case

Business Case approval milestones	Date
Approval of DFBC by CEC and TS.	21.12.06 ✓
Confirmation of Infraco tender prices to CEC.	01.02.07 ✓
Approval of DFBC by Transport Minister.	15.02.07 ✓
Approval of FBCv1 by TPB.	15.10.07✓
Approval of FBCv1 by Council.	25.10.07✓
Approval of FBCv2 by Council and TS.	20.12.07

Assumptions:

- Final facilitated negotiations result in a budget cost and construction programme that are within the desired ranges;
- Continued political support for the Project; and
- OGC Gateway 3 Review is successfully completed.

Utilities

Utilities milestones	Date
Completion of pre-construction period of MUDFA contract.	30.03.07 ✓
Commencement of utility diversion works trial site (Phases 1a).	02Apr07 ✓
Commencement of utility diversion works (Phases 1a).	09Jul07 ✓
Completion of utility diversion works (Phases 1a).	Nov 2008

Assumptions:

- Design can be issued in a timely manner to meet the construction schedule;
- There are no major archelogical discoveries that delay the programme;
- The utility diversions as designed can fit into the existing road structure; and
- There are no unknown utilities discovered that result in a delay or re-design.

Tramco

Tramco milestones	Date
Complete initial evaluation / negotiation (from 4 to 2 bidders).	07.03.07 ✓
Completion of clarification and refinement process.	06.07.07 ✓
Recommendation of Preferred Bidder.	19.09.07 ✓
Facilitation of Tramco / Infraco novation negotiation complete.	16.11.07 ✓
Final negotiation of Tramco.	16.11.07 ✓
Award of Tramco contract following CEC / TS approval and cooling off period.	28.01.08
Delivery of tram 1.	Dec 2009
Delivery of all trams – Phase 1a.	Sep 2010

Assumptions:

- Delivery of 1st five trams during December 2009 to allow type testing during January 2010 and subsequent driver training in the depot to commence early February 2010; and
- Five trams only required to complete driver training programme for Phase 1a.

Infraco

Infraco milestones	Date
Return of Stage 1 bid (Phases 1a and 1b core bid).	12.01.07 ✓
Commence depot works under pre-commencement agreement.	23.04.07 ✓
Completion of evaluation / negotiation of Stage 2 bid. (Phase 1a).	08.05.07 ✓
Recommendation of Preferred Bidder.	15.10.07 ✓
Facilitation of Tramco / Infraco novation negotiation complete.	16.11.07 ✓
Final negotiation of Infraco.	12.12.07
Negotiation and finalisation Phase 1b complete.	12.12.07
Infraco – Award Notification.	11.01.08
Award of Infraco contract following CEC / TS approval and cooling off period.	28.01.08
Infraco mobilisation commences.	01.02.08
Infraco mobilisation complete.	28.02.08
Construction commences Phase 1a.	29.02.08
Construction commences Phase 1b*.	06.07.09
Commencement of test running Phase 1a.	27.08.10
Delivery into Revenue Service Phase 1a.	Q1 2011
Commencement of trial running Phase 1b*.	21.09.11
Delivery into revenue service Phase 1b*	Q4 2011

*if decision to construct is made by late 2008.

Assumptions

- Construction completion includes commissioning;
- Working hours outside CoCP can be agreed with CEC as required particularly with regard to night working and long weekend closures at major city centre junctions;
- Traffic Management and TRO process is delivered to schedule and TRO is in place prior to on-street driver training;
- August Festival and Christmas Market exclusion periods apply between Haymarket and Picardy Place;
- NR infrastructure is progressed to meet Infraco programme;
- NR possessions as booked are available as programmed;
- No delays due to unforeseen archaeological or similar issues;
- Existing utilities i.e. Scottish Power 275kv cables at Leith Walk or British Telecom etc do not impact programme; and
- City centre construction constraints have been agreed with CEC and TEL and bidders confirmed recognition of these constraints whilst preparing the construction schedules.

Depot

Depot milestones	Date
Commence construction works (earthworks) under advance works.	**23.04.07 ✓**
Completion of construction drawings.	**17.07.08 ✓**
Commence building construction.	**29.02.08**
Commence yard and sidings.	**16.06.08**
Completion construction works (building).	**12.02.09**
Commence fit out.	**13.02.09**
Complete yard and sidings.	**13.11.09**
Complete fit out.	**14.07.09**
Commencing substation.	**11.09.08**
Complete substation.	**09.10.09**
Energise test track.	**05.02.10**
Commissioning of test track complete.	**14.04.10**
Test track available.	**14.04.10**
Complete building construction (fit out, tested and commissioned).	**04.11.09**

Assumptions:

- Depot is at reduced depth;
- Depot works have commenced with the exception of an exclusion zone around the SGN gas main diversions. SGN complete to programme at the end of January 2008;
- Drivers are recruited for a 6/12 service pattern and so there is no testing of the 8/16 patterns during extended periods;
- First five trams have been type tested before driver training starts;
- Driver training cannot commence until the depot is energised;
- Driver training in depot – total of 13 weeks;
- Driver training on Phase 1a – Off-street 13 weeks and on-street a further 13 weeks;
- Shadow running takes 13 weeks following completion of on-street driver training;
- Phase 1a opening Q1 2011; and
- Planning approvals are granted in the timescales anticipated.

Design and TROs

Design and TRO milestones	Date
TRO process commences.	**24.08.07 ✓**
Completion of construction drawings – MUDFA.	**29.02.08**
Completion of Planning Drawings Phase 1a.	**03.06.08**
Completion of Detailed Design Phase 1a.	**06.11.08**
Completion of construction drawings – Phase 1a Infraco.	**06.11.08**
TRO process complete.	**17.11.09**

Assumptions:

- Approvals and consents are delivered as required;
- SDS produce the TRO schedules and plans on time to meet the required programme;
- The TRO schedules and plans are right first time;
- The modelling is fit for purpose;
- There is sufficient modelling to satisfy the Roads Authority and to justify the measures;
- CEC can review the TRO package within two weeks and agree with the measures being sought;
- There is continued political support for the traffic measures;
- There are less than 5,000 objections, of which no more than 100 will be directly heard at a public hearing;
- There is no substantial technical objection considered by the hearing;
- The public hearing lasts for six weeks or less and the Reporters report will be presented within 90 days of the conclusion of the hearing;
- CEC will convene special Council meetings if required;

- If referred to the Scottish Government, they will respond within a month; and
- There is no judicial review.

Commissioning, training and overall completion

Commissioning and training and overall completion	Date
First tram delivered Phase 1a.	Dec 2009
Driver training commences for Phase 1a in depot.	07.12.09
Energisation Phase 1a off street.	26.06.10
Infrastructure commissioning complete for Phase 1a off-street.	26.07.10
Driver training commences for Phase 1a off-street.	27.07.10
Energisation Phase 1a total – on-street.	29.08.10
Infrastructure commissioning completion for Phase 1a.	27.09.10
Driver training commences for Phase 1a on-street.	28.09.10
Driver training completion for Phase 1a (excludes shadow running).	26.11.10
Tram commissioning complete for Phase 1a.	26.11.10
Shadow running complete for Phase 1a.	25.02.11
Revenue service commences Phase 1a.	25.02.11

Assumptions:

- Driver training programme can meet programme requirements (see assumptions under depot heading above);
- Control room, sidings yard and substation complete to allow energisation of test track; and
- Approval requirements under ROGS are met.

13. The case for Phase 1b

Purpose

13.1 The DFBC set out the economic, financial and operational Business Case for Phase 1 of the tram scheme. Details of the factors that led to the adoption of the staggered approach to construction are set out in section 3 of this FBCv2. This section summarises of the key aspects of the incremental economic and financial case for Phase 1b. It also includes details of the options for delivery of Phase 1b, as included in the Infraco and Tramco bids, together with potential opportunities to seek out additional funding to enable the implementation of this Phase.

Phase 1b justification

13.2 The STAG2 appraisal presented in the DFBC focused on Phase 1 in its entirety. However, the underlying detailed modelling work and assessments of cost and benefits identifies the incremental Business Case for Phase 1b. This case is embedded in the STAG appraisal and fully aligned to the planning objectives and Government's transport objectives which are presented in section 3. The following are the key elements from the economic assessment for Phase 1b.

Economic regeneration

13.3 In considering Phase 1b, the key 'driver' was the need to link the Granton waterfront with the rest of the network and the rest of the city / region. Granton is linked to the network at Haymarket via the Roseburn corridor, which also serves the new Telford College, the Western General Hospital, Craigleith Retail Park and other key destinations. This section remains an important priority in social inclusion and economic development terms.

13.4 One of the biggest development opportunities in Edinburgh is the redevelopment of the Granton area (Table 13.1). The development potential is focused on residential use, with some 7,800 units envisaged.

Table 13.1. Potential development in the area served by Phase 1b of the tram.

Location	Residential (Units)	Office / Business (m^2)	Retail (m^2)	Hotel (Rms)	Commercial (m^2)	Leisure (m^2)	Other (m^2)
Granton	7,800	0	40,400	0	130,000	8,800	65,000

Accessibility and social inclusion

13.5 An integrated, efficient, accessible and high quality public transport system is vital to promoting economic growth and improving the performance and competitiveness of local communities. Without Phase 1b of the tram it is unlikely the large scale redevelopment of Granton could go ahead in the same timescale or to the same extent. The new development will bring high quality living, leisure and employment opportunities. In addition to opening up brownfield land for redevelopment, it is highly probable that the tram will have a positive impact on the image of the area and hence help to stimulate further inward investment.

13.6 Mapping of the levels of economic deprivation, employment levels and levels of educational attainment show a considerable variance across the city. Areas of Granton and Pilton to the north have been identified as areas where socio-economic status is considerably less affluent than surrounding areas. Employment, income levels and car ownership tend to be comparatively low in these areas. Direct connection to the city centre and other employment areas which will be facilitated by Phase 1b of the tram will undoubtedly improve the situation for these areas. Phase 1b of the tram will offer an attractive service to those areas, including all the features to support enhanced safety and reliability associated with tram.

Transport and land use integration

13.7 Phase 1b sees trams, extend to the Granton Waterfront. It will provide an essential transport link for the planned developments at this important development site with other parts of the city. Regeneration of brownfield sites and protection of the greenbelt around the city boundaries form part of key planning strategies for Edinburgh. The likely success of the development in Granton, and thus the CEC strategy, will be strongly influenced by the provision of reliable, sustainable public transport network, of which tram plays an essential part.

13.8 In the absence of Phase 1b of the tram, the new development underway in North Edinburgh may contribute significantly more to city-wide congestion, and related environmental impacts, as a direct result of the failure to integrate land use and transport policies. It is also possible that the new development would be diverted to less sustainable locations with less potential for effective transport integration.

13.9 The introduction of tram will provide an opportunity to significantly improve integration between transport modes. The major advantage here is that integration can be planned before the start of services; this is much more effective than trying to achieve integration between already established services. As well as the interchange at Haymarket with heavy rail and buses, there will be an interchange with buses at Crewe Toll.

Patronage and transport mode shift

13.10 The extensive work on forecasting models for usage of the tram as described in section 4 predicts an incremental 2m tram passengers in 2012 for Phase 1b. This rises to an incremental 8m in 2031. This growth includes a substantial increase in the overall travel market based on the predicted additional commercial and housing developments as well as a significant element of mode shift. The Granton / Muirhouse area in particular exhibits mode shift of greater than 5% (encompassing significant areas of development and growth which otherwise would be associated with higher levels of car travel).

Economic activity and locational impacts (EALI)

13.11 The key EALI impacts of introducing Phase 1b of the tram are projected to be:

- **Employment development**: By 2015 more than 65,000 m^2 of employment development is anticipated to be advanced as a result of Phase 1b of the tram. Beyond 2015 this ultimately drops back to an additional 43,800 m^2 as the development pipeline catches up in the “without tram" scenario.
- **Residential development**: The construction and occupation of more than 4,500 additional residential units is anticipated to be advanced as a result of Phase 1b by 2015, reducing to 3,800 by 2020.
- **Employment generation**: More than 340 jobs, in present value terms, are expected to be generated or brought forward by the development impact of Phase 1b of the tram, after allowing for displacement of jobs elsewhere in Scotland.

13.12 Phase 1b is only operationally viable as part of a wider network under Phase 1a. Therefore, no separate assessment of the NPV and the benefits for every £1 of costs (BCR) was undertaken for Phase 1b alone at the DFBC stage. However, in comparing the appraisal result for Phase 1a (BCR 1.77) to those of Phase 1 in its entirety (2.31), it becomes evident that the incremental benefits of Phase 1b offer exceptional value for money in TEE terms (Table 13.2).

Table 13.2. Incremental benefits and costs to Government from Phase 1b of the tram.

£m Present Value, 2002 prices	Incremental Phase 1b
Public transport user benefits	254
Other road user benefits	116
Private sector provider effects	29
Accident effects	(12)
PV of scheme benefits (incl. accidents)	**388**
Investment costs	70
Public sector provider effects	19
PV of scheme costs	**89**

13.13 The principal reasons for the disproportionate level of net benefits afforded by construction of Phase 1b at the same time as Phase 1a are as follows:

- The assessed value of time benefits to public transport users arising from Phase 1a is limited by the existing high quality and frequency bus services provided on this corridor and the 'reference case' assumption that the application of CEC policy would seek to maintain, as far as possible, the existing level and travel time of the bus services by the introduction of bus priority measures. The Phase 1a tram provides the capacity on this corridor to deal with the predicted increases in public transport users;
- In relative terms, the Phase 1b corridor is not currently as well served by existing bus services, particularly for users travelling to Haymarket and to the west of the city, including the new employment opportunities at Edinburgh Park and the airport. For these users it is predicted that the Phase 1b tram will provide very positive time benefits, compared to the situation without the tram;
- Phase 1b is predicted to deliver relatively higher benefits to other road users because it has relatively few interfaces with the road network, being aligned for the most part on the Roseburn railway corridor and on the reserved tram corridor in the Granton development area; and
- The investment costs associated with Phase 1b are relatively low, reflecting the significant economies of scale which will be realised from the construction of this section of the tram. In addition, Phase 1a presents many complexities in terms of on-road running, including utility diversions, which are not so significant in the construction of Phase 1b. However, this opportunity to capitalise on economies of scale diminishes the longer the decision is delayed on whether to proceed with Phase 1b or not.

Project scope

13.14 The following section provides a summary of the key strategic functionality of Phase 1b and a high level description of the baseline scope for this Phase.

Route alignment

Granton Square to Ferry Road

13.15 The tram will run through the Granton Waterfront development area from Granton Square to the junction of West Granton Access and West Granton Road, at the northern edge of Pilton. Much of tram in this area will form part of a transport boulevard along the new spine road. This area is currently undergoing comprehensive redevelopment and as such the tram alignment has been determined primarily through the development master-planning process. The tram alignment continues along West Granton Access and through the junction at Ferry Road.

13.16 Stops are planned at Granton Square (centre platforms), Saltire Square (two side platforms) Caroline Park (two side platforms), West Pilton (midway along West Granton Access: two side platforms), and Crewe Toll (two side platforms). The Crewe Toll stop located next to the junction between West Granton Access and Ferry Road will form a bus - tram interchange between the north-south orientated tramway and the main road extending east-west.

13.17 The tram route adjacent to West Pilton is along a reserved corridor on the west verge of the newly constructed West Granton Access from West Granton Road to Ferry Road. The tram will be constructed along the broad grass verge to the new road. The track-bed will be in-filled with grass and the route will be landscaped with any vegetation removed during construction replaced with areas of trees and decorative shrub planting.

Ferry Road to Haymarket

13.18 The tram will follow the former railway corridor on a fully segregated alignment from Ferry Road to the point where it meets the existing heavy rail corridor just west of Haymarket. Stops are planned at Telford Road, Craigleith, Ravelston Dykes and Roseburn (all two side platforms). Alterations will be required to all the smaller bridges that the tram runs over, including the bridge over the A8 at Roseburn. Works will be required to widen the Groathill Avenue and Craigleith Drive underbridges, and also the Coltbridge viaduct.

13.19 The tram and the replacement cycleway / footpath will be constructed on the line of the old trackbed. The tram will run on the east side of the track-bed and the cycle and foot path to the west, with formal crossings as required allowing public accesses to the east. The combined width of the tram tracks and the cycleway and footpath will be approximately 11m, compared to the original railway of 8m and the current cycleway of 3ms. Through the majority of the existing cutting and embankments, retaining structures will be required to accommodate the required widening.

13.20 Where the railway corridor passes under narrow and low arched bridges, the track bed will be lowered to allow the tram tracks to be offset from the bridge centre-line and thus allow room for a narrower cycleway / footpath. The cycleway and footpath will be surfaced in a fine grade blacktop as existing, while the tram track, with the exception of crossings, incorporating a grass finish.

Interchange

Crewe Toll

13.21 The interchange at Crewe Toll is essential to meet the commitment given during the parliamentary process to provide feeder buses linking the tram route with the Western General Hospital. The location has sufficient space to maximise the potential for good tram / bus interchange. All bus and tram movements into and inside the interchange are required to be controlled by traffic signals.

Granton Square and Newhaven

13.22 Following on from the decision for phased construction of the tram, there is an opportunity to provide quality interchanges with bus at the end of Phase 1a in Leith and at the end of Phase 1b in Granton, thus linking the ends of the network along the seafront.

Interfaces with other projects and functional boundary

Granton Masterplan

13.23 In order to facilitate the expected economic regeneration, the Granton Masterplan sets out the development aspirations for this area in North Edinburgh. There will need to be close interaction between the CEC Planning Authority and the tram project so that the project can help to maximise the redevelopment and regeneration of this area.

Route capability

13.24 The performance criteria for Phase 1b are in line with those of Phase 1a and include:

- Journey time of 16 minutes and 30 seconds (including layover and dwell times of 25 seconds at each stop): and
- Achieving reliability targets where 99% of monitored tram departures are no earlier than one minute and no greater than two minutes late, compared to the scheduled headway. The reliability of the service will be measured at Crewe Toll (departure) and Granton Square (departure).

13.25 There will be turn back capabilities at Crewe Toll and layover facilities at Granton Square.

Project workscope

Track

13.26 The nature of tramline surfacing (track, swept path, affected roads and footpaths) is dependent upon its environment. On the Roseburn Corridor, the track finishes will primarily be grass

Structures

13.27 The following structures will be required to be constructed or altered to accommodate the tram:

- Roseburn Corridor retaining walls;
- Roseburn Terrace bridge;
- Coltbridge viaduct;
- St George's School access bridge;
- St George's School foot bridge;
- Ravelston Dykes bridge;
- Craigleith Drive bridge;
- Holiday Inn access bridge;
- Queensferry Road bridge;
- Groathill Road South bridge;
- Telford Road bridge;
- Drylaw Drive bridge;
- Ferry Road retaining wall; and
- Crewe Road Garden bridge.

Substations

13.28 The following substations will be built on line 1b:

- Craigleith substation;

- Granton Mains East substation; and
- Granton Road substation.

Overhead line equipment

13.29 The OLE will utilise a single contact wire system, with additional parallel (buried) feeders. Standard materials will be used with the exception of the route sections from Caroline Park to Granton Square tramstops, where stainless steel material (for tubes and fittings) will be provided.

Procurement approach

13.30 The procurement strategy applied by **tie** is entirely compatible with the approach of a staggered implementation of Phase 1b. The key contracts relating specifically to Phase 1b are SDS, MUDFA, Infraco and Tramco. The contractual principles for each of these are the same as for Phase 1a and the elements which are specific to 1b are set out below:

SDS

13.31 The contract awarded in Sept. 2005 included the design for Phase 1b in its scope. At the time of developing the phased approach to construction of the ETN, design work for Phase 1b had sufficiently progressed to warrant its completions. This is now scheduled for December 2007.

MUDFA

13.32 The contract for utilities diversion includes the provision of diversionary works on the Phase 1b route. As large parts of the 1b route are confided to the Roseburn corridor, the quantum of works required is significantly lower than for Phase 1a. These works will therefore be considerably less intrusive to traffic. The AMIS programme currently schedules commencement of diversions for 1b at the end of the works for Phase 1a. A commitment to diversion work on Phase 1b will be required before AMIS demobilises to minimise the loss of benefits of scale. Alternatively, if no decision on Phase 1b is reached beforehand, utility diversions could be included under Infraco. However, this would result in additional costs for Infraco and the loss of economies of scale which are to be had under the AMIS contract.

Vehicle supply and maintenance (Tramco)

13.33 The contracts for the supply and maintenance of tram vehicles contain an option to purchase additional trams on the same principles as for the base bid. Such additional vehicles could be used for services on Phase 1b. Under the contracts, **tie** has the option to purchase an additional four trams on a fixed price basis, comparable to that for the original 27 trams, plus the right to order a further four trams on an indexed price basis. The option can be exercised at any point prior to March 2009 at **tie**'s discretion.

13.34 It should be noted that, although the Tramco contract will be novated to Infraco, the decision to purchase additional trams is not necessarily linked to a decision on whether to construct Phase 1b. This means that additional trams could be purchased under the above conditions to serve increased service demands if required. **tie** retains the right to exercise the purchase of additional trams, even if Phase 1b does no go ahead.

Infrastructure provider and maintenance (Infraco)

13.35 As with the Tramco contract, **tie** has the option to instruct the construction of Phase 1b on the same terms as for Phase 1a at any time to March 2009. This means that prices, programme for construction and key technical elements of this option will be agreed as part of the main contracts which will be awarded in January 2008. The final terms of the option have not been agreed yet. However, these will be finalised prior to Financial Close.

Implementation

13.36 In addition to the system wide constraints and implementation plans described in sections 5 and 8 of this FBCv2, specific requirements for Phase 1b are outlined below:

Roads Authority Approvals

Temporary Traffic Regulation Orders

13.37 As stated in section 8, in respect of the TTROs, a strategy has been developed by **tie** to ensure that the necessary orders are in place for both the MUDFA and Infraco works. The strategy aims to maximise flexibility during the construction period and to minimise the risk of public confusion given the scale of the works.

13.38 Should the Phase 1b works immediately follow the 1a works, then these could continue under the measures already in place. However, if the diversion works for 1b were to be delayed, the appropriate TTROs would need to be raised.

Traffic Regulation Orders

13.39 Compared to the TROs required for Phase 1a, the TROs for 1b are less complex. However, as with the TTROs, if Phase 1b were to proceed concurrently or immediately after 1a, then the TROs required would be applied for at the same time as 1a. If 1b were to be completed at a later date, the appropriate TROs would need to be raised at that time.

Land assembly

Powers under the Acts

13.40 As stated in section 8, the Acts confer rights on CEC, as the authorised undertaker, to compulsorily acquire land and rights in land, both temporarily and permanently, as required for the construction and operation of the tram.

13.41 Notwithstanding the powers conferred by the Acts, Side Agreements have been entered into with various parties which limit these powers either in respect of the extent of the limits of deviation or the timing of the exercise of these powers or which impose additional obligations on CEC, particular in relation to temporary possession of land. There are also a number of undertakings which CEC have given to owners of land adjacent to the tramway in relation to construction related activities and hours of working as enshrined within the CoCP.

Key activities and assumptions

General

13.42 As with Phase 1a, the first set of GVD notices, which outline the intention to secure title under compulsory purchase powers, were sent out by the end of November 2006. Although it did not oblige CEC to purchase the land at that stage, it started the process which authorises the Statutory Undertaker (CEC) to proceed to the next stage in the GVD process, enabling the required rights and title to land to be acquired within 28 days of submission of a second GVD notice.

Landscape and Habitat Management Plan

13.43 A LHMP was developed during the Parliamentary process and this will continue to evolve as the project progresses. This relates to the Roseburn Railway Corridor only and was developed in recognition of the likely significant environmental impacts on the Roseburn Corridor and the change in its character.

13.44 The LHMP includes the following:

- Details of the trees to be removed and retained including any proposed pruning, lopping and topping of trees to be retained and the species, specification and location of any replacement trees;
- Details of the proposed accesses and finishes to the accesses;
- The locations of noise barriers, fences, lighting and other street furniture;
- The location and species of existing planting to be retained;
- Schedule and plans of proposed planting, including details of species, sizes, proposed numbers, planting density and location;
- Proposals for maintaining the landscaping; and
- A badger mitigation plan.

13.45 In addition the authorised undertaker is to employ all reasonably practicable means to ensure that not less than one tree is planted for each tree that is removed and that the track is constructed of a track form having a significant proportion of its surface finish in grass or similar.

13.46 The Act also prescribes who should be consulted during the evolution of the LHMP (see Section 68 of the Edinburgh Tram (Line One) Act 2006). These parties include local residents, emergency services and SNH.

Operational plan

13.47 Phase 1b would be a fully integrated part of the TEL transport network. As part of the strategic Business Plan prepared by TEL for the DFBC, service patters and patronage, revenue and profit forecasts were developed for Phase 1. Based on the same operational strategies and assumptions, this work demonstrated that the patronage forecasts for 1b support TEL's overall profitability. The financial forecasts highlights are presented in table 13.3.

Table 13.3. TEL profitability with Phase 1 of tram (All £ figures inflated).

Tram in service	Pre-tram		Ph1a Only	Phase 1a plus 1b			
Tram service pattern (see below for explanation)	n/a	n/a	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2012	2016	2021	2031
Patronage (Pax m)							
Bus	108	117	113	112	121	128	143
Tram	-	-	11	16	24	28	34
Total TEL Patronage	108	117	124	128	145	156	177
Revenues and costs (£m)							
TEL Revenues	88	109	119	128	168	216	357
TEL operating costs			120	127	157	195	312
Pre-tax operating profit/(loss)			(1)	1	11	21	45

Service Patterns

13.48 The planned service patterns for Phase 1a are outlined in section 5 of this FBCv2. The additional services provisions for 1b are 6tph in each direction between Granton Square and Leith via Haymarket. In conjunction with Phase 1a frequencies, this will provide 12tph in each direction between Leith and Haymarket (a tram every 5 minutes). This will be the case for Phase 1b if it is constructed concurrently with Phase 1a. However, if Phase 1b is delayed then the service pattern will align with that in existence with Phase 1a at the time (Figures 13.1 and 13.2).

Figure 13.1. 2011 tram services for Phase 1.

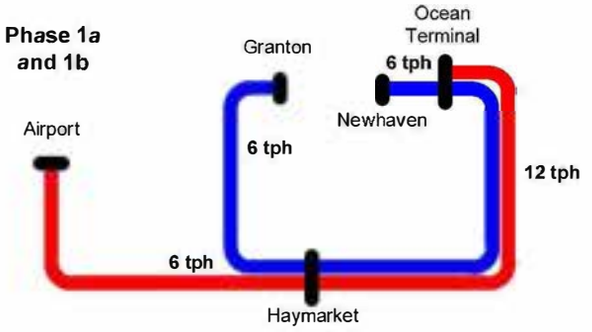
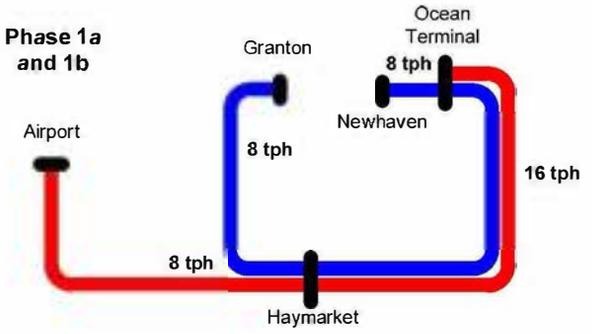


Figure 13.2. Tram services for Phase1 after initial 'build-up' period.



13.49 Phase 1b does not run parallel to any bus routes and is designed to cater for demand from future developments at Granton. Therefore, introducing tram here does not lead to reductions of current bus services or cost savings. During the parliamentary process a commitment was given to the effect that feeder buses would be provided linking Crewe Toll with the Western General Hospital and existing services to the area would be maintained.

Risks to patronage and revenues for Phase 1b

13.50 On Phase 1b, the opportunities to mitigate the impact of lower demand are lower than on Phase 1a, as a greater proportion of the patronage will be carried by the tram. Although patronage on Phase 1b amounts to approximately 30% of total tram passengers, nearly 70% of that demand will be directly dependent on the new development at Granton waterfront. However, in context, this represents a relatively small proportion of TEL's total revenue and opportunities will exist to reduce the planned level of tram services to mitigate the negative impact.

Financial analysis

13.51 The detailed review of the cost estimates undertaken in 2006 for the DFBC identified the capital costs for Phase 1b as £92m if constructed within a phased programme of work, the reasons for this approach and its associated risks and benefits are described in section 3.

13.52 The bids received from each of the Infraco and Tramco provide a contractually priced and committed option to proceed with the implementation of Phase 1b as well as for its maintenance, if approval was given by end 2008.

13.53 Based on these bids, the updated incremental cost of Phase 1b is £87m, these are subject to final negotiations, which will be completed prior to Contract Award.

Application of available funding

13.54 The principles for payments of the capital costs are set out section 7 and will be made in accordance with the contractual payment mechanism for the contracts. Table 13.4 below sets out the incremental impact on the payment profile for Phase 1b.

Table 13.4. Capital expenditure profile.

Payment profile	Phase 1a	Incremental Phase 1b*	Phase 1
Cumulative up to award of Tramco and Infraco	**£103.1m**	**£2.4m**	**£105.5m**
Year to March 2008	**£137.2m**	**£3.1m**	**£140.3m**
Year to March 2009	£161.6m	0[1]	£161.6m
Year to March 2010	£160.6m	£33.1m	£193.7m
Year to March 2011	£35.0m	£46.0m	£81.0m
Year to March 2012	£3.6m	£5.2m	£8.8m
Total capital expenditure	**£498.1**	**£87.3m**	**£585.3m**

*This includes £9m for risk allowances specifically identified for Phase 1b.

[1]this profile assumes no commitment to works are undertakend prior to end 2008 when a decision on Phase 1b is required to be made to achieve the proposed price of £87.3m.

13.55 In the context of the committed maximum funding package at £545m and based on cost estimates for Phase 1a at £498.1m, there is a funding shortfall of £40m in relation to Phase 1b. The revised funding arrangements set out by the Scottish Government as a condition of continued support require CEC to develop a different approach to funding their commitments, particularly for Phase 1b. Work is underway to investigate these opportunities and conclude on their realistic prospect in line with the planned duration of the period in which CEC can exercise its option under the contracts. Additional funding which requires borrowing (or equivalent mechanisms) will require careful cost:benefit evaluation.

13.56 Options under consideration are:

- CEC / TEL borrowing or leasing of assets;
- Developer contributions and related assets sales;
- TEL resources (other than borrowing);
- Third party grants (e.g. SESTRAN); and
- Tax shelter mechanisms.

Lifecycle costs and funding of major renewals

13.57 As for Phase 1a, TEL (and therefore CEC) will assume responsibility for paying for the regular heavy maintenance and renewals in respect of the tram vehicles and infrastructure for Phase 1b.

Summary

13.58 A decision on whether to go ahead with the construction of Phase 1b will be required by the end of 2008. This window of opportunity is defined by the proposed contract terms with the Infraco bidders, which provides for fixed terms and rates for Phase 1b. These terms are subject to final negotiations, but will be clarified prior to the contract award.

13.59 The decision on Phase 1b will be influenced by a number of factors. These will include an assessment of the actual pace of development in Granton, the opportunities to raise additional funding and the deliverability of the committed funding by CEC.

13.60 Making a decision in late 2008 / early 2009, will allow it to be informed by greater clarity, with respect of actual progress of construction on Phase 1a, particularly in relation of MUDFA works, and the relative usage of risk allowances included in the project estimate for Phase 1a.

14. Future phases

Project phasing

14.1 This FBCv2 sets out the strong business case for Phase 1 of the ETN with a primary focus on the implementation of Phase 1a. This would be followed, if sufficient funding can be agreed, by Phase 1b. This is in line with the preferred phased approach identified and approved in 2006. However, CEC remain committed to investigate opportunities to expand this core section to complete the full network of Lines 1 and 2 (Phases 2 and 3), as depicted in Figure 14.1 below.

Figure 14.1. Tram route for Phases 1, 2 and 3 (Lines 1 and 2).

Options for future expansion of the ETN

Heavy rail interchange at Gogar

14.2 As part of the announcement on the 27th September 2007 to cancel the provision of a heavy rail link to Edinburgh Airport (EARL), the Scottish Government suggested the option of creating a heavy rail station at Gogar that would connect with the tram to provide a rail link to the airport. This station would provide an opportunity for passengers from Fife and further north to access the airport with one interchange and the proposal may include the diversion of some Glasgow-Edinburgh trains to this station.

14.3 The impact of this new project in terms of costs, patronage and associated benefits will be subject to appropriate transport appraisal procedures and it will require to be funded separately from the tram project. Under the appraisal guidelines, the impacts of new projects on the existing transport infrastructure, in terms of costs and benefits, has to be taken into account in the assessment of the new project.

Further expansion opportunities

14.4 In addition to the construction of the core network (Lines 1 and 2) in phases, the Council remains committed to the construction of Line 3, for which much development work has been completed and the line of which is 'protected' by planning controls.

14.5 Line 3 would link the core network at Princes Street through the South Side to the key development area at Little France where a Bio-medical Research Park of international significance is being developed next to the Royal Infirmary and University campus. The line would then run through the regeneration area at Craigmillar to Fort Kinnaird and the existing park and ride and heavy rail station at Newcraighall. Like the core network, Line 3 could also be constructed in phases to reflect the availability of finance.

14.6 Beyond these firm proposals, previous work indicates that there are a number of further viable long-term extensions. These include the extension into northwest Edinburgh and extensions of Line 3 to Queen Margaret's University College, Musselburgh and East Lothian, and into the Midlothian towns not yet served by heavy rail.

14.7 Development beyond the initial core network will reflect circumstances and development patterns at the time. Appropriate powers will need to be secured.

Developments elsewhere

14.8 The plans and opportunities to secure additional funding for future expansions of the ETN should be considered, in the context of the success of tram schemes elsewhere. Currently there are 450 light rail systems operating in cities around the world. Closer to home, and more recently, Dublin's LUAS, Nottingham's Express transit scheme and Manchester's Metrolink have proven particularly successful. Patronage is increasing, revenues are in line with expectations and, overall, the new tram systems have been a success, evidenced by the current expansion proposals.

Dublin

14.9 LUAS currently encompasses two unconnected light rail lines in Dublin, measuring some 23km in length. As at November 2006, over 50m journeys have been made on the system.

14.10 The LUAS system is very popular with commuters, being seen as clean, dependable and reasonably good value. Patronage of the system has grown in popularity since its inception. 22m passengers were carried in 2005 and 26m passengers in 2006, working out at an average of 80,000 passengers travelling on the system every day.

14.11 There is currently 9km of construction underway on two extensions to the scheme and several other expansions are planned for the future, in part funded by a supplementary contribution scheme levied on both residential and commercial development within the catchment area. Two new metro lines are also planned, one from the airport to the city centre and a route in the west linking outlying towns to the city centre and airport.

Nottingham

14.12 Like Dublin, the Nottingham Express transit has appeared popular since it opened in March 2004, with patronage standing at 8.4m passengers in its first year of operation and attracting praise from passengers, the press and local and central government.

14.13 Integrated transport has been an objective from the start, with through ticketing and simple connections available to local buses and trains at several locations. There are also five park and ride sites, with free parking for tram passengers.

14.14 The system is a mixture of on-street running and reserved track. Line One is nine miles long, running from Station Street (next to Nottingham main line station) to Hucknall, just outside Greater Nottingham; there is also a short spur to Phoenix Park. Extensions are planned to the south and west of the existing scheme and a Statement of Case has been submitted (August 2007) by the joint promoters, Nottingham City Council and Nottinghamshire County Council, detailing their plans.

Manchester

14.15 Manchester Metrolink was a pioneering light rail system when it opened in 1992. It was the first in the UK to include on-street running, and has been a success in easing road congestion. In the year to March 2006, it carried 19.9m passengers.

14.16 After completing Phase 2 in 2002, and continued improvements to the existing system, a major new funding package was announced in 2006 to continue growing the Metrolink system. Together, the expansions Phases 3a and 3b will double the size of the current system from 38.4km to 76.8km. Following this, additional extensions are included in a bid for funding to the Government's Transport Innovative Fund, submitted in 2007.

Sheffield

14.17 Sheffields Supertram opened in 1994 with three routes radiating from the city centre to Meadowhall, Halfway and Middlewood, giving a total length of 30km. The Supertram serves residential, industrial and leisure destinations as well as running through run-down residential areas earmarked for redevelopment. It has been highly successful in terms of opening up access to the Lower Don Valley and is now seen as one of the major successes in Sheffield.

14.18 In 2003 it carried twice as many passengers as the local rail network and in the year to March 2006, carried 13.1m passengers. A total of 48 stops are served, including two with National Rail interchange and four park and ride sites. Future extensions may take the tram to Rotherham in the north, Dore in the south, Ranmoor in the west and Hellaby in the east.

Midland Metro

14.19 The Midland Metro opened in 1999 and runs 20.1km between Birmingham and Wolverhampton. There are three stops with National Rail interchange and four park and ride sites. Over 5m passengers a year are attracted to the best performing public transport mode in the West Midlands and it consistently exceeds 98% reliability of service.

14.20 Extensions are planned, including a line from Wednesbury to Dudley and Brierley Hill, a line through the Birmingham city centre to Five Ways and a loop in the Wolverhampton city centre to bring the total network length to 41.5km. A further 60km of route has been approved for consultation and development. The Midland Metro extensions will provide a valuable new transport corridor through some of the most deprived areas of the West Midlands improving access to jobs and services for residents as well as attracting new business and developments to these areas.

Docklands Light Railway

14.21 The original 16.1km of DLR lines opened in 1987. The system was designed with expansion and extension in mind and has been extended four times and now totals 32.2km. Further extensions are both under construction and being planned. All of the original stations have been rebuilt to take longer trains.

14.22 The DLR has developed and grown with the area it serves.The network has played an important part of the redevelopment of the London Docklands which had become derelict, but now form London's second business and commercial centre. 52m passengers were carried in the year to March 2006.

Croydon Tramlink

14.23 Croydon Tramlink is a 29.8 km light rail network serving Croydon, a major population centre in the south of Greater London, and the surrounding areas. Tramlink opened in stages in 2000 and 22.5m passengers were carried in the year to March 2006. Following on from the success of the initial network, a number of proposals have been made for extensions throughout South London. The extension to Crystal Palace is the most likely to go forward and would make journeys quicker and easier as well as improving the local economy and environment as 11,000 more households would be close to this frequent, fast, affordable and accessible service.

Conclusion

14.24 It is clear from the available evidence there are many tram success stories throughout Europe and further afield. It has been proven that investment in a tram system reaps rewards and generated revenues are meeting expectations. Edinburgh will be no different. With a BCR of £1.77 for every £1 invested, the introduction of Phase 1a will result in significant tangible benefits - socially, economically and environmentally. The integration with buses through common ticketing and branding will create a seamless and cost-effective transport network and ultimately ease congestion.

14.25 With patronage levels increasing on other tram networks, expansions are either planned or already underway. Further expansion for Edinburgh Trams to other areas, such as Newbridge, the Royal Infirmary, Forth Crossing and West Edinburgh, for example, would provide social inclusion and offer accessibility to jobs, leisure facilities and other transport modes. Key areas are earmarked for business or will house Edinburgh's growing population and they need better transport choices to help residents and employees to be better connected with the wider city.

14.26 Whilst Scotland's Capital City is currently successful and dynamic, this cannot be taken for granted. It will be necessary for Edinburgh to find ways to maintain this growth to ensure the city continues to offer a good quality of life to residents. It is fundamental that all communities have access to the opportunities available and an integrated transport system is essential to achieve this goal.

GLOSSARY

ACMP	Approvals and Consents Management Plan
AMIS	Alfred McAlpine Infrastructure Services
APA	Asset Protection Agreement
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
BCIS	Building Costs Information Services
BCR	Benefit to Cost Ratio
BPIC	Business Planning Integration Committee
CANHU	Countryside and Natural Heritage Unit
CCTV	Closed Circuit Television
CDA	Core Development Areas
CEC	The City of Edinburgh Council
CoCP	Code of Construction Practise
DFBC	Draft Final Business Case
DLR	Dockland's Light Railway
DPD	Design Procurement and Delivery
DMRB	Design Manual for Roads and Bridges
DPOFA	Development Partnering and Operating Franchise Agreement
DSA	Development Services Agreement
DV	District Valuer (Valuation Office Agency)
EALI	Economic Activity and Locational Impacts
EARL	Edinburgh Airport Rail Link
EIA	Environmental Impact Assessment
ER	Employers Requirements
ETN	Edinburgh Tram Network
ETP	Edinburgh Tram Project
FATS	Factory Acceptance Test
FBC	Final Business Case
FBCv1	Final Business Case Version 1
FBCv2	Final Business Case Version 2
GVD	General Vesting Declaration
H&S	Health and Safety
HMRI	Her Majesty's Rail Inspectorate
HR	Human Resources
ICP	Independent Competent Person
Infraco	Infrastructure Contract
ITI	Integrated Transport Initiative
ITN	Invitation to Negotiate
JRC	Joint Revenue Committee contractor
KPI	Key Performance Indicator
LAMP	Land Asset Management Plan
LB	Lothian Buses
LHMP	Landscape and Habitat Management Plan
LLAU	Limits of Land to be Acquired or Used
LOD	Limits of Deviation
LRT	Light Rapid Transit
LRV	Light Rail Vehicle
LTS	Local Transport Strategy
MRSG	Modelling Revenue Stakeholder Group
MUDFA	Multi Utilities Diversion Framework Agreement
NAO	National Audit Office
NPF	National Planning Framework
NPV	Net Present Value
NR	Network Rail
NTS	National Transport Strategy
OCIP	Owner Controlled Insurance Programme
OGC	Office of Government Commerce
OJEU	Official Journal of the European Union

OLE	Overhead Line Equipment
PFI	Private Finance Initiative
PIN	Preliminary Information Notice
PMP	Project Management Plan
PPP	Public Private Partnerships
QRA	Quantitative Risk Analysis
RBS	Royal Bank of Scotland
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations
ROGS	Railway and Other Guided Transport Systems (Safety) Regulations
RPI	Retail Price Index
RTS	Rapid Transit Solution
RTS	Regional Transport Strategy
RTU	Remote Terminal Unit
SATS	Site Acceptance Test
SCADA	Supervisory Control and Data Acquisition
SDS	Systems Design Services contractor
SE	Scottish Executive
SESTRAN	South East of Scotland Transport Partnership
SMS	Safety Management System
SNH	Scottish Natural Heritage
SPP	Scottish Planning Policy
SRO	Senior Responsible Owner
SRU	Scotland Rugby Union
STAG	Scottish Transport Appraisal Guidance
TEE	Transport Economic Efficiency
TEL	Transport Edinburgh Limited
The Acts	The Edinburgh Tram (Line One) Act, 2006 and the Edinburgh Tram (Line Two) Act, 2006
The Executive	Scottish Executive
tie	**tie** Limited
TPB	Tram Project Board
tph	Trams per hour
TRO	Traffic Regulation Order
TTRO	Temporary Traffic Regulation Order
Tramco	Tram Vehicle Supply and Maintenance Contract
TS	Transport Scotland
TSS	Technical Support Services contract
UTC	Urban Traffic Controls
VAT	Value Added Tax
VFM	Value For Money

Trams for Edinburgh
..connecting our Capital

TEL – Planning for the Future

Strategic Business Plan

2006

CONTENTS

Appendices

INTRODUCTION

1. As an integral part of the preparation of the Draft Final Business Case (DFBC), Transport Edinburgh Limited (TEL) have prepared a Strategic Business Plan which details the Company's objectives, its modus operandi, its relationship with CEC and with **tie** and analyses the opportunities and threats TEL will face in operating an integrated tram and bus business.

1.1. At the core of the TEL Business Plan is an assessment of how TEL will integrate the tram into its operations and a detailed assessment of TEL's anticipated revenues and profitability operating with Phase 1 of the tram in place. This analysis is established from TEL's involvement in the development of prospective integrated service patterns for tram and bus for the Joint Revenue Committee (JRC) models and validation of the patronage and revenue projections which have flowed from the modelling process.

2. Rationale for TEL

2.1. Experience gained from a wide range of tram schemes has demonstrated that integration with other modes of public transport, particularly bus, will greatly contribute to the success of trams as part of an integrated transport network. The principal bus operator in Edinburgh is Lothian Buses (LB), which is wholly owned by the public sector and 91% owned by CEC. LB's operations are currently very successful, holding a share of approx. 85% of Edinburgh bus patronage and having experienced patronage growth of more than 25% since 1998.

2.2. To facilitate effective integration between tram and bus and to build on the success of the current LB bus services, CEC has established Transport Edinburgh Limited (TEL), which is charged with the delivery and management of an integrated bus/tram network that optimises service provision while maximising operational synergies. With the establishment of TEL, CEC are re-enforcing their commitment to continuing to provide first class public transport in Edinburgh.

2.3. The approach to integration of the key local public transport modes, bus and tram, sets Edinburgh apart from other UK tram schemes. The integration of high quality bus and tram services will improve the attractiveness of the combined network to something greater than the sum of its constituent parts. The levels of demand projected by the JRC transport model (an increase of 61% (1.8% p.a.) between 2005 and 2031) indicate a significant profit potential for TEL operating with Phase 1 of the tram. This places TEL in a unique position of strength to capture and service the predicted overall growth in the travel market.

3. Financial forecast highlights

3.1. Table 3.1 below provides a summary of the financial highlights from the forecast of TEL's profitability operating with bus and tram. This summary reflects the following:

3.2. Figures for 2011 are presented on two bases; that Phase 1 of the tram will be operating in its entirety in 2011 (the assumption reported on by JRC) and separately that Phase 1a of the tram will operate in 2011 with Phase 1b coming onto service in 2012.

3.3. The overall operational cash flow profile will be positive once the tram and bus patronage has stabilised after a "ramp-up" period. On this basis the requirement to demonstrate that, over time, the integrated service will not require subsidy has been fulfilled.

3.4. The financial forecast reflects the increase in pension contributions required to meet the recommendations contained in the 2006 actuarial valuation of the LB pension scheme. This

has the effect of eliminating the £20m net deficit and predicted future service costs and is unrelated to the introduction of the tram.

3.5. The financial forecast includes taxation on forecast profits calculated at the prevailing rate of corporation tax. However, TEL will continue to examine opportunities for tax efficient cash flow planning.

Table 3.1 - TEL profitability with Phase 1 of the tram

Tram in service	*Pre-tram*		*Ph1a Only*	*Phase 1a plus 1b*				
Tram service pattern	*n/a*	*n/a*	*6/12*	*6/12*	*6/12*	*8/16*	*8/16*	*8/16*
Year	*2006*	*2010*	*2011*	*2011*	*2012*	*2016*	*2021*	*2031*
Patronage (Pax m)								
Bus	*108*	*117*	*112*	*110*	*112*	*121*	*128*	*142*
Tram	*-*	*-*	*11*	*13*	*16*	*23*	*26*	*32*
Total TEL Patronage	*108*	*117*	*123*	*123*	*128*	*144*	*154*	*174*
Bus Revenues (£m)								
Farebox	*82*	*102*	*101*	*99*	*104*	*132*	*169*	*279*
Other	*6*	*7*	*7*	*7*	*7*	*9*	*10*	*13*
Total Bus Revenues	*88*	*109*	*108*	*106*	*111*	*141*	*179*	*292*
Tram Revenues (£m)								
Farebox	*-*	*-*	*10*	*12*	*16*	*26*	*36*	*63*
Other	*-*	*-*	*1*	*1*	*1*	*1*	*1*	*2*
Total Tram Revenues	*-*	*-*	*11*	*13*	*17*	*27*	*37*	*65*
Total TEL Revenues	*88*	*109*	*119*	*119*	*128*	*168*	*216*	*357*
Operating Costs (£m)								
Bus			*103*	*102*	*107*	*131*	*164*	*267*
Tram			*17*	*19*	*20*	*26*	*31*	*45*
Total TEL operating costs			*120*	*121*	*127*	*157*	*195*	*312*
Pre-tax operating profit/(loss)			*(1)*	*(2)*	*1*	*11*	*21*	*45*
Tram lifecycle costs			*-*	*-*	*-*	*1*	*2*	*2*
Notional taxation			*-*	*-*	*-*	*3*	*6*	*14*
Dividend payment			*-*	*-*	*-*	*3*	*3*	*5*
Net TEL cash surplus/(deficit)			*(1)*	*(2)*	*1*	*4*	*10*	*24*

3.6. The table above reflects that following an initial period of tram patronage build up, the TEL business as a whole will be profitable after one year of tram operations and will thereafter experience significant growth in profits.

3.7. The Joint Revenue Committee (JRC), consisting of Steer Davies Gleave and their sub consultants Colin Buchanan & Partners are responsible for the demand modelling, revenue forecasting and appraisal of the tram scheme. The consultant team have extensive local and worldwide experience in the development of multi-modal transport models and the appraisal of major transport infrastructure schemes. The forecast are based on the patronage forecast for both tram and bus developed under the JRC contract. The key assumptions used for this forecast with respect to fares strategy and the development of cost estimates are detailed throughout this Business Plan.

3.8. Under the JRC Contract, the primary deliverable is to develop and maintain a comprehensive transport modelling suite which will inform the design of the tram system, inform on demand, fare strategy, revenue forecasting and scenario testing for all public and private transport modes within Edinburgh and those areas with journeys to and from the greater Edinburgh area. The JRC is also responsible for an ongoing review of revenue risks through the design process, construction and into operation of the system.

3.9. The forecast of patronage and revenues presented above remains very sensitive to the quantum and timing of new development in North and West Edinburgh as detailed in section 6. The sensitivity of the forecast to this and other factors is considered at section 15 below.

4. TEL's objectives

4.1. The public sector ownership of TEL presents opportunities and challenges which are different to most public transport organisations. Although achieving profitable operations and payment of dividends are key objectives, profit maximisation is not the primary objective. The majority shareholder, CEC, seeks a 'social dividend' in terms of fare and network / service strategies. CEC requires TEL to maintain lower fares and a more comprehensive level of service provision than would normally be the case for a transport operator seeking to maximise profit.

4.2. CEC promotes alignment of TEL's corporate objective to return sufficient post-tax profits to meet its investment and dividend obligations, with CEC's planning objectives and the Government's five key objectives for transport as detailed in the STAG2 report submitted as appendix to the DFBC. These can be broadly summarised as:

- To support the local economy by improving accessibility;
- To promote sustainability and reduce environmental damage caused by traffic;
- To reduce traffic congestion and encourage mode shift;
- To make the transport system safer and more secure; and
- To promote social benefits.

4.3. The future challenge for TEL is to integrate the tram into its business in a manner which maintains long-term profitability, thereby allowing the economic, environmental, development and urban regeneration, social inclusion and transport objectives of the tram scheme to be achieved. The measure of success for TEL will be the overall performance in commercial, social, customer and financial terms of the integrated bus and tram network.

5. Parameters under which TEL operates

Legislative Parameters

5.1. The statutory parameters under which TEL will operate are prescribed by the Transport Act 1985. Transport Industry expectations are that some changes in the present legislative framework are likely with the aim to give local authorities more influence over routes, timetables and fares. Such a move is most likely in major metropolitan conurbations in England, however, in time some form of regulation may well also be considered appropriate for Scotland.

5.2. TEL will carefully monitor any developments in the regulatory and legislative environment which could impact on LB's (and thus TEL's) market position. Active membership of trade associations, close liaison with local and national transport planning organisations and lobbying groups will ensure TEL's awareness of likely changes and offers an opportunity to influence decisions. TEL, with its integrated bus/tram system and public ownership, may be

in a unique position to mitigate the risks or maximise the opportunities arising from potential regulation.

Local Transport Strategy

5.3. The key features of the Local Transport Strategy (LTS) are set out in section 3.23 of the DFBC. It sets out CEC's vision for a transport system in Edinburgh, which will be an expansion of the current Bus services. The success of the current services has been aided by the effective partnership between CEC and bus operators and is linked to local and national commitment to transport investment in the future. Details of the achievements to date and opportunities for TEL between now to tram opening and beyond are set out in Appendix 1.

Shareholder requirements

5.4. Fares and route planning are currently determined by LB with reference to its financial targets and the 'social dividend' objectives outlined above. Specifically, this relates to running services to destinations and/or at frequencies which are not justified purely by the level of patronage achieved on these routes. LB is able to provide these services partly by effective and efficient management and partly through co-operation with CEC and Transport Scotland's Bus Route Development Grant funding. Additionally, the 'social dividend' drives LB's current policy regarding fare increases. Although there is no official commitment, LB manages its business to avoid increases in average fares above RPI +1%. It is anticipated that TEL will aim to continue these policies on the introduction of the tram, without however, prejudicing the opportunity for a policy review if appropriate.

Patronage requirements

5.5. TEL will continue the approach to meeting CEC 'social dividend' requirements in the form of integrated ticketing for bus and tram under a common fare structure. Further, with the introduction of the tram, TEL will need to carefully consider the varying requirements of its patronage base, bearing in mind the specific customer service responsibilities which flow from the high level of public transport demand experienced in Edinburgh to date and forecast for the future. The introduction of the tram will drive a certain shift in the composition of patronage on TEL services. The JRC modelling output predicts that 83% of year 1 tram passengers will have transferred from existing public transport, predominantly LB, with the remaining 17% being new to public transport, transferring predominantly from car. The forecasted level of abstraction from existing LB services on the one hand means these TEL passengers are already familiar with the services provided and are less likely to resort to other forms of transport. Yet, the very success of the existing services means passengers will have very high expectations for TEL services. Additionally, achieving the aim to capture 17% of tram patronage from predominantly car users means the quality of service must be sufficient to induce mode shift through ease of use, accessibility, affordability and convenience. To meet the requirement of all of these passengers, service integration plans have been developed and the structure created for bus and tram to operate within a single economic entity in which both modes play complementary roles.

Commercial background

5.6. Building on LB's current market position, the common control of LB and tram means TEL will hold a majority share of the public transport market in Edinburgh. This provides a solid basis for capturing significant portions of the projected demand increases. Specific areas for expansion identified by the JRC modelling are West Edinburgh and the Airport for employment growth and Leith Docks, Western Harbour and Granton Waterfront for primarily housing development. Provision of sufficient capacity for peak time demand will be crucial in

capitalising on the opportunities. This will have to be balanced with the operational and financial impact of likely lower demand on some parts of the route, particularly to Granton, at inter-peak times.

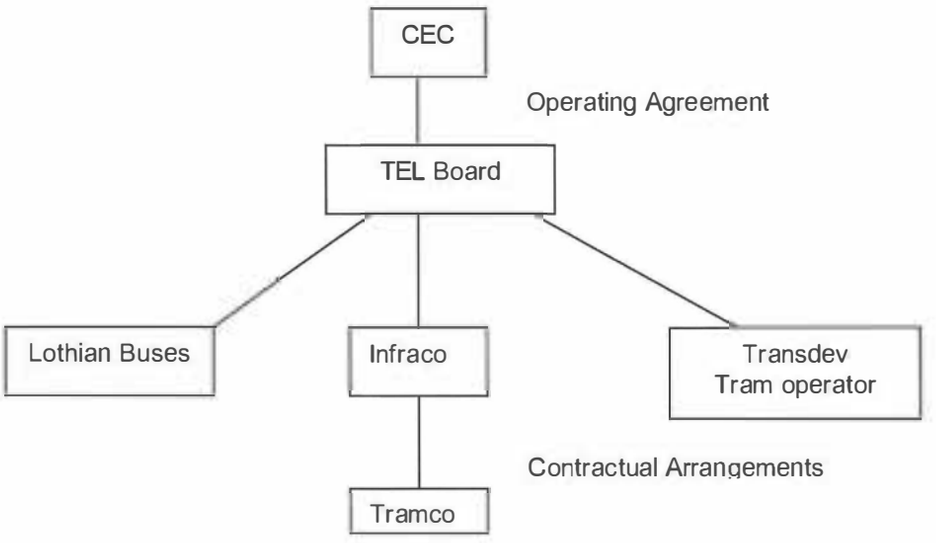
5.7. The JRC modelling suggests that in a non-regulated market the proposed bus/tram service integration plan at most offers limited opportunity for a commercially viable competitive challenge. LB services in the period prior to the introduction of the tram, and the envisaged TEL bus and tram services thereafter, will be continuously reviewed and optimised to meet emerging demand and passenger requirements, especially in light of the significant growth projected to arise

TEL governance structure and operational arrangements with CEC

5.8. Governance and operational arrangements for TEL have evolved since its inception in 2005. The process is driven by the desire to establish a strong leadership function for TEL and the need to clarify and codify the roles of the principal parties involved in the development of the tram project (CEC, Transport Scotland, TEL, **tie** and LB). Details of how governance will evolve during the phases of the project are detailed in section 6 of the DFBC.

5.9. TEL has appointed a Board of Directors including two independent non-executives (including the Chairman). The Chief Executive of LB has been appointed as Chief Executive of TEL. The governance structure of the tram project has now been amended such that TEL has clear accountability for planning and implementing the integrated transport business, with **tie** (advised by Transdev) charged with delivery of the tram project. This structure has been implemented such that clear and full accountability to the Council as Promoter of the tram project and majority owner of LB is sustained and that the interests and influence of Transport Scotland as the principal provider of funding for the tram project are preserved. Figure 5.1 outlines the high-level governance structure for TEL following commencement of tram operations.

Figure 5.1 TEL Governance structure post-2011



5.10. The role of the TEL Board is focused on its statutory stewardship function and its overall responsibility to deliver an integrated public transport network for Edinburgh. In this role, the board has fiduciary duties to its shareholders and stakeholders with clearly defined responsibilities. They include matters relating to board membership, statutory reporting, internal controls, health & safety, and oversight and management of operational risks.

5.11. It is anticipated that CEC's 91% shareholding in LB will be transferred to TEL at some point prior to commencement of tram operations. The day to day management of LB will remain the responsibility of LB's executive team.

5.12. The contractual relationship with Transdev is governed by the Design, Partnering, Operating Franchise Agreement (DPOFA; currently under review), whereas the relevant arrangements with the eventual providers of infrastructure and tram construction and maintenance are yet to be contracted. The procurement strategy pursued by the project and agreed by its stakeholders provides for the Infraco contract to be procured by **tie** and transferred to TEL after commissioning of the tram system. The contracts will have been subject to TEL board approval in its project board role. Similarly, the contract for provision and maintenance of the tram vehicles will be procured by **tie**, however, instead being transferred directly to TEL, current intentions are to novate the contract to the Infraco contractor once appointed. The contractual structure will be such as to avoid payment of profit for Infraco on the profit element for Tramco.

5.13. The operational relationship of TEL with CEC will in time be governed by an Operating Agreement between these two parties. The focus of this agreement will be the continued cooperation of CEC and TEL to further the integration of bus and tram services. It will emphasise the need for TEL to act commercially within the framework of its public ownership and sets out the parameters for CEC's support to TEL in terms of policy implementation.

6. Patronage targets

6.1. Public transport patronage is the key driver for TEL's revenue forecasts. The projected patronage is fundamentally dependent on growth in the existing public transport market and the assumptions about future residential and commercial developments at key regeneration sites in Edinburgh. In addition, aspects of the service provision, such as run times, service frequency patterns and interchanges, which affect the transport experience of the travelling public, will also impact on the levels of patronage that can be achieved.

Patronage forecast

6.2. Significant residential and commercial development is planned at key sites in North and West Edinburgh. Assumptions about scale and rate of these developments, developed in consultation with CEC, underpin the JRC model, which allocates the resulting travel demand to the most appropriate mode of transport. Based on this allocation, forecasts for TEL patronage were estimated. Using the geographical analysis of where this forecast demand is likely to originate / terminate, TEL has developed a flexible service integration plan reflecting planned tram services and bus services beyond the introduction of the tram.

6.3. The patronage forecasts have been reviewed in light of known public transport patronage growth and an economic assessment of the uptake of planned developments. The starting position for the patronage projects have been validated against LB's recent experience: over the last 8 years, LB has achieved passenger growth consistently above 2% growth per annum, forecasting over 108 million boardings in 2006.

6.4. The JRC's forecasts for the period 2011 to 2021 reflect demand arising from planned developments as per the CEC Structure Plan. The assumptions for the phasing of this new development have been reviewed by independent commercial property advisors. A thorough review of the likely time-scale of the planned developments was performed which takes into account actual progress of key development sites against their planning horizon in 2021. The resulting travel demand curve predicts a growth in public transport demand of 13% by 2011 (from 2005) and 61% in 2031.

6.5. The period from 2022 to 2031 is based on an assumed growth rate of 2% pa in travel demand, which is in line with LB's historical experience and with a reasonable expectation of future economic growth for the City as validated by Scottish Executive economists. Given the inherent uncertainty of growth in demand, especially with a relatively distant planning horizon, the TEL Business Plan assumes 1.5% per annum growth in patronage from 2031 to 2041.

6.6. Table 6.1 below summarises the projected TEL patronage levels for key years:

Table 6.1 TEL patronage projections with Phase 1 of the tram

Tram in service	Pre-tram		Ph1a Only	Phase 1a plus 1b				
Tram service pattern	n/a	n/a	6/12	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2011	2012	2016	2021	2031
Patronage (Pax m)								
Bus	108	117	112	110	112	121	128	142
Tram	-	-	11	13	16	23	26	32

Mode Shift

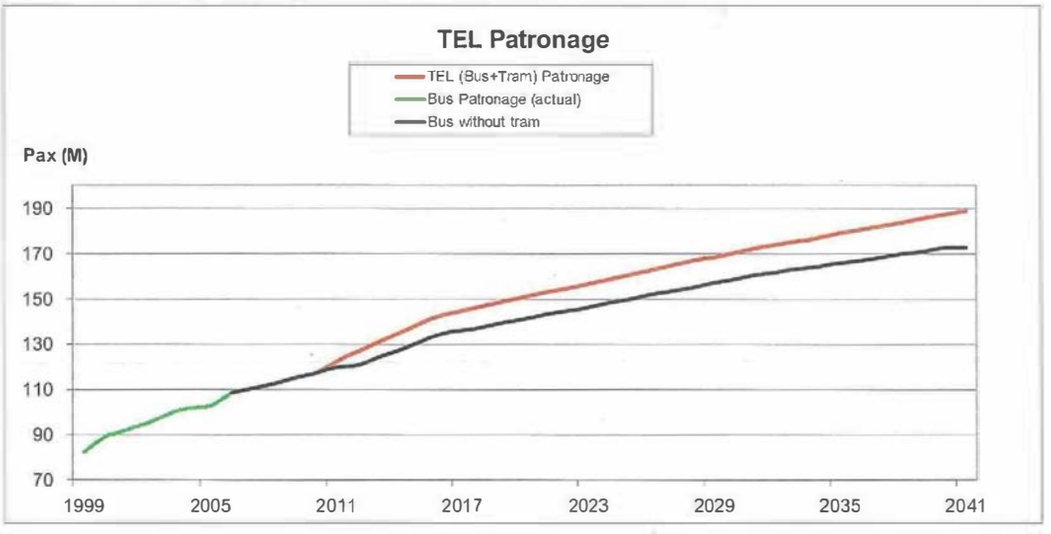
6.7. A considerable proportion of the projected tram patronage is expected to arise from those not currently using public transport. 17% of total tram patronage in 2011 (rising to 20% in 2031) is anticipated to arise either through mode shift from car or from new trips generated as a result of the improved opportunity to travel. This equates to approximately 6,600 new public transport passengers per day, rising to 15,800 passengers, following the introduction of the tram. Experience with other UK tram schemes, and more recently Dublin, has shown that such a level of modal shift can reasonably be achieved, even within the context of Edinburgh's already high public transport usage.

6.8. Further, the JRC model incorporates a parameter of perceived attractiveness of the tram to users, based on the results of the Stated Preference Survey. This survey established public transport users' (and potential users') attitudes to the proposed tram network and the resulting weighting of in-tram vehicle time impacts on tram patronage forecasts. The survey was performed well before details of the proposed tram network were widely available and experience has shown that once a tram system is introduced, its usage will be based on personal utility. This means, TEL will have the opportunity to capture greater than predicted patronage levels by providing an integrated tram network which meets the high expectation of the travelling public.

6.9. Mode shift from car is directly linked to reducing congestion and associated environmental benefits, and is one significant benefit associated with the introduction of the tram. TEL's tactical, operational and marketing strategies are all aligned to facilitate achieving the predicted targets for patronage and mode shift.

6.10. Ultimately, the introduction of the tram and its integration with LB's bus services will result in greater numbers of passengers than either bus or tram could hope to achieve independently. Figure 6.1 shows the predicted levels of patronage in a "with" and "without" tram future.

Figure 6.1 - TEL patronage with and without Phase 1 of the tram



Patronage risk and opportunities

6.11. As patronage is the key revenue driver for TEL, its reliance on growth in the travel market in general and on planned developments in particular could potentially lead to significant risks and opportunities for TEL. The JRC has performed a number of sensitivities to assess these risks and opportunities in their Risk and Revenue report, a summary of the key points is provided in section 15 of this Business Plan.

Service patterns & interchange

6.12. A key element of the strategy to realise the above patronage forecasts is the implementation of optimised service patterns for both bus and tram and maximising the opportunities for effective interchange between bus and tram and between other modes of transport.

Tram service patterns

6.13. The tram network will serve major high-volume transport corridors in Edinburgh and thus build upon on existing high levels of public transport usage. Being able to identify the routes and frequencies of services necessary to cater for demand is fundamental for TEL's success .The service patterns for the tram must provide sufficient and reliable capacity to meet the demand and ensure overcrowding does not dissuade passengers from using public transport, or affects effective operations by leading to longer journey times and reduced reliability.

6.14. The JRC modelling work in conjunction with the service integration plan provides patronage forecasts for the tram network and for TEL in terms of geographical area and peak/off-peak requirements. This allows the tram and bus service plans to be validated and adjusted to ensure sufficient capacity is provided at an affordable level throughout the network.

6.15. The tram service patterns have been developed to meet capacity demands and are based on target run-times as detailed in the Project Scope section of the DFBC. The service integration plan assumes an average tram capacity of 265 passengers per tram. The tram service provision is based upon the number of trams per hour (tph) necessary to carry the demand predicted by the JRC model in the AM peak hour in the busiest direction. Figures 6.2 and 6.3 below show the predicted tram loading against capacity based on the JRC mode forecasts for AM Peak in 2011.

Figure 6.2 – 2011 AM PEAK HOUR WESTBOUND

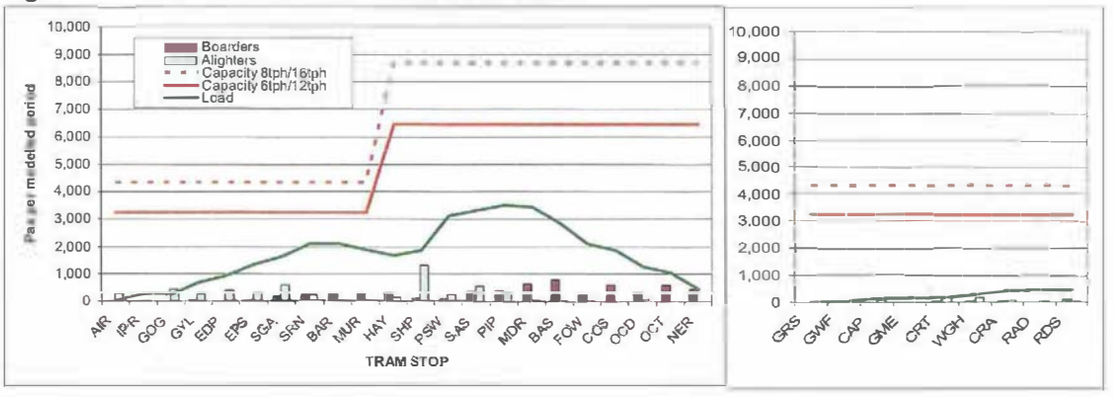
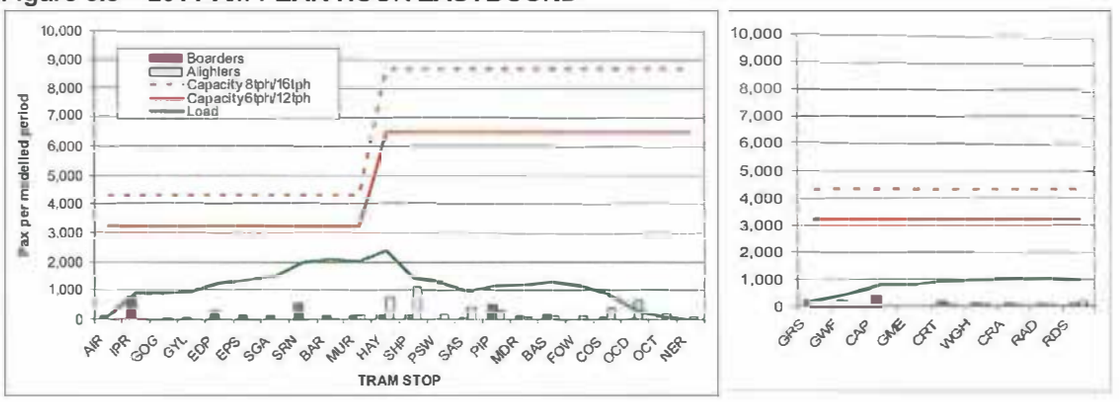


Figure 6.3 – 2011 AM PEAK HOUR EASTBOUND

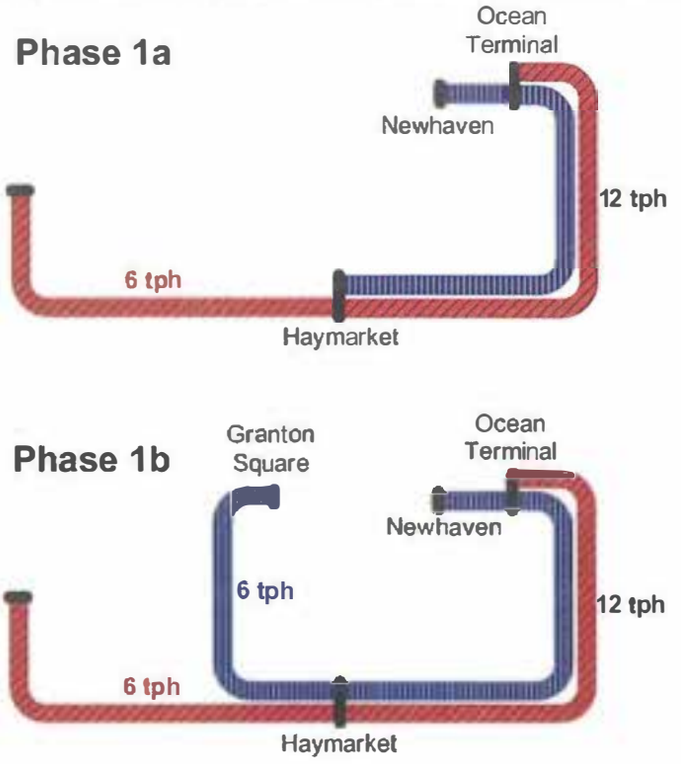


6.16. The busiest direction in the AM Peak Hour is Westbound as shown above. The solid red line indicating the capacity provision of the 6/12 tph service results in 10 min and 5 min intervals between trams. Whilst a lower frequency would meet the capacity at tram opening, a greater than 10 min interval is considered too infrequent for a "turn-up & travel" style service. The resulting service patterns are depicted as outlined below.

6.17. **Phase 1 in its entirety** – From opening in 2011, 6 trams per hour in each direction between the Airport and Leith (a tram every 10 minutes) plus 6 trams per hour in each direction between Granton Square and Leith via Haymarket. This will provide 12 trams per hour in each direction between Haymarket and Leith (a tram every 5 minutes).

6.18. **Phase 1a only** – From opening in 2011, 6 trams per hour in each direction between the Airport and Leith plus 6 trams per hour in each direction between Haymarket and Leith, Again This will provide 12 trams per hour in each direction between Haymarket and Leith.

Figure 6.4 – 2011 Tram service patterns for Phase1a only and for complete Phase 1



6.19. The forecast of demand indicates that after the initial five years of growth, tram services will require to be increased to provide sufficient capacity primarily to serve demand on the Leith to Haymarket section. Therefore the TEL Business Plan assumes that from 2016, the 6/12 trams per hour service patterns above will be increased to 8/16 trams per hour. Further, the growth in passenger projections will make further increases in service frequency likely from approximately 2027 onwards along the section between Haymarket and Edinburgh Park of the tram network. This would be achieved for Phase 1a by extending the Newhaven to Haymarket service to Edinburgh Park. For Phase 1, the demand could be met by overlaying and additional service operating between Ocean Terminal and Edinburgh Park at a frequency of 4 tph which would raise the tram service on Ocean Terminal to Haymarket to 20 tph and Haymarket to Edinburgh Park to 12 tph.

6.20. Figure 6.5 and 6.6 below show the predicted tram loading against capacity based on the JRC mode forecasts for AM Peak in 2031 with Figures 6.7 and 6.8 depicting the preferred service patterns from 2016 and 2027 onwards respectively.

Figure 6.5 – 2031 AM PEAK HOUR WESTBOUND

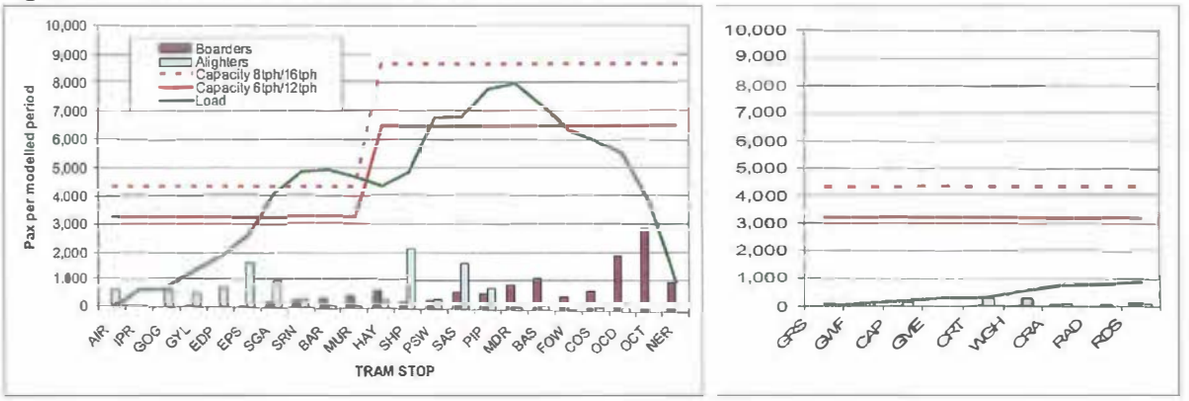


Figure 6.6 – 2031 AM PEAK HOUR EASTBOUND

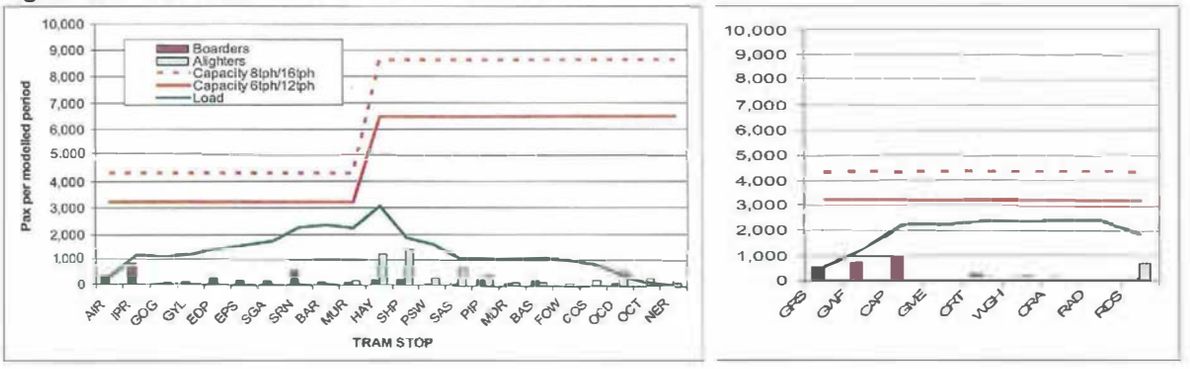


Figure 6.7 – 2015 to 2027 Tram Service

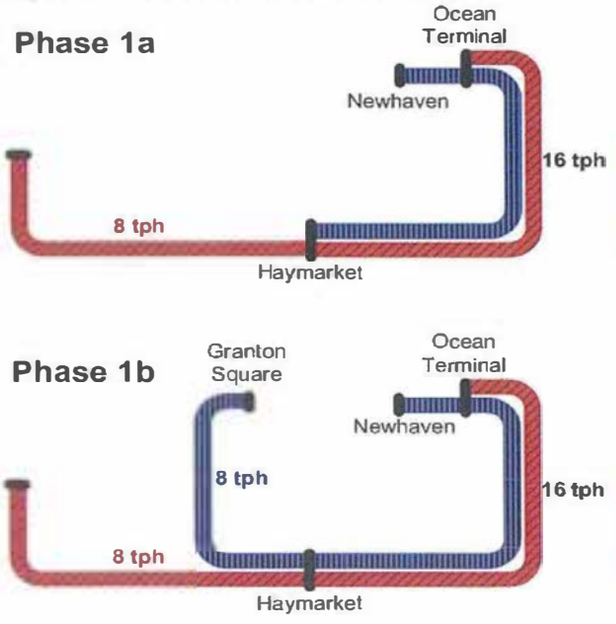
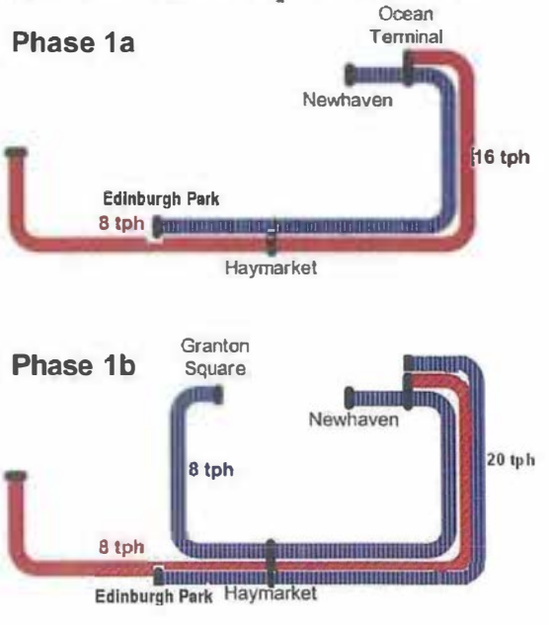


Figure 6.8 – 2027 onwards Tram Service



6.21. Detailed tables of the proposed tram frequency scenarios are provided in Appendix 2.

Impact of Phase 1b

6.22. Phase 1b sees trams, which are planned to terminate at Haymarket under Phase 1a, extend to Granton Waterfront. This will provide an essential transport link for the planned developments at this important development site with other parts of the city. Regeneration of

brownfield sites and protection of the greenbelt around the city boundaries form part of key planning strategies for Edinburgh. The likely success of the development in Granton and thus the CEC strategy will be strongly influenced by the provision of reliable, sustainable public transport network, of which the tram plays an essential part.

6.23. Phase 1b does not run parallel to any bus routes and is designed to cater for demand from future developments at Granton; therefore, introducing the tram here does not lead to reductions of current bus services or cost savings. During the parliamentary process a commitment was given to the effect that feeder buses would be provided linking Crewe Toll with the Western General Hospital and existing bus services to the area would be maintained. Implementation of Phase 1b at the same time as Phase 1a is dependent on capital funding availability and the assessment of the potential risks to patronage forecasts for this route due to the high degree of reliance on future developments being realised within the planned horizon.

Key assumptions for tram service patterns

6.24. The first and last tram services and initial frequencies for 6 & 12 trams per hour are based on the following assumptions and conditions;

- The provision of a total of 12 trams per hour in 2011 is required during the daytime to replace withdrawn bus services (and therefore capacity and demand) on Leith Walk.
- Short workings between Edinburgh Airport/Granton Square and St. Andrew Square are dependent on the ability to turn trams at St. Andrew Square. The precise location and feasibility of the turnback is currently under review.
- Edinburgh Airport service tram frequency is ramped up/down from Ocean Terminal. Granton Square or Haymarket service tram frequency is ramped up/down from Newhaven.
- Trams going into service between Gogar depot and Ocean Terminal / Newhaven will run "in service" from the Gyle (first tram Gyle to Ocean Terminal approx. 05:15).
- Haymarket or Granton Square service trams going out of service running between Newhaven and Gogar depot will run "in service" as far as the Gyle.
- Edinburgh Airport service trams going out of service will run "in service" from Ocean Terminal to Edinburgh Airport with a short "dead run" from Edinburgh Airport to Gogar depot.
- The period of time between the last tram returning to the depot at night and the first tram leaving the depot in the morning is about 4hrs 30 min. Consequently the maintenance window will allow work on the system infrastructure for about 3 hours and 45 minutes, depending on location each night and allowing time for the implementation and withdrawal of isolations. Future demand on the early and late services will be reviewed to allow greater optimisation of this service window.
- Service proposals are based on the requirement to always have a tram present at the Airport tramstop.

Bus service patterns

6.25. Amendments to the bus service provision are envisaged under the service integration plan where the tram runs parallel or close to an existing bus route to prevent unnecessary overlap of services. Where the tram route follows a different alignment with no bus routes running parallel or in close proximity, no reductions are anticipated, the principle being that bus service reductions are only applied where the tram offers an acceptable alternative level of travel. This approach allows TEL to match the most effective mode of transport to levels of demand and avoid competition between bus and tram, while the travelling public continues to benefit from high quality public transport provision.

6.26. The tram route varies in its proximity to bus routes, hence the changes to bus services also varies according to the sections of the tram. On a rule of thumb bus:tram ratio of 2.6 to 1, for

every 1 tram per hour, the objective is to take out 2.6 buses per hour. The following section provides a high-level summary of the anticipated changes, details of the proposed rationalisation are contained in Appendix 3.

Ocean Terminal – Foot of Leith Walk

6.27. The section of tramline between Ocean Terminal and Bernard Street, via the Docks and Ocean Drive, does not closely mirror or replace any existing bus route. Hence bus services on this section will be maintained, feeding into the tram at the foot of Leith Walk.

Foot of Leith Walk – St Andrew Square

6.28. This section offers great potential for bus service reductions. A detailed review of current bus services shows that a total reduction of 28 buses (based on future likely service provisions) would be anticipated. It means that the target bus volume reduction is virtually identical to the volume currently operating the full length of the Leith Walk – Princes Street axis (services 10, 12, 16, 22, 25 combined). However, the strategy is to retain a limited number of buses directly linking Princes Street with Leith Walk in order to retain a through-service option for passengers with restricted mobility for whom enforced interchange would be unacceptable. As most Princes Street / Leith Walk bus services are replaced by the tram, the remaining buses on Leith Walk mostly run on the Leith Walk – Bridges – New Royal Infirmary axis, as the tram will not offer a service on this corridor.

6.29. This proposal assumes high-quality interchanges are deliverable at the foot of Leith Walk and at St Andrew Square. The 'interchanges' section below expands on implications for bus services which are truncated at both St Andrew Square and the foot of Leith Walk.

St Andrew Square – Haymarket

6.30. The scope for reducing bus volumes on this section, which largely comprises Princes Street, is limited as the tram route does not offer any substantial cross-city link currently offered by bus. This means that, while most routes serving Leith Walk can be removed from Leith Walk, because the western or southern ends of those routes are not replaced by trams, they still need to traverse Princes Street. It is TEL's desire not to introduce an enforced interchange for the very large number of passengers who would be affected only a short distance from their trip destination or origin; neither would it be sensible for force bus passengers to alight at the foot of Lothian Road and expect them to walk along Princes Street. For these reasons, the potential for reduction in buses on Princes Street itself comprises the reduction in frequencies of Services 22 and 100.

Haymarket – Airport

6.31. There are two facilities offered by the tram which yield the potential to reduce significantly the volume of bus service provision:

- Airport – City Centre passenger demand
- The section of route from Broomhouse to Saughton Mains, currently comprising the Fastlink guided busway

6.32. As far as the Airport is concerned, it is assumed that many passengers who currently use Airlink 100 will transfer to the tram. Those who will definitely not do so are those who use the Airlink to travel between the Airport and points not served by the tram, namely all stops between Maybury and Wester Coates. To serve those passengers, a reduced-frequency Airlink will continue to run. For passengers travelling between the Airport and the Haymarket – Waverley section, the majority are assumed to choose the tram. The working assumption for present purposes is that the volume of service on Airlink will be cut by circa 50% to 4 per hour though this can be reviewed further.

6.33. As far as the Fastlink section between Broomhouse and Saughton Mains is concerned, it is assumed that virtually all passengers travelling between this section and Princes Street will switch to the tram. This volume of demand is, however, a relatively small proportion of the total demand on the existing service (22), thus only a reduction in this service has been assumed. Regarding the other Fastlink service (2), the link it offers will not be provided by the tram, so no reduction in provision on Service 2 is assumed.

Interchange between bus and tram

6.34. In order to achieve TEL's objective of providing a truly integrated public transport system a small number of bus/tram interchanges are essential. It is TEL's aim to protect its patronage by offering as near seamless a journey through the network as possible. By minimising the requirement for interchange for the maximum number of passengers making short to medium length journeys, the inconvenience of interchanging, where necessary, will be eliminated. Further, the integration plan for bus and tram seeks to achieve optimal alignment of service frequencies at interchanges thus making interchanging as simple as possible. This will ensure that entry to and use of the TEL network is as easy and convenient as possible and the risk of loss of patronage is minimised.

6.35. The design of first class interchange facilities is critical to minimising any potential negative impact of interchange. The JRC has analysed the sensitivity of the patronage and revenue targets to the provision of effective bus /tram interchange (in 2005 prices), and has forecast that the impact of optimising the interchanges can improve revenue by approx. £0.5M pa in 2011, rising to £1.1m by 2031. The following locations have been identified as requiring first class interchange to allow TEL to meet these aims:

Foot of Leith Walk

6.36. This interchange is the key to being able to curtail bus routes at the northern end of Leith Walk. Without it, there is no practical way in which buses approaching the foot of Leith Walk from Great Junction Street or Duke Street can be curtailed such that they no longer continue up Leith Walk. An effective interchange at this location must be delivered, otherwise, bus volume reductions on Leith Walk (and the consequential cost savings) will not be realised. The numbers of passengers involved in what will be enforced modal interchange is significant, therefore a high quality of design, minimising both walking distances and waiting times, must be achieved.

6.37. On the assumption that a sufficiently good design can and will be delivered, a network design was developed which matches routes curtailed at Great Junction Street with routes curtailed at Duke Street, so they can be linked into through routes, thereby reducing what would otherwise be an absolute requirement to accommodate terminating buses at this awkward location. The proposed network does take into account retaining a limited number of buses per hour linking Leith Walk with Princes Street to ensure that those with restricted mobility have an alternative to enforced interchange.

St Andrew Square:

6.38. An interchange at the east end of the city centre is required to accommodate buses reaching the city centre from points west and south of the West End which currently continue via Leith Walk. These are the routes which need to be truncated in order to achieve modal transfer on Leith Walk. Various options have been considered and a design arrived at which accommodates the following:

- provision for passenger interchange between bus and tram
- provision for terminating buses and essential layover

Crewe Toll

6.39. This interchange is necessary to accommodate the provision of the feeder buses linking the tram route to the Western General Hospital. A free-standing shuttle bus may be provided to meet this requirement for feeder buses or existing bus services 29 and 37 may be sufficient.

Interchange between air travel and TEL services

6.40. Edinburgh Airport provides the opportunity for interchange for passengers arriving and departing by air with local public transport. Tram, together with reduced frequency Airlink bus will provide air passengers with a first rate option for travelling to/from the city centre, thus promoting a favourable first impression of Edinburgh. Further, enhancing the option to use public transport to and from the airport reduces the reliance of air passengers on taxi and private car travel. TEL will develop the currently existing operating agreement between LB and BAA which governs access arrangements, facilities and information to include the tram and the new facilities at the tramstop.

Interchange between heavy rail and TEL services

6.41. Facilitating easy interchanges between heavy rail with bus and tram supports national and local objectives of reducing the reliance on private car travel. Rail patronage has increased significantly over the last few years, which offers a great opportunity for TEL to increase revenues by providing onwards travel to rail passengers. Key opportunities for integration between heavy rail and bus/tram are:

- Haymarket
- Edinburgh Park
- Princes Street / Waverley
- Airport now + when EARL is constructed

Park and Ride

6.42. Interchanges between private car and bus / tram are vital to the patronage and revenue projections for TEL, especially in terms of modal shift. With the right facilities, Park and Ride can offer an attractive alternative to bringing cars into the city. Such facilities include information provision, public safety features and comfortable customer amenities, as well as frequent and reliable public transport services to and from the sites. All new Park and Ride sites in Edinburgh (existing or planned) will feature high quality facilities which support the current positive achievements and future success expectations.

6.43. Key Park and Ride sites for TEL services are located at Hermiston and Ingliston. These sites are ideally situated to cater for cars travelling to Edinburgh from West Lothian, where significant residential growth it predicted. There is also an interchange between private car,

rail and bus at Newcraighall, managed and maintained by ScotRail and CEC. CEC are currently assessing the opportunities for additional potential Park and Ride sites:

Hermiston Gait Retail Park

6.44. The outstanding benefit this site has to offer is its proximity to the Edinburgh City Bypass and the M8 extension. It is within easy reach of a strong car commuter route and is ideally placed to attract car commuters travelling from the west into the city. The site's northern perimeter lies some 150 metres from Edinburgh Park tramstop. The development of a park and ride site at this location building upon the informal use as by members of the public currently could yield significant benefits to the patronage potential of the tram. The existing car park could be further expanded to offer additional Park & Ride spaces by decking over the existing car park, which could potentially add up to 1000 additional car parking spaces. Discussions are in hand between CEC and Clerical Medical, the owner of the site, on this matter.

Saughton House (Formerly Government Buildings)

6.45. The potential usage of this site is not in the same league as Hermiston Gait but it lies adjacent to a tramstop and could generate worthwhile additional tram patronage from development of a "traditional railway station car park" style of park and ride site for 100-200 cars. Its location is 2.8km inside the city Bypass and thus is unlikely to be attractive to commuters from outside the city, but it is very well placed for more locally-based commuting. It is expected that it would be attractive to car borne commuters from South Corstorphine, Longstone, Carrick Knowe, etc for whom the tram will be an appealing option for travel to city and also in the opposite direction to Edinburgh Park, The Gyle, the Royal Bank and Airport. This site is in CEC ownership and is currently designated as open space. This should make it straightforward to develop detailed plans for a 100 to 200 space car park to be developed on part of the site to be used as a financially viable Park & Ride.

6.46. A number of additional sites and/or expansions to existing sites for interchanges between private car travel and TEL services are currently either under investigation or actively being progressed by CEC:

Ingliston

- This existing successful bus based P & R site (530 spaces) is currently running close to capacity and significant expansion is scheduled for 2007 with a final phase of expansion planned to coincide with the opening of the tram which will directly serve this site.

Hermiston

- Existing successful bus based P & R site (470 spaces) likely to reach capacity in 2007 when further expansion will then be required.

Sheriffhall

- (approximately 500 spaces) bus based site due to start construction mid 2007, due for opening mid 2008.

Straiton

- Proposed new bus based site – still at evaluation stage with construction planned to commence mid 2007, with opening around the beginning of 2008.

Barnton/Cramond Brig

- Proposed new bus based site – at evaluation stage.

Newcraighall

- Established (565 spaces) rail based site – currently attracting some 200 cars per day.

Information provision

6.47. Integrated transport needs integrated information; the right information, provided at the right time, by the most appropriate means, puts the needs of the user first. TEL will ensure that the information it makes available to the public results in reliable and straightforward travelling experiences. Well presented information is of essential value to transport users – it helps them to complete their journey efficiently and with greater ease. Well informed customers will ultimately lead to increased patronage and revenues.

6.48. Multi-operator information is provided by telephone and internet through Traveline, the national travel information system. TEL will also maintain its own in-house telephone and web-based information services. TEL will use LB's existing 3 travel shops in the city centre to provide information not only on TEL products and services but on One-ticket and services provided by other public transport providers.

6.49. Realtime information displays are currently located at some 150 bus stops, rising to 250 by mid 2007, and all tram stops will be equipped with Platform Indicators Displays. The current Realtime information displays only provide information on LB (future: TEL) services, and other forms of roadside publicity such as the information provided at bus stops (and in due course, the tramstops) are also not integrated. However, quarterly integration meetings are aimed at encouraging involvement of the other public transport providers to ensure that future benefits which may arise from a more integrated approach are captured.

Integrated ticketing with other operators

6.50. TEL is committed to promote wider use of public transport within Edinburgh, a key to which is integration with other operators. Aside from TEL's fare & ticketing strategy for 'red buses' and 'red trams', a number of product offerings exists to facilitate integration of public transport throughout Edinburgh, and indeed, across Scotland. Key ticket products offering an element of integration are:

- One-ticket: South-East Scotland region wide ticket offering travel on FirstBus, TEL, Stagecoach and some smaller operators plus rail service in East Lothian and Edinburgh.
- Plus Bus & Tram: Rail+bus ticket currently available from any UK rail station, combining special rail tickets to / from Edinburgh with unlimited travel on TEL services on the day of validity.

3rd party responses

6.51. Good relations between TEL and 3rd party operators are considered essential for the success of wider public transport in Edinburgh. Close co-operation with 3rd party operators may offer potential opportunities for TEL if the combined network is perceived by the public as part of a wider public transport provision within Scotland.

6.52. The risk of competitive response has been reviewed by TEL and the JRC modelling includes sensitivity testing on patronage and revenue for this risk following the introduction of the tram. In this test, the buses removed under the service integration plan were re-inserted, which resulted in a reduction of revenue for TEL by £1.2M (2005 prices) in 2011 and by £3.2M (2005 prices) in 2031. This compares to the cost of provision of these buses of approx. £3M (2005 prices).The conclusion from this analysis is that it would not be economically viable for another operator to sustain competition – it confirms the effectiveness of the Service Integration Plan in terms of tram integration and in ensuring that the rationalisation of bus services on the introduction of the tram does not leave a service gap in the market.

7. Revenue targets

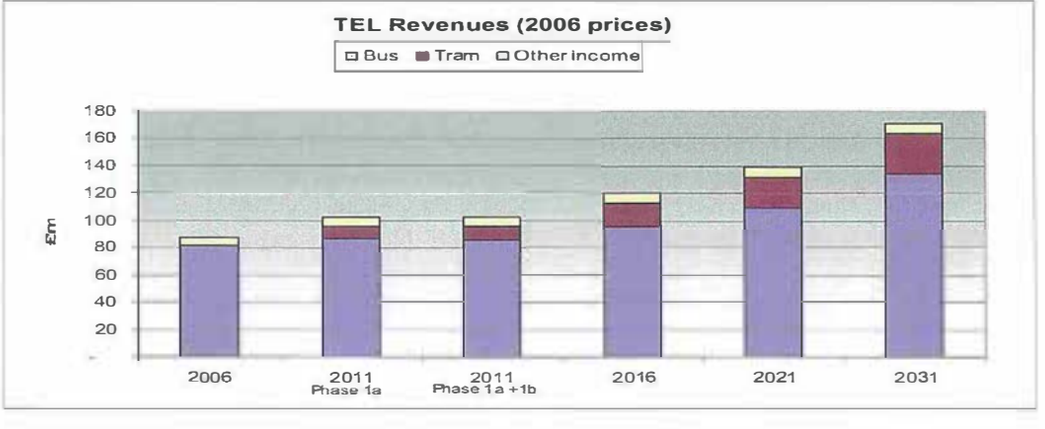
7.1. TEL's target revenue levels are directly correlated to the outputs from the JRC model in terms of patronage on TEL services. JRC have prepared revenue forecasts based on the current yield per passenger being achieved by LB, discounted to take account of an increased risk of fare evasion on trams compared to buses and inflated in accordance with the principles of TEL's fare and ticketing strategy as explained below. The fares underlying the yield calculation as based on a flat fare structure; the same fare applies regardless of the distance travelled. A pro-active management of the revenue yield per passenger will provide further opportunities for increased profitability for TEL in the future. Table 7.1 below summarises projected TEL revenue levels for key years:

Table 7.1 TEL revenue projections with Phase 1 of the tram

Tram in service	Pre-tram		Ph1a Only	Phase 1a plus 1b				
Tram service pattern	n/a	n/a	6/12	6/12	6/12	8/16	8/16	8/16
Year	2006	2010	2011	2011	2012	2016	2021	2031
Bus Revenues (£m)								
Farebox	82	102	101	99	104	132	169	279
Other	6	7	7	7	7	9	10	13
Total Bus Revenues	88	109	108	106	111	141	179	292
Tram Revenues (£m)								
Farebox	-	-	10	12	16	26	36	63
Other	-	-	1	1	1	1	1	2
Total Tram Revenues	-	-	11	13	17	27	37	65
Total TEL Revenues	88	109	119	119	128	168	216	357

7.2. The forecasted patronage and revenues for 2011 to 2014 have been reduced to take account of a ramp-up period as it is common practice to assume that new services will take some time to be fully adopted by users. However, it may be expected that a significant proportion of the forecast patronage discounted in the ramp-up adjustment would otherwise travel by bus, therefore the effect of ramp-up on tram revenues may be slightly understating the potential total TEL revenues during those years. Figure 7.2 below outlines how revenue contributions from tram increase in total over time as well as in percentage terms of the total TEL revenue.

Figure 7.2 - TEL revenues with Phase 1 of the tram



Fares and Ticketing Strategy

7.3. TEL's fare and ticketing strategy is driven by its objective to achieve a balance between the attractiveness of price, flexibility and simplicity of use. This planned degree of integration between tram and bus is rare in the UK outside London and the exceptional experience it offers will further enhance the public transport image in Edinburgh.

7.4. TEL will set fares at a level necessary to allow it to cover network operating and lifecycle costs and pay any required dividends to shareholders. The fare structure will be a single, fully integrated, flat fare regardless of the distance travelled (with the exception of journeys to and from the Airport and night services) and will be common to both bus and tram. The principles of the existing LB fares structure which will migrate to form the TEL combined network fare structure are:

- Child, adult and concessionary travel categories
- Fares products paid for at time of travel, or Ridacards purchased in advance
- Premium fares levied for journeys when the value of service provided is discernibly higher, or the cost of service provision is discernibly greater.

7.5. The yield per journey resulting from this fare structure forms the basis of the revenues projections for TEL. The yield will be managed by TEL to achieve revenue targets based on patronage projections and the current assumption is that the average yield for TEL will be increased at the rate of the Retail Price Index (RPI) +1% growth per annum, which translates into average annual fare increases of no more than RPI + 1%. This is in line with historical increases in fares by LB, meets political and stakeholder expectations and supports TEL's aim to provide transport services at an affordable price.

7.6. Average flat fares are envisaged to rise in line with the foregoing up to the introduction of the tram in 2011. Fares to and from the airport on non-Airlink services are the same as general network fares, however, Airlink fares are currently set at £3. Historically, there has been no regular fare increase on the express service as it is influenced to some extend by taxi fares, the direct competitor. When EARL is built, it will further influence the maximum level for premium Airport fares as it will not be possible to charge a higher fare than the single rail fare from Waverley to Linlithgow or Dalmeny which will the determinants for the airport fare on EARL.

7.7. Sensitivity tests have been performed using yield growth of RPI + 1.5% and RPI + 0.5%. These show that after taking account of the elasticities of demand against price, the yield remains the key driver to ensure revenue targets are achieved. The impact on individual fares will vary year on year due to necessary considerations of public demand of specific tickets, practicality of applying specific fare increases, and the history of increases on a particular ticket product.

7.8. TEL's ticketing strategy is based on the principle of providing services through a single ticketing system, where all tickets are fully interoperable on TEL bus and tram. This means no additional costs of travel arise from any interchange between bus and tram or vice-versa and will enhance the perception of a fully integrated transport network. All tram tickets are to be purchased off-board and ticket machines will be provided at all trams stops and a number of bus stops. The only tickets to be sold on-tram are to be adult and child single tickets which will be priced at a premium above the price from ticket vending machines.

7.9. The ticket machines themselves will be based on a parking meter style, which are simple to use and have been shown to be very reliable and possess high resilience to vandalism. Reliable ticket machines are essential for TEL to promote customer confidence and to the principle of enforcing on-board premium fares. Administration of the ticketing system, including collection, counting and banking of the revenue is part of TEL's forecast overhead costs.

7.10. LB's current ticketing strategy encourages wide use of pre-paid and/or multi-journey types of tickets by offering discounts to the standard fare, and TEL is committed to continue and further enhance this approach. Advance payment for ticketing products has benefits from a financial perspective (income is secured, risk of fare evasion / ticket fraud is reduced), whilst improving customer loyalty and delivering operational benefits such as reduced boarding times.

7.11. It is a fundamental assumption that TEL bus and tram will both participate in the national concessionary ticketing scheme. The relevant agreement has not yet been finalised although Transport Scotland have given support for this assumption in the preparation of the TEL Business Plan. Under the terms of the scheme, operators receive payment of 73.6% of the price of an adult single for each journey by concessionary travel holders. This level of recompense is assumed to continue.

7.12. LB currently participates in multi-operator ticket offerings PlusBus and the One-Ticket. These products encourage greater use of public transport through ticket integration across a number of operators and modes (Bus & Rail):

- The One-Ticket is the South-East Scotland region-wide product which offers travel by FirstBus, TEL, Stagecoach and other smaller operators. It currently includes rail services in East Lothian and parts of Edinburgh but is expected to expand to include rail throughout the SESTRAN area in 2007 which may result in an uplift in sales of these tickets from current levels at approx. 1% of LB revenue.

- Plus Bus & Tram is the ticket which is currently available from any UK rail station and allows a rail passenger to purchase a ticket which gives rail travel to/from Edinburgh, plus unlimited travel on TEL services on the day of validity, i.e. Network Rail journey plus TEL Network bus day ticket (also available on FirstBus and Stagecoach). The "non-rail" revenue apportionment is £2 per ticket (or £3.40 including travel to or from the airport), which is divided between TEL, First and Stagecoach, based on market share. LB currently receive an average of £3.20 per ticket on current sales due to the high proportion of purchasers travelling to the airport. Although current sales account for a small fraction of a percent of LB revenue, participation in the scheme is important in the promotion of integrated public transport Scotland wide. It is anticipated that "Plus Bus" will transform into "Plus Bus & Tram", giving the same validity on trams as on bus at present, with the same reimbursements to TEL as currently received by LB.

Revenue protection

7.13. In devising a revenue protection strategy, TEL aims to achieve a balance between attractiveness of price, flexibility and simplicity of use. Applying a strict and consistent fare enforcement policy will allow TEL to provide a safe, secure, positive and equitable travelling environment, thereby encouraging increased patronage through modal shift and minimising the revenue loss arising from fare evasion.

7.14. Fare evasion and fraud on the existing LB bus network has been limited following the decision to remove centre doors from buses, the introduction of smartcard period tickets, the simplification to a flat fare regardless of journey length and the elimination of cash handling by all but Airlink drivers and travel shops. Limited opportunities remain for passengers passing on paper day tickets from one user to another, counterfeiting of the paper day ticket, the purchase of child tickets by young adults, and limited potential for cash fraud with sales of Airlink and Tours tickets.

7.15. Trams, with multi-door boarding, require active processes in place to limit the opportunity for fare evasion and fraud in general as well as the particular need to enforce the premium Airport fare. Loss of revenue from ticketless travel as well as reduced use of the tram through

a perception that the system is not sufficiently secure, result in fare levels having to be higher than otherwise necessary. This increases the barrier to use for price sensitive travellers and reduces the potential for modal shift. A high fare may also open up a gap in the market for cheap, low quality, small bus operators to move in to compete with TEL's business.

7.16. Some tramways and light rail systems (Sheffield, Birmingham, Nottingham and Birmingham) use conductors as the primary means of revenue collection and protection. Others (Croydon, Manchester and Dublin) use platform ticket vending machines and *ad hoc* inspection..

7.17. Other schemes have shown that conductor performance is very effective during quiet periods, however, it falls off sharply when trams become busy, much non-payment in those circumstances being through lack of opportunity rather than unwillingness to pay. Further, it has been shown that utilising ticket vending machines without the option to purchase on-board, but applying a high penalty fare instead, often leads to confrontation and it is no coincidence that Croydon and Manchester have sizeable dedicated police resources that have to be funded out of revenue, e.g. Manchester, where a dedicated force of 29 police officers are employed exclusively to police the trams. On the other hand, Sheffield and Nottingham, where the opportunity to purchase tickets on-board is available, have not required dedicated police resources. Appendix 4 summarises the regimes applied in these networks and their experience to date

7.18. The principal elements of the revenue protection regime which will be adopted by TEL for trams is a combination of placing inspectors on each tram and providing ticket machines at all tram stops, with a significant price incentive to buy a ticket off-tram. This means that although tickets can be bought on-board, these are priced at a premium and the members of staff enforcing the ticketing strategy are not "conductors" in the traditional sense, but primarily ticket inspectors. This provides the advantage of achieving a high level of ticket compliance supported by the necessary infrastructure for providing passengers with both the opportunity and financial incentive to pay before boarding the tram. The revenues reflected in the TEL Business Plan have been adjusted to reflect an assumed 3% fare evasion rate.

Effect of vandalism graffiti and anti-social behaviour

7.19. Vandalism and graffiti increase operating costs, and antisocial behaviour affects the decision of passengers on the mode of transport to take for a journey. Whilst having uniformed staff on board trams and on-board CCTV will not completely prevent these issues, they do have a very substantial effect on moderating the behaviour of those inclined to antisocial or criminal behaviour. In addition to the quantified benefit associated with 100% ticket inspection, the presence of a member of staff on board has been shown to promote a sense of security for passengers and be an effective deterrent to anti-social behaviour. The additional costs of providing inspectors on all trams is therefore off-set not just by increased revenues collected but also by reduced costs for graffiti / vandalism damage repairs and increased patronage due to a heightened sense of security in passengers

8. Other income opportunities

8.1. The experience of LB and other UK transport operators, including existing UK tram schemes, is that useful additional income may be derived from other activities in addition to patronage driven revenues. TEL with its combined bus / tram network offers attractive opportunities to generate additional revenues in the following categories:

- Tours and hires
- Advertising;
- Small scale commercial development; and
- Marketing and tourism driven revenues

8.2. The largest element of income not derived from public transport demand relates to open top tours and hires. The projections in this Business plan are based on LB's current experience, assuming no change in these activities following the introduction of the tram.

8.3. A key target for the tram and TEL is to achieve modal shift away from cars through the provision of an efficient, affordable and high quality public transport system. A system which takes account of the demands of its users will stand a better chance of being successful. TEL will therefore assess any opportunities for other income source being mindful of the added customer service benefits they may provide. In pursuing these opportunities, it is recognised that TEL's first and foremost purpose is to provide public transport services, and as such TEL will only engage in activities which are complementary to its core-activities. Consequently operational requirements for all activities are limited and carry minimal operational risks.

Advertising income

8.4. Of the above, on vehicle advertising as well as poster sites at stops is forecast to provide attractive additional income and LB currently achieves sizeable income of approx. £1m pa. The introduction of the tram offers additional opportunities, not purely in terms of additional sites offered but also by providing advertisers with a new medium which is unique within Scotland. This will be balanced by TEL to ensuring both bus and tram are presentationally as attractive and uncluttered as possible, thus assessing the opportunity for additionally revenue on the basis of net commercial value versus the impact on customer service and the environment.

8.5. The financial projections in the TEL Business Plan include a prudent assessment of the income which might be earned from these additional sources based primarily upon the existing experience of LB and discussions with their current provider of advertisement, Viacom. The projections have also been benchmarked against experience on other UK tram scheme, particularly Croydon, Manchester and Sheffield. The key assumptions underlying the projections for TEL are:

- Current levels of LB advertising revenues will be maintained;
- There are no constraints on interior and exterior advertising other than the general tram design and board policy regarding advertising. Exterior advertising may include wrapped trams / buses and interiors may include large passenger panels and floor graphics;
- Advertising on digital panels at high quality interchange locations and also potentially on-board trams will be pursued in addition to the agreement on tram stop advertising;

8.6. At present, LB does not advertise on any of the bus stops within Edinburgh. Discussions with CEC have indicated that the current contract with CEC and Adshel, which covers advertising on bus stops, is due for renewal in 2014 which affords an opportunity to negotiate a new commercial contract. Early suggestions are that tram stops could be included under an umbrella contract with bus stops, which, if agreed, would mean trading potential loss of revenues from tram stop advertising to TEL for the costs of cleaning and maintenance of the stop. The relatively small number of tram stops and the fact that advertising at stops has important legal and planning aspects, which limits the number of stops available for advertising, potentially makes this loss insignificant (potential impact approx. £100k - £160k pa compared to costs of a similar level). However, the opportunity for advertising on digital panels at key interchanges should be retained by TEL as significant growth in advertising potential is forecasted by Viacom in this area.

Small scale commercial development

8.7. Small scale commercial development is most likely to take the form of kiosk or vending machines at tram stops and interchanges. Initial research has indicated that income could be derived from rental plus a percentage of profits. The existence of staffed kiosks will positively add to passengers' perception of the environment, specifically safety, and may improve the customer experience at interchanges – particularly where mode-change between tram and bus is enforced.

8.8. In addition to staffed kiosk, unstaffed vending machines offer another revenue opportunity. Although there is an inherent risk associated with vending machines in terms of vandalism and maintenance costs, early research has shown that a growing number of vending machine providers are willing to take on the maintenance and repair risks in return for lower profit share – this would allow TEL to obtain incremental revenues for minimal operational risk exposure. TEL would be able to offer targeted customer amenities such as vending machine for snacks or convenience goods, mobile phone top-ups, music download stations or the provision of Wi-Fi access. Clearly, the projections are highly subjective at this stage, however, initial contact with prospective providers reinforces the potential.

Marketing and Tourism driven revenues

8.9. In addition to patronage from the general Edinburgh public, revenue opportunities may be available to TEL from specific marketing activity. These would focus on tourism, the conference market and visitors to major events. Activities could include annual contracts with major corporations (e.g. RBS for transport to the Gogarburn training academy and conference centre) and providing journey tickets in conjunction with major events. LB's experience in marketing driven activities and indications from other schemes supports the potential.

Risks and constraints

8.10. The success of the opportunities identified above may be limited by a number of constraints. These fall into two broad categories – TEL operational and design constraints and external approval requirements.

8.11. Other than relating to tram stops, the risk to the revenue potential from advertising activities appears to be limited. Primary risks are likely to be contract and design related. LB have had good experience in their long-standing relationship with Viacom, who in turn are highly experienced interior / exterior public transport advertising contractors. Being the provider for tram advertising in Sheffield, Croydon and Midland Metro, Viacom have provided advertising solutions for a number of different tram vehicle designs and it can be assumed that the design of the Edinburgh tram, when determined, should not pose a significant challenge.

8.12. Small scale commercial developments will be subject to appropriate planning approvals. The key challenge will be whether kiosks/ vending machines can be integrated into the relevant designs for stops and interchange to a standard which is acceptable to CEC planning authorities. Additionally, the type of product sold at kiosks may be limited by TEL's operational policies of prohibiting food and drink on bus and tram.

8.13. Marketing driven and tourism driven income opportunity is relatively limited since the tram does not directly reach most of Edinburgh's conference facilities and tourist hotels. Strategic marketing and close relationships with key event organisers and corporate sponsors may however provide opportunities for incremental revenues as well as to increase the public perception of the integrated bus / tram system.

8.14. Operationally, Viacom are responsible for all advertising fixing and LB facilitate this on their premises. The practicalities of this arrangement for the trams will have to be investigated when greater details of the Depot design are available

9. Benefits realisation plan

9.1. The benefits realisation plan is concerned with the way TEL will meet objectives set by CEC and how TEL will contribute to and influence realising both the financial and wider benefits associated with the introduction of the tram where TEL is able to exert an influence. TEL's corporate focus is determined by its unique ownership structure as well as its commercial environment.

9.2. Considering how these benefits can be realised at the planning stage is sound business practice as it promotes alignment of operational strategies with the goals of the business. Further, establishing a clear strategy of how benefits will be realised provides reassurance to the stakeholders that the focus of day to day operational activity is aimed at achieving its corporate ambition and allows regular sense checks to ensure that these are realistic within the commercial reality in which the business operates

Critical success factors

9.3. Many of the benefits associated with the introduction of the tram and the establishment of TEL essentially depend on achieving the target patronage levels, particularly through mode shift from car and the generation of new journey opportunities. This is true of the financial and operational benefits as well as the wider benefits such as social inclusion, support to economic development and environmental benefits as outlined in section 4 above.

9.4. Reaching the predicted levels of public transport usage will be a measure of TEL's success in providing an accessible, integrated network as well as supporting a reduction in traffic congestion and promoting a sustainable alternative to private car travel. Urban regeneration, road safety and other social benefits are expected to flow from providing such an accessible public transport network.

Benefits scope

9.5. The realisation of benefits is predicated to some extent on the actions and policies of stakeholders which are outwith TEL's control. This is particularly true for those benefits which are directly impacted by National Transport Policies, CEC Planning policies and CEC Traffic Management Schemes. TEL will assume responsibility for realising those benefits which are directly within its sphere of influence, specifically in the post-launch period of operation.

9.6. Closely aligned to the provisions of the Operational Performance regime below, the benefits realisation plan outlines the strategies and practical measures which TEL will adopt in order to achieve the highest levels of patronage. Specifically, this relates to how TEL will ensure:

- The highest quality of transport offering in terms of run times, frequency, affordability, reliability, cleanliness and comfort.
- Comprehensive geographical accessibility
- Optimal physical accessibility for all passengers
- Maximum integration of modes, services, fares and tickets
- Enhanced actual security of the TEL public transport network and passengers' perception thereof.

Key assumptions

9.7. The key assumptions underpinning the anticipated benefits relate to the basis for the predicted patronage growth, based on growth in travel demand in general and due to development growth in particular. The detail of the assumptions and their inclusion in the JRC forecast are contained in the Risk and Revenue report and STAG report of the DFBC

9.8. Other key assumptions for the realisation of the network benefits relate to the presumed continued commitment by CEC to promote the use of public transport through priority measures and other traffic management schemes.

Key risks

As outlined in section 5 above, changes in the legislative environment could impact on TEL and its operations. The projections prepared by the JRC model are based on a non-franchise world where TEL will be able to meet public transport demands in similar manner as today. Any restrictions on how the travel needs in Edinburgh are met would inevitably directly impact on TEL's ability to realise expected patronage levels.

Approach to benefits realisation

9.9. Key Performance Indicators (KPIs) will be adopted to allow measuring of the success of TEL in realising the benefits. These KPIs will be incorporated into the relevant contracts and operating agreements with service providers to TEL, primarily with Transdev, the operator of the trams, and with the maintenance providers for the infrastructure and tram vehicles.

Quality of transport offering

9.10. The KPI's used to incentivise delivery of a quality transport offering include service reliability of both bus and tram. This will be measured by the real time passenger information systems and a regular survey regime, which will be linked in the case of the tram to payments to operator and maintainers. There will also be a series of qualitative measures of the quality of the provided service provided by monitoring of the cleanliness, information provision, appearance and helpfulness of staff which in the case of the tram will be linked to payments to the operator.

9.11. Actual and perceived run time of public transport is a key determining factor in mode choice. Quick runtimes depend on the traffic priorities afforded to bus and tram and TEL will cooperate with the City of Edinburgh Council to ensure the best possible balance for public and private transport is achieved.

Mode shift

9.12. TEL must offer an integrated network which is attractive to users and non-public transport users by providing a viable alternative to the private car. TEL plans to deliver this ambition by ensuring that the integrated bus and tram network provides a frequent, rapid, affordable and reliable service.

9.13. The achievement of modal shift success will be assessed through a combination of passenger surveys conducted quarterly and an assessment / measurement of the take-up use of park & ride sites around the city. The initial target for transfer to the tram is a switch from private motor vehicle of 17% of total tram patronage within 1 year of opening and 16% within 3 years of opening. Park & Ride usage of 2% per annum will become the primary measure, supplemented by continued survey data. The target for increasing use of Park & Ride is dependent upon, and assumes, continued investment by CEC in the introduction of additional and expansion of existing Park & Ride sites.

Accessibility

9.14. Ease of access is key to attracting passengers for any public transport network. Accessibility can be measured in geographical terms, and also in physical term:

a) Geographical accessibility

9.15. TEL is committed to provide a network which is more comprehensive than one based purely on considerations of profit maximisation. This includes matching operating hours and frequencies to the needs of the travelling public. As a result the fully integrated network will serve those areas of the City which at the moment are less accessible by the current public transport network. The aim is to improve social inclusion within the city, linking up the city's residents and connected them with employment opportunities.

9.16. Travel accessibility will be assessed by the number of boardings in key areas earmarked for development or as existing areas identified for benefit from greater connectivity to emerging employment opportunities.

b) Physical accessibility

9.17. The LB fleet has already been equipped with first class accessibility features including 'kneeling' buses to facilitate boarding. The introduction of trams will further build on these strengths. Compliance with the Rail Vehicle Accessibility Regulations will ensure that trams have stepless tramstop access, level vehicle boarding, wide doors, wide supportive seats and provision for multiple wheelchairs and prams. Smooth acceleration and deceleration will enhance stability for standing passengers, complemented by handrails provided within each tram. Passenger information and Public Address systems both at tramstops and within vehicles will assist the visually impaired, as will tactile paving at stops. Help points at stops and within the tram will also allow passengers with special needs to easily contact the driver or system operator. TEL will require the tram operator and maintainer to ensure that the accessibility features of the vehicles are maintained and that the tram system is serving all passengers regardless of their particular accessibility needs.

Integration

9.18. Integration of transport modes has been shown to be a successful way of increasing patronage across all modes in other schemes. TEL developed strategies which will maximise integration between bus and tram as well as between tram and car (i.e. P&R) and between TEL and other public transport providers (i.e. Rail, other bus services):

- The integrated TEL network features a single flat fare structure which makes interchanging between LB bus and tram simple and affordable. The single ticketing regime for all forms of ticketing (single & day tickets, Ridacard & concessionary tickets) will add to the ease of use of TEL's services.

- The Service Integration Plan developed by TEL aligns the operating hours and frequencies of tram and LB bus in a way which will meet the demands of the Edinburgh public whilst ensuring limited duplication of service provisions. The operating patterns will regularly be reviewed by TEL to ensure operational efficiency.

- High quality interchanges at key locations are being designed as part of the tram project. These interchanges reflect the requirements of TEL to enable straightforward changing between modes, in a pleasant and safe environment, where real time bus and tram information will be provided.

- By providing quality public transport at P&R sites, TEL will encourage private car users to leave their car outside the city centre and join the public transport network, thus reducing the volume of cars entering the city centre.

- TEL will play a key role in integration with other public transport service providers through continuing the existing dialogue with third party operators, and identifying opportunities and methodology for integration.

Safety

9.19. Actual and perceived risks to personal security are often a deterrent to the use of public transport. This is particularly true for vulnerable groups in society, such as women and the elderly and is compounded for travelling in the hours of darkness and/or at more remote locations. TEL is addressing these concerns in the design of stops and interchanges. Waiting facilities will be bright and attractive, and will be monitored by CCTV. There will be Panic Buttons in case of emergency and control rooms between LB bus, tram and city centre will be coordinated, providing direct links to the Police. Further, the physical presence of staff on TEL vehicles (bus drivers & tram inspectors) will enhance the perception of personal security for passengers.

9.20. Safety will be assessed by number of vehicle kilometres between passenger injury incidents accidents/incidents. These statistics will be supplemented by survey data, monitoring passengers' perception of safety and security.

Marketing, Communications and Stakeholder Management Strategy

9.21. The benefits realisation plan is strongly supported by TEL's strategic Marketing, Communications and Stakeholder Management Strategies. Effective initiatives here will foster dialogue and, most importantly, ensure that the integrated bus / tram services are understood by the travelling public. The strategic marketing approach will raise and cultivate awareness of the TEL network through advertising and promotional initiatives. These will be combined with targeted communications and stakeholder management activities which will pro-actively engage Edinburgh's public, media and stakeholders at every opportunity. Effective communication will have significant influence over the public perception of the integrated services and therefore will be critical in creating a positive image to assist increasing patronage, particularly from those who are not currently users of public transport.

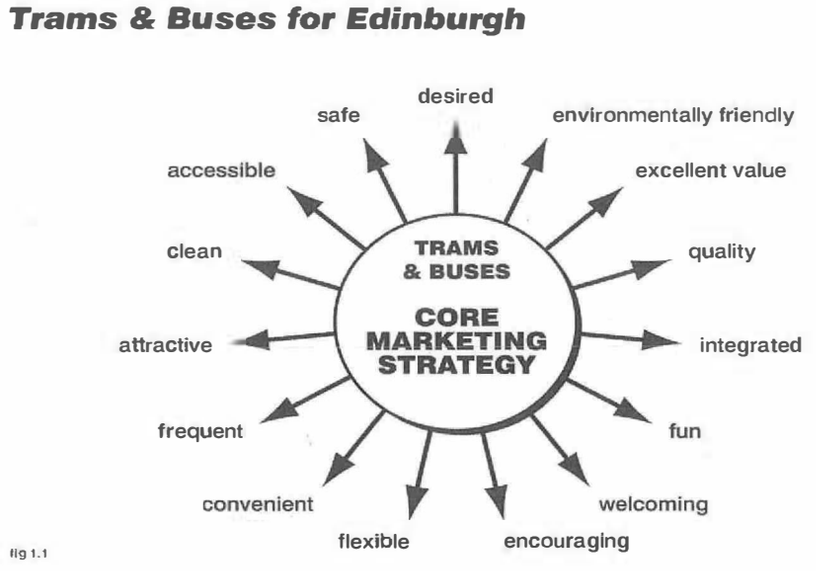
9.22. The strategy advocated by **tie** and TEL recognises that the different stages of operation, both pre- and post-launch of the tram (i.e. LB alone during pre-launch) of the integrated bus/tram network have different requirements for Marketing, Communications and Stakeholder management activities. A robust, comprehensive and consistent approach to media, stakeholder and community engagement has been developed for all stages leading up to launch of the integrated bus/tram network and into operations. During the project, the main focus for all activities is to generate enthusiasm and anticipation for the tram, inform and support residents, businesses and visitors and manage specific stakeholder concerns. Post – launch, the focus shifts to promoting the benefits of the integrated network thus increasing patronage.

Communications and Stakeholder Strategy

9.23. The ongoing focus for communications and stakeholder activities is pro-active engagement of the media, stakeholders, businesses and the community in general. This is particularly important during all periods leading up the launch of operations, where communications can play a key role in building anticipation of the arrival of the tram whilst also providing practical information. Then, post – launch, communication of the real and tangible benefits of the integrated network will be instrumental in encouraging modal shift and the adoption of the new network by existing public transport users. Effective communications will have significant influence over the public's perception of the integrated bus/tram network and thus will be critical in creating a positive image which will assist in increasing patronage by targeting those groups who are not currently public transport users, or do not make journeys in the first place.

9.24. The success of the strategy will stem from a strong core strategy based on key positive messages, as shown in **Figure 9.1** below:

Figure 9.1 – Key communications messages



Marketing Strategy

9.25. To date, LB have provided quality, frequent and value for money bus services for the people of Edinburgh and the Lothian's, building one of the largest passenger bases in the UK. This achievement has been supported by successful marketing campaigns. Much of the planned "tram" and "tram and bus" integration marketing will follow on from this approach. In recognition of the fact that many of the initial tram passengers will be existing public transport users, it is important to create marketing campaigns which have synergy with existing LB services – using family colours, ticketing promotions etc.

9.26. Simultaneously, realising the benefits of the scheme is dependent on attracting those people who currently do not use public transport. Marketing occupies a key role in raising the required awareness with non-public transport users and encouraging behavioural change to achieve a shift away from car use and encouraging people to use the tram. In order to target these groups, the marketing strategy will focus on the additional benefits which the integrated bus/tram network can offer.

9.27. The 12 rules for strategic marketing have been developed to provide the key messages which will underpin the marketing strategy and crystallise the benefits of the tram:

12 rules for strategic marketing:

1: **Get up close and personal**
Your tram, people's tram, Edinburgh's tram

2: **Tap basic human needs**
Public transport, need to use, get from A to B, commuting

3: **Innovation**
Hi-tech, world class, European class, new, plush, clean, modern, ticketing

4: **Mythologize the new**
Got to try it, never been seen before, wow, imposing

5: **Tangible difference in experience**
Unique, fun, visual, seating, heating, the view, smooth, silent

6: **Authenticity**
Only one, no other

7: **Consensus**
Word of mouth, agreement, good, got to try it, positive

8: **Participation**
It's an experience, got to try it, a must do

9: **Communities of interest**
Increases of wealth, desirable areas, boast

10: **Creativity**
Ahead of it's time, no other, wow factor, ticketing

11: **Stake a claim to fame**
First in Scotland, a World/European must see, wow

12: **Follow a vision**
Next lines, early promotion of future development

9.28. A key part of developing strategic Marketing, Communications and Stakeholder Management plans has been to ensure that correct and consistent information on the role and purpose of the individual parties involved in the project and the integrated bus/tram network is readily available to all groups. This has specific implications for TEL as the entity which will ultimately be charged with the management of the integrated bus/tram network. As a brand, TEL will not be visible to the general public. Instead, TEL will be the background legal entity, fulfilling its legal and statutory obligations as a public transport provider whilst all branding, marketing and communications activities will focus on **"Trams for Edinburgh"** and **"Lothian Buses"**.

Implementation of strategic marketing and communications

9.29. The approach to strategic marketing and communications builds on the successes of the existing marketing function within LB and the comprehensive and consistent strategies developed by **tie** for media, stakeholder and community engagement. In period leading up to and post commencement of tram operations, TEL will provide integrated marketing and communications support for both tram and bus to ensure consistency of messages and to maximise synergies.

9.30. TEL is responsible for the management of a profitable and successfully integrated transport network for Edinburgh. Throughout the course of the project, TEL, working with **tie** and partner organisations, will be closely involved in all marketing, communications and stakeholder activities. The approach to strategic marketing, communications and stakeholder management is underpinned by operational plans, all of which have been designed to achieve TEL's organisational objectives.

9.31. In the lead up to launch, TEL will be supported by the existing marketing function within LB and by the existing Communication and stakeholder management capabilities of **tie** Limited, until the start of operations. The tram Communications strategy covering the period to operation produced by **tie** will continue to provide direction and be assessed over time in line with TEL's long-term objectives and any emerging requirements.

9.32. Following a migration period in the lead up to launch, post launch responsibility for communications and stakeholder activity will rest with TEL. LB marketing department will work to deliver the marketing for the integrated tram and bus and continue their already close involvement with the communication and stakeholder activity.

Strategic marketing and communication approach to benefits realisation

Economic regeneration and Integration of land use and transport planning

9.33. Economic regeneration has been identified as a priority in certain key areas of the City, and the transport system should support a strong and sustainable local economy. The tram network serves key regeneration areas, providing enhanced transport connections with these sites. Developments along the tram alignment will profit from good links with the rest of the

city and the tram will be available as a viable alternative to car from the outset of the development.

9.34. The Marketing, Communications and Stakeholder strategy will target residents and workers at these development areas, encouraging them to use the integrated bus/tram network. Liaising closely with developers on progress and providing promotional material will allow marketing of the developments as accessible by public transport from the outset.

Traffic Congestion

9.35. If road users can be persuaded to leave their cars behind, and use public transport, the result will be a reduction in traffic congestion on the City's roads. As a joint effort between tram and LB marketing and communications will ensure that both modes of public transport are promoted, with an emphasis on getting those who do not currently use public transport to change mode. The strategy will target car users in order to inform them as to the additional benefits of the integrated network and tram in particular. These benefits include the carrying capacity, meaning large numbers of passengers can be accommodated at peak times. Further, an emphasis on the comfort and ride quality of the tram may appeal to key groups of non PT users; those who do not currently travel at all, and, in particular, those with restricted mobility.

Environment

9.36. A reduction in vehicle emissions can significantly improve air quality in the City of Edinburgh and support the overall CEC objective of a reduction in emissions. In addition noise levels at points around the tram network will be reduced as trams are quieter than either cars or buses. The anticipated environmental benefits of introducing trams are linked to modal shift from private cars. Informing Edinburgh's public of the positive environmental impacts which tram has, marketing and communications activities will encourage behavioural change and motivate people to travel by public transport instead of private cars.

Social Inclusion

9.37. Edinburgh strives to be a city with a transport system that is accessible to all and serves all. The improved public transport network will further connect the city, providing the public with better access to employment opportunities and the city's amenities, facilitating greater social inclusion within the City. A key aim for marketing and communications is to provide information to those living along the tram route as to how their access to the City will be improved, and promote the integrated network's value in opening up the whole city to them.

Transport Integration

9.38. CEC's Local Transport Strategy states that people should be able to meet their day to day needs within short distances that can easily be undertaken by foot, bicycle or public transport and choice should be available for all journeys within the city. An integrated system provides this choice and can be more attractive to people who would otherwise use their cars as well as to those people who might simply not make a journey due to limited accessibility. marketing and communications activity will focus providing details on how to use the system, inform on the advantages of the integrated fare structures, the integrated service plans and on promoting Interchanges as pleasant areas to change mode, where real time bus and tram information and maps will be available to make changing modes as easy as possible.

Accessibility and Personal safety

9.39. The integrated network will improve access to public transport. This is measured in terms of network coverage and physical accessibility of the system by those with restricted mobility. Edinburgh's transport system should contribute to better health, safety and quality of life in the City, with particular consideration for specific groups such as children, the elderly and the

disabled. Passenger security is also a concern to more vulnerable groups and may presently discourage them from using public transport. The Marketing, Communications and Stakeholder Strategy will provide information about the easy accessibility of the network, promoting the partial low floor vehicles, level boarding provision of wheelchair and buggy spaces, plus reserved seating for the mobility impaired. It will also explain about the security features both on and off-vehicles. Communicating these aspects of the tram system will assist to instil confidence in those groups that the integrated network has been planned with accessibility and security in mind, thereby encouraging them to use the system.

Streetscape

9.40. The image of a city, conveyed by its streetscape, is linked to continued investment and regeneration. Investment in trams has been shown in other cities to be a catalyst for the improvement of the streetscape and of the City's environment in general. The Marketing strategy in particular will play a key role in creating positive support for the tram and its impact on the city's streetscape. Work has already been done with great success in creating visuals which allow the public to envisage the impact of the tram on their environment. Marketing strategy will continue in this vein, emphasising how the tram can add to the environment and character of the City in a positive way.

Road Safety

9.41. Reduced congestion as a result of the introduction of trams may lead to less road traffic accidents on Edinburgh's streets than under more congested conditions, as its fixed path is more easily perceived by motorists and pedestrians alike. A decrease in cars in the City centre as people switch mode from car to the tram will also create a safer environment on the roads. The strategy for marketing and communications will highlight this benefit to the general public, thus providing another motive for people to use the system.

Reliability

9.42. Reliable running times provide an incentive for people to travel on the integrated network. Together with the provision of real time information, it ensures that people can plan their journey effectively and have a positive impression of the system. Marketing and communications will ensure that user-friendly information on timetables and run times is easily accessible at stops, in shops and on websites etc, and will ensure that journey planning on the new integrated network is simple.

Evaluating the Success of the Marketing, Communication and Stakeholder Management Strategy

9.43. The effectiveness of communication, marketing or stakeholder activities will be assessed during and following the execution of all campaigns. Additionally, regular reviews will be undertaken to evaluate the success of the overall strategy in realising the anticipated benefits. A number of key performance indicators will be developed which will allow qualitative and quantitative appraisal of the results of these reviews. TEL will assess the outputs from those appraisals to identify how far individual stakeholder groups have moved towards the desired objective, affirming the approach or enabling a rethink of how to better target the activities.

Evaluation techniques will include:

- Carrying out market research in order to gather, analyze and interpret information about the public transport market; the service to be offered for sale in that market; and about the past, present and potential customers for that service;
- Prompted awareness and recognition of the campaign/brand, in order to discover how effective the marketing campaign has been;
- Knowledge and behaviour relating to the campaign messages;

- Analysis of ticket sales will provide concrete evidence as to patronage and revenue;
- Questionnaires at each travel shop will target existing public transport users, a percentage of whom have been predicted to shift mode from bus to tram;
- TEL's reporting cycle;
- Requesting feedback from Stakeholders at events to monitor opinion;
- Event attendance as the project moves into operation to measure whether or not stakeholders interest are kept,;
- Numbers of queries and balance of positive-negative;
- Listening groups;
- Website hits and comment will prove a useful tool in gauging public interest and opinion;
- Media Monitoring is an essential tool for keeping abreast of news being printed or broadcast about the tram system, TEL and the industry as a whole. A comprehensive public and media relations program will track public perception and enable TEL to respond accordingly.

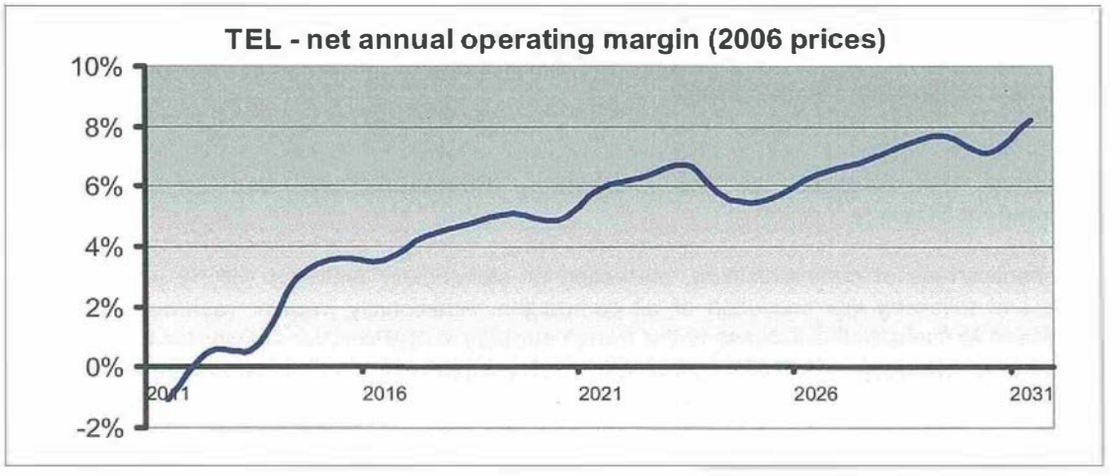
The results of the evaluation will be formally reported to the stakeholders on a regular basis, to be agreed as part of TEL's reporting cycle.

10. Operational targets and strategies

10.1. TEL's operating cost projections are based on:

- the current experience of LB for buses, scaled for the planned future level of bus services with Phase 1 of the tram and the number of bus vehicles that will require;
- A detailed assessment of tram operating costs based upon the planned service patterns and required number of tram vehicles, validated by Transdev and subjected to a thorough review and benchmarking process;
- The forecast combined operating margin for TEL as shown in Figure 8.4 reflects the significant opportunity which TEL has to operate as a highly profitable business.

Figure 10.1 - TEL annual operating margin with Phase 1 of the tram



Operational performance regime

10.2. Transdev have been awarded the contract to operate the tram network under the DPOFA, and ultimately will be in day to day control of the quality of service provided to the public. However, responsibility for project development and delivery lies with TEL, **tie** and their advisors. One of the main reasons for bringing in an Operator during the early phases of the project is to inject their perspective into the development of the network, and hence to facilitate the development of the optimum tram network. This approach, which was endorsed

by CEC, has helped facilitate the successful delivery of the project to date and will continue to do so.

10.3. To address performance issues during the operating phase of the contract, the DPOFA incorporates a payment mechanism which offers the Operator an appropriate risk/reward balance. In summary, the Operator will be incentivised under a regime based upon clearly defined and understood Key Performance Indicators set against the required service specification, and an agreed pain/gain sharing mechanism designed to minimise costs and maximise performance. The final element of the payment mechanism, namely the Vision Achievement Incentive, reflects a longer term goal to which the Operator should aspire. This payment will only be made in circumstances where the tram project's financial performance exceeds defined expectations, and where the quality of service delivery has been consistently maintained after an extended period to match a pre-agreed challenging target level. The scope of cost responsibilities and the definition of the gain/pain share mechanism in the context of an integrated bus and tram system are under review.

10.4. The tram fleet reliability and availability are crucial to provision of the high quality tram service required to encourage modal shift from private car to public transport. The tram Maintainer is being procured under a tram Maintenance Contract which covers vehicle maintenance services and vehicle spare parts. The reference bid is to provide vehicle maintenance for an initial 6 year operating period only. However, bidders have also been required to submit maintenance variant bid based on 30 year maintenance contracts. This approach both maintains flexibility in terms of future maintenance provisions and tests the value for money of the reference case. At this stage it is envisaged that the tram Maintainer, for the initial 6 years at least, will be contracted to the Infraco Contractor to whom it is intended that the contract will be novated at contract close.

10.5. The tram Maintenance Contract has 30% of the annual maintenance services fee as a performance related payment based upon a punctuality and availability monitoring regime. Deductions in payment are proportional to the number of late departing trams compared to those timetabled to operate and tram availability including a 'hot spare' offered for service each day.

10.6. An Infrastructure Maintenance Contract is currently being tendered which covers the infrastructure maintenance services including lifecycle maintenance for a reference bid based on a 15 year period. Bidders have also been asked to submit a maintenance variant based on an initial 3 year period extendable to 6 years.

10.7. The Infrastructure Maintenance Contract has 30% of the annual maintenance services fee as a performance related payment based upon a punctuality and availability monitoring regime. To incentivise the Infrastructure Maintainer to present the tram to a high standard, an additional 7.5% of the annual maintenance fee is calculated based upon inspectors making qualitative assessments against established criteria. These cover tram system cleaning, tram system repairs and maintenance, CCTV, passenger information displays, poster cases and signage and public address and help points. In order to incentivise fault correction in a timely manner for items of the tram network that are not covered by the punctuality or the qualitative regimes, 2.5% of the annual maintenance fee is made based upon actual fault correction against target correction times.

10.8. The contractual structure after the first 3 years following commencement of service remains subject to further discussion and development within tie and TEL in order to find the solution that achieves best value for money and risk transfer.

10.9. The day to day management of LB will rest with its management team. However, certain elements, such as fare and ticketing strategies as well as strategic marketing will be retained by TEL as the overarching body.

Pricing and Revenue Risk

10.10. A key element of retained risk for the public sector relates to ongoing Farebox revenue and operating costs. One of the factors influencing the decision to proceed with separate procurement of DPOFA and Infraco contracts was the past underperformance of a number of full PFI/PPP structures where 100% Farebox risk was transferred to the private sector. In more recent deals, financiers have applied a heavy discount to revenue projections as a result of recognising that revenue is affected by many factors outside the operator's control and that operators therefore have great difficulty in forecasting it reliably. The Procurement strategy proposes the retention of all of the Farebox revenue and a proportion of operating cost risk with the public sector.

10.11. The means to manage the public sector's exposure to operating costs has been built into the DPOFA approach in the form of the development of a pain/gain sharing mechanism. This mechanism, which rewards the operator for the degree to which actual costs outperform pre-agreed targets, has the joint benefit of incentivising the operator to minimise costs and maximise performance. The scope of cost responsibilities and the definition of the gain/pain share mechanism in the context of an integrated bus and tram system are under review. Critically the management of the public sector's exposure to revenue risk is facilitated by the development of an integrated tram and bus business under TEL.

Operating costs

10.12. Effective control over all aspects of operating costs is essential for TEL to achieve its profit objectives. However, the public's perception of the quality of services translates directly to patronage and revenue generation, therefore TEL must balance opportunities for cost savings against the impact this may have on the quality of services provided. Table 10.1 below summarises TEL's projected operating costs with Phase 1 of the tram in operation

Table 10.1 TEL operating cost projections with Phase 1 of the tram

	£'m (2006 prices)					
		Phase 1a	Phase 1a+1b			
	2006	2011	2011	2016	2021	2031
OPERATING COSTS						
Bus	68.4	88.4	87.7	97.2	105.2	127.7
Tram	0.0	14.8	16.5	20.0	20.0	21.5
TEL total	**68.4**	**103.2**	**104.3**	**117.2**	**125.3**	**149.1**
Bus costs / mile	2.76	3.76	3.72	4.12	4.29	4.94
Tram costs (equal capacity) / mile	-	4.23	3.81	3.82	3.83	4.10
Tram costs (absolute) / mile	-	11.00	9.91	9.92	9.95	10.67

10.13. Operating cost projections have been developed for TEL's bus and tram operations based on current experience and benchmarked against other schemes. The primary driver for these estimates has been capacity demand based on the patronage growth projected by the JRC modelling. An iterative review process has allowed TEL to take an overarching view of the projections, avoiding cost duplications in the operational set-up and a number of opportunities for synergies have been identified. The resulting cost projections are a reflection of the integrated system which TEL will operate, and an attempt has been made to merge activities where possible. Areas where significant synergies may be further explored include administration, marketing, cash collection and security as well as other back office functions.

10.14. The current bus operating margin is approximately 8.1% in 2006 (forecast: 6% in 2007) and TEL's goal is to maintain average operating profitability at this level. Bus operations are relatively flexible in their nature which allows LB to react quickly to changes in demand and to control its cost base. For example, routes and frequencies can be altered or dropped if too uneconomical within a relatively comparatively short time frame. The speed of reaction cannot be easily replicated by the tram, thus it is important for TEL to establish a strong performance monitoring scheme as outlined in section 10.2 to 10.9 above, to ensure operating efficiency is maximised.

10.15. The key items for both tram and bus are costs of drivers wages, fuel and electricity, all of which are highly sensitive to the economic climate. All costs have been inflated by RPI and where there is an expectancy of greater increases, these have been factored into the forecast.

Tram operating, maintenance and management costs

10.16. Tram operating, maintenance and management costs represent approximately 14% of the overall cost base for TEL in 2011 and remains relatively constant over the 30 year life of the system

Operating costs

10.17. The majority of tram operating costs estimates have been developed by the appointed operator, Transdev, based on the cost model prepared for the DPOFA. Key operating costs outside the DPOFA are Electricity, Insurance and Marketing costs. All operating cost projections, including the ones provided by Transdev, have undergone an iterative process of evaluation, involving input from TEL and benchmarking against other UK tram schemes.

10.18. The operating costs cover day to day costs which will be incurred in the running of the tram system, and include the operator's management fee. Costs are driven by the operating requirements of the different service patterns which will be implemented during the life of the tram system to meet travel demand. The service pattern assumptions are fully aligned to the service integration plan for TEL tram and TEL bus, assuming a frequency of 6/12 in 2011, moving to 8/16 in 2016 with a further increase by 2027 to meet increased demand on the section between Ocean Terminal and Edinburgh Park.

10.19. The largest single component is staff costs, with drivers and inspectors comprising approx. 51% of the total tram operating costs (approx. 4% of total TEL costs). Likely staffing requirements are based on operating hours and frequency patterns as per the service integration plan. Currently, averages of 4.3-4.6 drivers are assumed per tram and their costs are pegged against current TEL bus driver rates. Inspectors are paid at a proportionally lower rate at 85% of drivers' costs.

10.20. Another significant operating costs item is electricity which represents approx. 10% of the operating cost for trams. Electricity costs are directly linked to the annual km of the tram system and the price per km has been benchmarked against emerging average prices in Sheffield and Nottingham. As there are high uncertainties around future changes in the underlying energy prices, additional cost inflation above RPI has been applied to the projections. Although an estimate has been calculated by Transdev, electricity does not form part of the DPOFA and it will be TEL's responsibility to ensure effective cost control is applied, e.g. through forward hedging.

Management costs

10.21. Tram management costs relate entirely to the management element of the DPOFA and marketing costs incurred to promote the tram system. The latter are proportionally higher in

the first 2-3 years after opening, reflecting the important role played by effective marketing in promoting the system and supporting the patronage projections.

Maintenance costs

10.22. To achieve the expected life and ensure the system performs effectively throughout its expected life, a robust maintenance regime must be implemented. Maintenance costs represent 25% of total tram costs (4% of total TEL) in 2011 and on average over 30 years. Cost projections for maintenance have been developed by Turner & Townsend with input from Transdev, **tie** and TEL. The projections are built up from an assessment of the maintenance requirements of individual elements of the tram network based life expectancy for each item and percentage of the base quantity that may need replacing. The assumptions have been supported by knowledge derived from benchmarking against other schemes already operational in the UK and Ireland, previous experience of individuals within **tie** and its contractors, and engineering judgement. In each case a conservative approach was adopted to defining maintenance intervals and costs, thus limiting the risk of actual costs exceeding estimates and negatively impacting on projected cash flows.

10.23. Included in the projections are all costs relating to maintenance of systems and sub-systems which may include replacement of defective minor components. The maintenance of the trams accounts for more than 51% of the total regular maintenance costs which reflects the day-to-day running costs of the vehicles. This includes such items as daily inspection, cleaning, consumables, standard daily maintenance regimes and graffiti cleaning / vandalism repair. Other key annual maintenance cost items relate to swept path maintenance & cleaning (32% of total tram costs).

Bus operating, maintenance and management costs

10.24. Costs associated with the operations of TEL bus represent 85% of TEL's total cost base in 2011 and it remains relatively constant over the 30 year projections. It reflects the nature of the business, where bus carries between 80-90% of total TEL passengers.

Operating costs

10.25. Bus operating cost projections have been developed by TEL from a base position reflecting LB's operating costs for 2006. Bus patronage is a variable in the cost projections that will flex the peak bus vehicles (PVR_{Bus}), hours and miles required to meet demand. The service integration plan has established the bus service reductions for bus which are assumed to flow from introduction of the tram as described in section 6.26 above. These assumptions are used to estimate the bus operating costs immediately following the introduction of the tram based on PVR_{Bus}, plus changes in scheduled hours and miles. All future year service requirements and associated cost projections are driven by the projected patronage growth from the JRC model.

10.26. Costs covered are operational staff costs, fuel, consumables, maintenance and fleet renewals and additions. As with tram, drivers' costs represent more than 50% of the total operating costs – the relative size of the bus operations mean that they are approx. 43% of TEL's total cost base. Operating hours are the key determents of drivers' costs – these are fully flexed in line with service integration plan requirements.

10.27. Employer's pension contributions for staff who are members of the final salary pension scheme currently operated by LB are a significant cost. It is anticipated that changes to the pension arrangements may be made pre-introduction of the tram which will affect new starters. For the current cost projections, a move to a defined contribution scheme has been assumed for new starters from 2009 onwards. It is recognised that there is a core element within the existing workforce which is less likely follow the general trend of 15% staff turn-over – this has been taken into account in projecting future pensions costs.

10.28. Fuel forms a significant cost item for the bus operations (11% of total bus costs, 9% of total TEL) and is highly sensitive to changes in the market place. Directly linked to annual mileage, LB pursues a policy of forward hedging of fuel where the opportunity presents itself. Given the high degree of uncertainty around future changes in the market price for fuel, a real costs increase above inflation at 2% has been applied to the cost projections.

Maintenance and servicing costs

10.29. The cost projections are based on current LB experience and key driver is the number of annual PVR_{Bus}. They represent 14% of bus costs (11% of TEL total) and include fleet renewals and additions in line with demand increases as per the JRC model. The costs are a reflection of LB's policy to manage its fleet life to an average of 6years / vehicle – an objective which will be adopted by TEL. This is in line with aspirations of providing bus services with attractive, highly accessible, low floor vehicles which operate efficiently and meet required emissions' standards.

Management and Administration costs

10.30. Based on LB's current cost base, these projections include all Head office costs as well as specific depot maintenance and management costs. Signifying 13% of total bus costs (11% of TEL), the costs are not sensitive to volume changes in operational requirements and are relatively constant throughout the estimate period. Real cost increases for salaries at 2% above RPI has been assumed to reflect the likely mix of staff levels included here. The management and admin costs also reflect the assumption that most of TEL's corporate management and administrative activities will be performed by the current LB Head office functions.

11. Human resources, industrial relations and succession planning

11.1. The recruitment plan and terms and conditions are one of the primary drivers of the labour cost contained within the individual tram and bus operating costs. Maintaining and developing good industrial relations is essential to ensure the ongoing success of the TEL business. TEL has created an outline human resource strategy to maintain and develop the bus operating division, to meet the resource requirements of TEL itself and to develop the tram operating division in partnership with Transdev.

11.2. The key objective of the outline strategy is to provide a basis for TEL's approach to recruitment, training and retention of high calibre staff to meet and develop TEL's business goals and to facilitate compatibility between operating units as far as possible. Having an overarching HR and industrial relation strategy will be essential from an operational perspective to support integration of bus and tram as a single economic unit and avoid conflict between the divisions. The human resources strategy has further identified a number of areas where inclusion in common training of tram staff with bus staff would be beneficial from an integration perspective as well as offering opportunities to secure cost.

11.3. The successful detailed development and eventual implementation of the outline HR strategy depends on a number of key assumptions. These include that LB's terms and conditions for staff are unlikely to change significantly in the period to 2010, and that there will neither a downturn in the Edinburgh labour market to ease wage pressures or staff recruitment availability, nor will staff turn-over rates change significantly from 2006 levels, thus allowing for natural reduction in driver numbers at the tram introduction date. Further, the DPOFA stipulates that Transdev will set its own terms and conditions for the tram operating division, however these will be mindful of the TEL objective to ensure that tram driver salaries are kept in line with, and are reviewed in tandem with bus drivers salary reviews.

12. Safety Management and Quality Assurance

12.1. TEL will implement a Safety Management System to assume its duties in relation to Health & Safety requirements as the majority owner of LB, and to monitor the Health & Safety and Quality management of the tram operator, Transdev. TEL's responsibilities with respect to monitoring health and safety management of the tram and infrastructure maintenance providers will depend upon on the final contractual arrangements with those entities, but it is anticipated that the tramway operator will play a pivotal role in determining the safety of the tramway system at all times during the operational phase.

12.2. Key ingredients of an effective safely, quality and environmental management system are clear allocation of roles and responsibilities, both at TEL levels as well as within the operational divisions. This includes clear responsibility and accountability for design and construction safety of the tram system and for works at TEL's premises or under its control.

Pre-launch of tram operations

12.3. TEL will not be involved at a detailed level in tram safety considerations until the system becomes operational. **tie** will take the lead until then on all matters regarding safety and quality management, and the **tie** tram Project Safety Management System and the **tie** Corporate Safety Management System have been adopted for the period of the construction -TEL and **tie** will advise HSE that **tie** will be the Client's Agent for this time.

12.4. TEL will set operational requirements for the tram system but will not involve itself in design matters impacting safety, other than as an observer. Similarly, the HM Railway Inspectorate has indicated that it considers **tie** to be the appropriate body to take responsibility for obtaining the required approvals prior to opening of the tram. However, as TEL will assume responsibility for safety once the tram system becomes operational, TEL will have the opportunity to influence and "sign-off" decisions which affect safety during the design and construction periods. The timing of the transfer of responsibility on commencement of tram operations or at some point it, is subject to further discussion and these will be mindful of the requirements contained in the contractual arrangements for commissioning, testing and training.

12.5. With regards to the bus operating division, LB's Safety Management System and Quality Management System are well established. Safety practitioners representing all sections of LB actively inspect and resolve safety and / or quality issues arising on an ongoing basis. Regular review meetings take place at the Safety Committee under the chairmanship of the Health and Safety Manager. Additionally, an annual Safety Forum, consisting of the Safety Committee and the Executive Directors review achievements and establish safety targets and objectives. It is anticipated that TEL will continue the approach to Safety Management and that its own systems will be complementary to these processes.

Risk and Insurance provision

12.6. TEL is duty bound to protect itself, sponsors, funders, and the public sector from risk exposure and is committed to the maintenance of a strategy for the identification, classification, analysis, mitigation and monitoring of risk.

12.7. Appropriate risk allocation is fundamental to achieving value for money for the tram system. As part of the risk management approach developed by **tie** during the design, construction and commissioning phases of the tram project, risks are being allocated to the parties best placed to manage and/or bear them and can be used as a basis to incentivise the private sector to help ensure that CEC's objectives for the tram and TEL are met.

12.8. The risk analysis has considered the historical risks affecting light rail schemes as identified in industry best practice and government guidance. A comprehensive risk management strategy has been developed by **tie** which will be carried forward during the project phases and into commencement of operations of the tram. The aim is to combine approaches to risk analysis and management in tram and LB, thereby providing TEL with a sound foundation from which to assess and, where possible, mitigate risks to the business.

12.9. Details of the risk management strategy are contained in section 10 of the DFBC.

13. Capital Assets and Investment Strategy

13.1. The proposed legal ownership structures for the tram assets are quite distinct from the operational use of these assets in the integrated system. Important drivers for the decision on the optimum ownership arrangements are direct and indirect tax implications during and post construction of the tram for TEL, CEC and **tie**. These are balanced with the legal obligations arising from the creation of the tram assets and the subsequent operational implications. Investigations are currently underway to identify opportunities to minimise future tax burdens while maintaining operational flexibility. The financial projections in the TEL Business Plan assume that corporation tax will be payable at the prevailing rate on TEL's forecast operating surpluses.

13.2. It is intended that ownership of CEC's majority shareholding in LB will transfer to TEL prior to the commencement of tram operations. Upon the transfer of ownership of LB from CEC, TEL will acquire LB's assets which consist primarily of passenger vehicles and properties. All of these are fully utilised in the operations of LB's business and the day-to-day management of these assets will remain with LB's executive management team.

13.3. The pivotal role played by the depots in the operations of the bus company means continuous maintenance is required, which forms a significant part of LB's annual expenditure. Three of the bus depots in LB's current ownership have been substantially refurbished over the past five years, thus brining them up to "fit for purpose" for the next twenty years or so. Opportunities to optimise the value of the depots to the business as well as opportunities for alternative locations are continually assessed.

13.4. The assets created during the construction of the tram will not be legally owned by TEL but remain in the ownership of CEC. This includes all compensation paid in respect of land and properties acquired as well as the tram vehicles and infrastructure assets. In effect this means that CEC will hold the assets on their books and account for depreciation according to local authority rules, whereas TEL will account for maintenance expenditure as and when it is incurred as part of its ongoing business. Operational management of the assets will lie with TEL and its contractors.

13.5. To provide TEL with legal access to the tram assets, CEC will grant an interest to TEL which will allow it to operate the tram. This grant could take form of a licence for peppercorn consideration, the details of which will be included in an operating agreement between CEC and TEL. Regular maintenance and life cycle renewals of the assets are likely to be a requirement of the licence, thus ensuring that the assets are maintained to a high standard. Clarity on the respective responsibilities for on-going highway maintenance and repairs in the area immediately around the tram will be the subject of a Roads Demarcation Agreement established with CEC.

Lifecycle costs and replacement costs

13.6. The capital investment and lifecycle costs provided for in the TEL Business Plan relate primarily to the purchase of new buses to renew and/or expand the existing bus fleet and to

the heavy maintenance expenditure on the tram (infrastructure and vehicles) necessary to ensure the tram assets reach the end of their useful lives.

13.7. Based on LB's current experience, bus fleet renewals and additions range between £12m - £19m per annum (2006 prices) which represents approx. 10% of total bus costs in any given year. This cost reflects TEL's targets to maintain an average fleet age of 6 years.

13.8. The projected life of the elements of the tram system will vary. Replacement of many of the major elements, including the tram vehicles will be required soon after it has been in operation for 30 years. The TEL Business Plan provides specifically for the expenditure required to achieve the life expectancy of the system over the first 30 years of operation and to ensure the system performs effectively throughout. During this period, regular heavy maintenance and renewals must be implemented and will take place at pre-determined time intervals dictated by the specified performance criteria for the individual elements of the system. These costs are significant and particularly the half-life refurbishment of tram vehicles after approximately 15 years will require careful planning to balance cash flow availability with servicing needs. Details of major systems' life-expectancy are contained in Appendix 5.

13.9. The TEL Business Plan does not specifically provide for the major replacement expenditure which will be required after 30 years, including replacement of the tram vehicles, and the options for funding this expenditure will need to be kept under review in light of the operating surpluses which TEL achieves and in consultation with CEC and Transport Scotland.

14. Distribution policy

14.1. CEC currently receives a dividend of c£2m per annum in respect of its 91% shareholding in LB. The TEL Business Plan adopts the payment of this level of dividend by TEL as a continuing requirement in the period beyond the commencement of tram operations when TEL will become the majority shareholder in LB.

14.2. The TEL Business Plan assumes this dividend policy will be applied prudently and that the annual dividend might be reduced or foregone for short periods in response to lower profits or short term demands on TEL's cash-flows. In such circumstances, the dividends for future periods would be adjusted upwards to ensure the shareholders receive the target dividend on a cumulative basis.

15. Risks to patronage and revenues

15.1. In consultation with TEL, **tie** and other stakeholders, JRC has carried out a series of tests on the sensitivity of the forecast TEL patronage and revenues to changes in key assumptions. The results are detailed in the Revenue & Risk report at Appendix III and are summarised below.

Development and economic growth

15.2. Phase 1 of the tram is an investment to encourage and facilitate the new development planned in north and west Edinburgh and to stimulate economic growth in the City. However it is important to recognise that the forecast of future TEL patronage and revenues, both for bus and tram, is highly sensitive to the level and timing of new development and the underlying level of economic growth. Two tests have been carried out as follows:

- **Lower and delayed new development** – new development at Granton is 25% of that in the central case and in other areas, including Leith and Edinburgh Park, is delayed by 5 years.
- **Lower underlying economic growth –** long-term background patronage growth is 50% of that reflected in the central case.

The results are shown in Table 15.1 below:

Table 15.1
Sensitivity of TEL revenues to development and economic growth (2005 prices)

2005 Prices	2011 Shortfall		2031 Shortfall	
	£m	%	£m	%
Lower and delayed new development				
Reduction in total TEL revenue	3.1	3%	20.7	13%
Reduction in revenue uplift due to tram	0.4	16%	4.0	54%
Lower underlying economic growth				
Reduction in total TEL revenue	7.2	8%	40.0	25%
Reduction in revenue uplift due to tram	0.6	22%	4.6	61%

15.3. In the event of slower than expected development or a general economic downturn, TEL would plan and implement services to match the reduced demand.

15.4. On the Phase 1a corridor, where there is already a high level of demand, the opportunities to implement revised integrated service patterns for buses and tram, with commensurate savings in operating costs, would significantly mitigate the risk of failure to meet annual operating profit targets.

15.5. Approximately 30% of forecast demand between Leith and Haymarket will be directly dependent on new development. Approximately 50% of forecast demand between Haymarket and the Airport will be directly dependent on new development although there is potential to adjust bus and tram service provision to mitigate shortfalls in demand.

15.6. On Phase 1b the opportunities to mitigate the impact of lower demand are lower than on Phase 1a as a greater proportion of the patronage will be carried by the tram. Opportunities will however exist to reduce the planned level of tram services to mitigate the negative impact. Although patronage on Phase 1b amounts to c30% of total tram passengers, nearly 70% of that demand will be directly dependent on the new development at Granton waterfront. In context however this represents a relatively small proportion of TEL's total revenue.

Other risks and sensitivities

15.7. Other sensitivities tested included:

- **Attractiveness of the tram to the public** - To realise the incremental revenue and wider economic benefits from the introduction of the tram, TEL will strive to meet and exceed targets with regard to travel times and environment, comfort of seating, accessibility and reliability of the tram. These factors represent an opportunity as well as a risk and the analysis shows that tram revenues could be influenced by as much as +/- 10% by relative success or failure to achieve these targets.

- **Revenue yield** – TEL will have the same opportunity as any other public transport operator to influence its revenues by managing its revenue yield per passenger in a relatively inelastic market. Increasing the target revenue yield per passenger by RPI + 1.5% each year (instead of RPI + 1% used as the base assumption in the revenue forecasts) results in an uplift of £4.3m (3.4%) of total TEL revenue forecast for 2012. However the TEL Business Plan reflects TEL adoption of the fares strategy at 7.4 above.

Trams for Edinburgh
..connecting our Capital

TEL – Planning for the Future

Strategic Business Plan

2006

Appendices

Lothian Buses
..way ahead in Edinburgh

CONTENTS

Appendix 1 – Developing existing public transport services and future transport investment

Developing existing public transport services

Bus services in Edinburgh have been very successful. Passenger numbers on Lothian Buses network have grown by 25% since 1998. This growth has been aided by effective partnership between the Council and bus operators. Initiatives have included:

- the redevelopment of Edinburgh Bus Station,
- bus priority schemes including Greenways, Quality Bus Corridors and the A90 queue management system. The latter was delivered in tandem with the highly successful Ferry Toll Park and Ride, which now has increased parking capacity and a bus to central Edinburgh on average every 5 minutes in the morning peak;
- the recasting of the bus network in the vicinity of the new Royal Infirmary of Edinburgh (RIE), with 8 bus services now directly serving or terminating at the new hospital. This continues to develop with services from Midlothian, the Borders and Fife now calling at the site.
- the use of developer contributions to provide new or extended bus services;
- improved bus stops;
- the Bustracker satellite bus location system – giving 'real time' information at over 250 bus stops and improved service reliability;
- the Edinburgh Fastlink guided busway; and
- in partnership with other SESTRAN Councils, the One-ticket multi-operator transport ticket.

Much has been done to encourage and promote bus use in the city, but there are still considerable opportunities for further progress. A range of projects either in the process of being implemented or are under investigation:

- New Park and Ride sites at Ingliston and Hermiston giving new opportunities for travellers from west Edinburgh and West Lothian to use the bus for the urban section of journeys to Edinburgh. Sites at Sheriffhall and Straiton (delivery via Midlothian Council) are due to follow in 2007 & 2008 respectively;
- nine Bus Interchange points in the city have became fully operational in 2006, enabling more effective use of the bus network as a whole; and
- bus service enhancements on a number of routes through the Bus Route Development Grant scheme.

Looking further into the future, the 'Bustracker' system offers great potential for further progress, through:

- providing 'real time information' not just on an expanded network of bus tracker signs, but via mobile phones, the internet, and workplace intranets;
- giving priority to late-running buses at traffic lights; and
- enabling better on-road management of bus fleets, delivering a more reliable and punctual service.

Despite recent progress, buses are still significantly affected by congestion in some locations, and potential remains to provide further on-street priority through bus lanes. Work is underway to identify a series of proposals for such lanes.

Transport investment in the next 5 years

A major transport investment programme, unprecedented in recent decades, is due to take place in Edinburgh and its hinterland over the next 5 years. .

The core elements of the investment package for the city are introduction of the Tram , extensive modernisation and improvements at Edinburgh Waverley Station, and the Edinburgh Airport Rail Link (EARL).

The first phase of the £150m upgrade of Waverley Station is underway and due for completion by 2007. The project will see the provision of an escalator at Waverley Steps, two additional platforms and lifts.

A Bill for Edinburgh Airport Rail Link (EARL) has been lodged with the Scottish Parliament this year. Funding of £500m has been earmarked by the Scottish Executive for the project, which is programmed for completion by 2011.

Other major schemes which will improve opportunities for travel to the city, are the reopening of the Waverley rail line and the Airdrie to Bathgate rail line.

Integrating the new transport projects will be crucially important. Work is underway to ensure high quality interchange between tram, rail and bus at both Waverley and particularly Haymarket stations. As mentioned previously, TEL is charged with ensuring bus-tram integration.

Appendix 2 – Proposed tram frequencies

6 & 12 tram per hour scenario

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

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

Network / Phasing	Service frequency commencing at:	Sunday (trams per hour) first tram 06:00	06:45	08:00	08:20	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	6	6	6	6[a]	0
1a	Ocean Terminal to Airport	6	6	6	6	6	0
1a	Haymarket to Newhaven	0	0	6	6	0	0
1a	Newhaven to Haymarket	0	0	0	6	0	0
1b	Airport to Ocean Terminal	0	6			6[a]	0
1b	Ocean Terminal to Airport	6	6			6	0
1b	Granton to Newhaven	0	6			6[b]	0
1b	Newhaven to Granton	6	6			6[c]	0

Notes:

[a] from approx 23:15 trams run from Airport - City Centre only

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

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

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

Appendix 2 – Proposed tram frequencies (cont.)

8 & 16 tram per hour scenario

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

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

Network (phasing) and service frequency commencing at:		Sunday (trams per hour)									
		first tram 06:00	06:45	07:50	08:00	08:45	18:00	18:20	18:45	23:15	last tram 23:59
1a	Airport to Ocean Terminal	0	8	8	8		8	8		8[a]	0
1a	Ocean Terminal to Airport	8	8	8	8		8	8		8	0
1a	Haymarket to Newhaven	0		8	8		8	8			0
1a	Newhaven to Haymarket	0		0	8		8	8[d]			0
1b	Airport to Ocean Terminal	0	8		8	8	8		8	8[a]	0
1b	Ocean Terminal to Airport	8	8		8	8	8		8	8	0
1b	Granton to Newhaven	0	4		4	8	8		4	4[b]	0
1b	Newhaven to Granton	4	4		8	8	4		4	4[c]	0

Notes:

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

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

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

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

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

Appendix 3 – Proposed bus service pattern

1. Bus service rationalisation – current inter peak buses per hour and anticipated volume reduction

Leith Walk Bus & Tram Frequencies @ bus:tram ratio of 2.6 to1

Current

	tph
Tram	0

2005 inter-peak bus volumes

Ser No.	bph
7	6
10	6
12	4
14	4
16	6
22	12
25	6
49	3
Total	47

Proposed

	tph
Tram	**12**
Equivalent bph	**32** ratio 2.6 to 1
Residual bus target	**15** (47 minus 32)

Post-Tram inter-peak bus volumes

Ser No.	***proposed*** Bph	***Current*** bph	***change*** net
7	6	6	0
10	0	6	-6
12	0	4	-4
14	4	4	0
16	6	6	0
22	0	12	-12
25	0	6	-6
49	3	3	0
Total	19*	47	-28

tph: trams per hour
bph: buses per hour

* includes retention of a limited number of buses linking Leith Walk with Princes Street.

Appendix 3 – Proposed bus service pattern
2. Bus Fleet – indicative alterations to integrate with tram
OCT - AIR plus GRS (Scenario 3) Including service 16 down Leith Walk

INDICATIVE BUS ALTERATIONS TO INTEGRATE WITH TRAM - Based on proposals agreed in principle by LB & TET
Bus Alterations below work on the assumption of:
Ocean Terminal - Haymarket 12tph; Haymarket - Granton 6tph; Haymarket - Airport 6tph and a high quality of interchange at both St Andrew Sq and the Foot of Leith Walk

Ser No	LB routes as of 18/10/05. Details of routes after changes with either new route or part of route or withdrawn route or part of route	Notes	Current headway (mins)	New headway (mins)	Inter-peak PVR		+/- PVR
					Current	New	
10	Torphin or Bonaly, Polwarth, Toll Cross, Princes St, St Andrew Sq, Leith Walk, Gt Jct St, Newhaven	A	10	10	11	8	-3
12	Gogarburn (peak), Gyle, Drumbrae, Haymarket, Princes St, St Andrew Sq, Leith Walk, then Constitution St and Leith Links or Seafield, Portobello, the Jewel	B	15	15	10	6	-4
16	Colinton or Hunters Tryst, Greenbank, Morningside, Toll Cross, Princes St, St Andrew Sq, Leith Walk, The Shore, Commercial St, Newhaven, Granton, Silverknowes	C	10	10	14	14	0
21	Gogarburn (peak), Gyle, Drumbrae, Crewe Toll, Goldenacre, Gt Jct St, Duke St, Leith Links, Lochend, Restalrig	D	15	15	8	9	1
22	Gyle, Broomhouse, Stenhouse, Balgreen, WAR, Princes St, Leith St, Leith Walk, The Shore, Ocean Terminal	E	5	6	20	11	-9
25	Riccarton HWU, Sighthill, Gorgie, Haymarket, Princes St, Leith St, Leith Walk, Duke St, Lochend, Restalrig	F	10	10	13	9	-4
32	Clovenstone, Sighthill, Drumbrae, Muirhouse, Granton, Newhaven, Leith, Lochend, Restalrig, Kings Road, Portobello, Niddrie, NRI	G	30	30	7	5	-2
35	Sighthill, Chesser, Fountainbridge, Royal Mile, Easter Rd, Duke Street, Constitution Street, Bernard Street, The Shore, Commercial Street, Ocean Terminal	H	20	20	6	6	0
40	Ocean Terminal, The Shore, Seafield, Portobello, Niddrie, NRI	I	0	30	0	4	4
100	Airport, Maybury, Drumbrae, Murrayfield, Haymarket, Princes St, Waverly Br	K	10	15	10	6	-4
WGH	Crewe Toll, Western General Hospital	L	0	7	0	2	2
PVR Totals					99	80	-19

Notes:

A	Section between Newhaven and Foot of Leith Walk replaced by tram
B	Section between King's Road and Foot of Leith Walk replaced by new service 40
C	via The Shore and Commercial St in Leith to replace withdrawn 22
D	Replaces service 25 between Leith Links and Restalrig
E	Section between Ocean Terminal and Foot of Leith Walk replaced by services 16, 35 & 40 via Shore and Henderson Street (n.b service 1 stays on current route along N. Jct St)
F	Section between Restalrig and Foot of Leith Walk replaced by service 21
G	Replaced by new service 40 from Kings Road to NRI
H	via The Shore and Commercial St in Leith to replace withdrawn 22
I	Replaces service 12 between Leith Links and Kings Road
K	Reduced frequency on service 100 from every 6 bph to 4 bph - no route change
L	New service connecting Crewe Toll Interchange with the Western General Hospital

Appendix 3 – Proposed bus service pattern (cont.)

3. Bus / Tram network integration – detailed service proposal

Service 10 **Currently** Torphin – Newhaven
Becomes Torphin – St. Andrew Square.

Service 12 **Currently** Gogarburn – The Jewel
Becomes Gogarburn – St. Andrew Square.
Section between The Jewel and Foot of the Walk covered largely by Service 49 and section between King's Road and Foot of Leith Walk replaced by new Service 40

Service 16 **Currently** Colinton – Silverknowes
Becomes Colinton – Silverknowes but diverted via Henderson St to replace service 22.

Service 21 **Currently** Gyle – Duke Street
Becomes Gyle – Restalrig

Service 22 **Currently** Gyle – Ocean Terminal
Becomes Gyle – Leith Street at reduced frequency. Replaced between Ocean Terminal and Foot of Leith Walk by diversion of Services 16 and 35 via Commercial Street, Shore and Henderson Street

Service 25 **Currently** Riccarton – Restalrig
Becomes Riccarton – Leith Street.
Section between Restalrig and Foot of Leith Walk replaced by Service 21, terminating at Restalrig

Service 32 **Currently** Clovenstone – RIE
Becomes Clovenstone – Kings Road
Replaced between King's Road and RIE by new service 40.

Service 35 **Currently** Sighthill – Ocean Terminal
Becomes Sighthill – Ocean Terminal, but diverted via Henderson Street, Shore and Commercial Street to replace Service 22

Service 40 New service, Ocean Terminal – RIE, to replace Service 22 on Shore, service 12 via between Foot of Leith Walk and The Jewel and service 32 between Kings Road and RIE

Service 100 **Currently** Airport – Waverley
Frequency reduced to every 15 mins

Appendix 4 – Revenue protection schemes on other tram and light-rail schemes

Network	Current Regime	Why	When
Sheffield	Conductor only	Vandalism of ticket machines & high fare evasion levels	Changed to conductors 2 years after opening.
Manchester	Machines only and inspectors on board	GMPTE would prefer conductors but when Phase 3 extensions are built conductors are not viable.	Persevered with original solution despite high level of fare evasion and antisocial behaviour problems.
Nottingham	Conductor only	Relatively small system not dissimilar to phase 1a in Edinburgh.	Conductor only from start.
Croydon	Machines only and inspectors on board	Benefit from high use of travelcard and LUL gating	Continued with original solution
Midland Metro	Conductor only	Despite high use of travelcard, security combined with fare evasion justifies conductors.	Changed from machine only to conductors shortly after opening.
Dublin	Machines and inspectors	High use of integrated ticketing travelcard.	Continued with original solution.
LUL	Barrier	Benefit form high use of travelcard	Introduced in 1991.
DLR	Machines and inspectors	Benefit from high use of travelcard and LUL gating.	Continued with original solution.
Tyne & Wear	Machines and roving security guards / inspectors	Barriers originally installed but removed for unreliability & post-Kings Cross requirement to staff gated stations.	High level of ticket checks by roving inspectors and external security firm.
Glasgow	Machines + Barrier	Security and fare evasion forced barrier introduction.	Introduced in 2005.
Lyon	Machines, Barriers & Front door bus loading	Security and fare evasion forced barrier introduction.	Introduced in early 2006.

Appendix 5 – Maintenance, Lifecycle and Renewals cost report

The projected life of the whole tram system has been assumed to be 60 years in line with current STAG appraisal guidelines. To achieve the expected life and ensure the system performs effectively throughout, a robust maintenance and renewals regime must be implemented. As part of the Draft Final Business Case (DFBC) and TEL Business plan, maintenance and renewals costs have been assessed for the Phasing options 1a and 1a + 1b and service patterns 6/12 vs. 8/16.

The DFBC and TEL business plan assumes that regular maintenance and *ongoing* lifecycle costs will be met by operating surpluses within TEL. Funding arrangements for major renewals, particularly mid-life replacements are to be agreed between key stakeholder, TEL, CEC, and Transport Scotland.

This report defines what constitutes maintenance and on-going lifecycle costs as opposed to renewals cost for Business case / Business plan purposes and the approach taken to estimate these costs and their timings over the 60 years.
The report should be read in conjunction with the TSS report on Life Cycle Cost Models which contains details of individual cost estimates and classification.

Approach to costs estimation

Detailed costs models have been developed by **tie**'s advisors estimating the operational maintenance and all lifecycle costs for the tram system to inform the DFBC and TEL Business plan. The cost models break down the whole tram network into a full list of elements which require maintenance through the life the system. *This work breakdown structure is aligned with the SDS costs report **[ref]** used for the baseline cost information.*

The individual systems and sub-systems within each element of the work breakdown structure have been analysed and basic assumptions have been made regarding annual, day-to-day maintenance items and planned replacement items. They take into consideration the frequency of replacement and the percentage of the base quantity that may need replacing. This approach allows the calculation of a cost "rate" for projected maintenance and replacement costs.

The assumptions have been supported by knowledge derived from benchmarking against other schemes already operational in the UK and Ireland, previous experience of individuals within **tie** and its contractors, and engineering judgement. In each case a conservative approach was adopted to defining lifecycle intervals and costs, thus limiting the risk of actual costs exceeding estimates and negatively impacting on projected cash flows.

Definition of cost categories

Operational costs
Day to day – costs of daily maintenance and operational maintenance of systems and sub-systems which may include replacement of defective minor components. This includes such items as daily inspection, cleaning, consumables, standard daily maintenance regimes and graffiti cleaning / vandalism repair. These costs are routine in their nature and as such are part of the systems annual operating cost.

Lifecycle costs
These encompass all costs arising from operating the tram systems which fall out with the standard operating and maintenance costs described above. They are capital in nature and include such costs as for the replacement of civil, electrical and stop installations, tram vehicles refurbishment and all "heavy maintenance" activities. The costs models developed for the DFBC and TEL business plan classifies these costs as:

Planned Renewal – replacement / renewal of systems / sub-systems at the end of their anticipated life expectancy. These will take place at pre-determined time intervals dictated by the specific performance criteria of the individual system. The major system working lifecycle requirements are outlined in appendix 1; and

Planned Refurbishment – covers major overhaul of the tram fleet in order to achieve the required overall 30 year life span for these units. This refurbishment, undertaken at 15 year intervals, covers livery, upholstery, motors, pantographs, etc. After 30 years service, the complete tram unit is replaced.

Residual values

A significant proportion of the system would have a life materially longer than 60 years. For example, land will have alternative use value which could be realised if the tram system were terminated. The value of such "enduring assets" has been calculated for Business Case and Business Plan purposes, however, the problem is that the assets are only worth what they can realise and it is therefore necessary to evaluate future cash flows, assuming best use is as a tram system. This also ignores any restitution costs since the system will continue as a going concern. The residual value of the tram system will be further evaluated to ensure that this significant consideration in the preparation of the TEL Business Plan is given full visibility.

Cost not included

The cost estimates **exclude** any maintenance costs out with the operational scope of the tram system – thus any potential costs arising in the wider area of the tram network are not taken into account here. Specifically, utility diversion works are **excluded** from the costs on the basis that once diverted, the responsibility for on-going maintenance of the utilities resides with the relevant utilities company.

All costs identified in the models are assumed to fall outside operational costs covered under the DPOFA contract with Transdev.

Any costs arising from legal obligations or on-going maintenance requirements associated with land purchases, building fixings or other compensation type payments **are not** covered within the cost models.

Systems life expectancy

System Element	System life expectance (replace at end of year)
Trams – refurbishment	15 years
Trams – replacement	30 years
CCTV	15 years
Ticket Vending Machines	15 years
Passenger Help Points	15 years
Passenger Information Displays	15 years
Public Address	10 years
Radio Communication Systems	15 years

Control Room Equipment	15 years
Signalling	20 years
Overhead Line Equipment	40 years
Traction Power Equipment	35 years
Track – off street locations	30 years
Track – on street locations	50 years
Buildings	50 years
Structures	120 years

EDINBURGH TRAM NETWORK

Edinburgh Tram Network STAG 2 Appraisal

Report

December 2006

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Contents

FIGURES

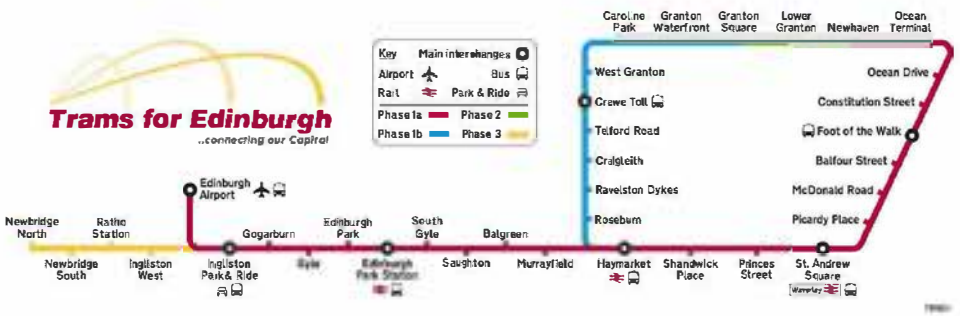
TABLES

APPENDICES

SUMMARY

1. This STAG2 report represents a comprehensive assessment of the appraisal case to construct and operate phases 1a and 1b of the Edinburgh Tram network. Figure S1 below shows the full planned network. Given that Phase 1 comprises two sections 1a (Newhaven to Edinburgh Airport) and 1b (Newhaven to Granton via the Roseburn corridor), a STAG2 appraisal has been undertaken for the core route (1a) alone and for Phase 1 in its entirety (1a+1b).

FIGURE S.1.1 EDINBURGH TRAM NETWORK PHASING



2. The proposed phased implementation was assessed by Transport Edinburgh Limited (TEL) following the successful acquisition of powers to construct the project, recognising current affordability constraints

3. The route choice and phasing has been guided by the need to address the socio-economic, environmental and transport problems and opportunities and, in line with STAG guidance, to meet the Transport Planning Objectives for the proposal.

4. Analysis of the current socio-economic characteristics of Edinburgh revealed that the recent strength of the regional economy, with corresponding increase in population and jobs, is set to continue in future. Opportunities for growth exist in particular along Edinburgh's waterfront at Leith, Newhaven and Granton.

5. The lively economy is likely to result in both considerable inward migration and an associated increase in commuting. As a result the capacity and range of Edinburgh's public transport system will be required to increase to encourage growth and development opportunities to be met sustainably.

6. Mapping of the levels of economic deprivation, employment levels and levels of educational attainment show a considerable variance across the city. A number of trends are evident which make it possible to identify a range of pockets and corridors of deprivation. Areas of Granton and Pilton to the north, and a zone around Leith Walk, as well as around Saughton and Balgreen in the west are identified as areas where socio economic status is considerably less affluent than surrounding areas. Employment, income levels and car ownership tend to be comparatively low in these areas which result in a notably higher index of multiple deprivation.

7. Direct connection to the city centre and other employment areas which would be facilitated by the proposals would undoubtedly improve the situation for these areas. Despite the high levels of car ownership at the city wide level, similar pockets of low car ownership exist, broadly correlated to areas of high population density. The proposals would offer an attractive service to those areas which include Granton, Newhaven, Leith and Leith Walk, as well as Haymarket and Gorgie near the city centre and Saughton and Balgreen in the west.

8. Assessment of the environmental aspects of the proposal show that it would make a positive contribution towards objectives of reducing emissions and improving air quality in the Air Quality Management Area (AQMA) set up by City of Edinburgh Council (CEC). The proposal passes through the heart of the city centre would specifically contribute to these issues in the AQMA. Its contribution to mode shift would enable further progress towards objectives set in the Air Quality (Scotland) Amendment Regulations 2002 and to national objectives to reduce emissions of greenhouse gases. CEC have identified air quality issues in the western corridor of the city leading to the airport area, with a particular focus on Corstophine Road, St Johns Road and Drumbrae Roundabout, monitoring of this is being carried out with a view to determining it a second AQMA. The proposal would pass directly through this corridor, as a result contributing to air quality improvements in the area.

9. The public transport infrastructure in Edinburgh is currently reliant upon buses – primarily operated by Lothian Buses and First Edinburgh. Implementation of a wide range of bus priority measures has improved the bus service but the bus services remain vulnerable to the effects of increasing congestion across the city. In this regard the proposals would enhance the public transport 'offer' of the city, making contributions to mode shift and air quality objectives in the process.

10. Development of planning objectives is fundamental to development and appraisal of transport proposals. Planning objectives were developed taking cognisance of the Scottish Executive's national objectives and to incorporate the relevant policies in local planning documents. They were based significantly on the opportunities, problems and constraints in the waterfront – city centre – airport corridor.

11. The planning and policy context at national, regional and local levels was used as the basis to develop the following Transport Planning Objectives:

- To support the local economy by improving accessibility;
- To promote sustainability and reduce environmental damage caused by traffic;
- To reduce traffic congestion;
- To make the transport system safer and more secure; and
- To promote social benefits.

12. Scheme development and acquisition of parliamentary powers was undertaken in parallel for the northern loop route (formerly Line 1: Granton, Roseburn corridor, city centre, Leith) and the former line 2 between St Andrews Square and Newbridge/Edinburgh Airport. Each route went through a detailed route and option development process, including full STAG2 appraisals.

13. Extensive consultation was undertaken during the development of Lines 1 and 2. This continued through the Parliamentary process, notably the management of and negotiation with objectors to the Bill. A separate strand during this time and subsequently has been the creation of Community Liaison Groups to inform further development of the scheme. A Business Liaison Group has been set up for traders on Leith Walk and Constitution Street.

14. The proposed service pattern for Phase 1 is as follows:

- **2011** opening date 6 trams per hour Edinburgh Airport to Newhaven via Princes Street (Phase 1a), combined with 6 trams per hour Granton to Newhaven via the Roseburn corridor and Princes Street: combined 5 minute frequency between Haymarket and Newhaven (Phase 1b), rising to:
- **2031** 8 trams per hour on each leg: combined frequency of a tram every 3 ¾ minutes.

15. Total out-turn capital costs for phase 1 are **£580m** including a 16% allowance for risk and optimism bias. **£495m** of this cost would be attributable to phase 1a if built alone. Operating and maintenance costs for phase 1 are expected to be **£15.8m** in 2012, although after allowing for advertising income and savings in bus operating costs, net costs are **£4.5m**. For phase 1a alone, the equivalent figures are **£14.4m** (gross) and **£3.1m** (net).

TABLE S.1.1 TRAM CAPITAL COST EXPENDITURE PHASE 1A AND 1B

Item	Cost (£m)
Scheme 1a + 1b Costs	
Out-turn costs, assuming 6% construction price inflation	499
Of which	
Risk and optimism bias component	81
% risk and OB	16%
Total – out-turn – Scheme 1a + 1b Costs	**580**
Total – out-turn – Scheme 1a only	**495**

Note: These were the capital costs at the point of a 'freeze' in their development. Further work has since been done on costs, resulting in marginal changes, the results of which are reflected in tie's Financial Business Plan. The differences have a relatively marginal impact on the economic appraisal, the results of which are available in a technical note.

16. Extensive work has been undertaken to build new demand forecasting models to predict use of the tram and the impact upon use of other transport: bus, rail and car. Annual demand for phase 1a is predicted to be **10.6m** tram passengers in 2011 (**13.2m** for 1a+1b) (assuming that 75% of modelled demand occurs in the first year), rising to **24.3m** in 2031 (**31.6m** for 1a+1b). This growth is predicated on substantial growth in the total travel market, as well as additional predicted commercial and housing development as a result of the scheme. Table S.1.2 and Table S.1.3 below summarise demand.

TABLE S.1.2 EDINBURGH TRAM PHASE 1A DEMAND (TRIPS PER 2-HR PERIOD)

	2011		2031	
	AM	IP	AM	IP
Eastbound	2,689	2,005	3,967	4,331
Westbound	4,041	1,696	11,876	3,956
Total	6,730	3,701	15,843	8,287
Annual (m)	10.61		24.32	

TABLE S.1.3 EDINBURGH TRAM PHASE 1A+1B DEMAND (TRIPS PER 2-HR PERIOD)

	2011		2031	
	AM	IP	AM	IP
Eastbound	3,664	2,607	6,839	6,276
Westbound	4,433	2,154	12,485	5,911
Total	8,098	4,761	19,324	12,187
Annual (m)	13.18		31.62	

17. Abstraction from (TEL and non-TEL) buses is predicted to be **8m** annually in 2011(**10.3m** for 1a + 1b), rising to **16.7m** by 2031 (**23.6m** for 1a +1b). About **17%** of tram patronage is attracted as new public transport patronage in 2011, rising to **20%** in 2031. The expected reduction in person car trips would be **2m** in 2011 (**2.3m** for 1a +1b) rising to **6m** by 2031 (**6.4m** for 1a +1b).

18. Tram revenue is projected to be **£7.4m** in 2011(**£9.4m** for 1a +1b), rising to **£21.1m** in 2031(**£27.9m** for 1a +1b).

19. For appraisal purposes, the tram project has been appraised against a 'reference case' alternative rather than a conventional 'do minimum'. This is to sensibly reflect the traffic management and bus policies that it would be necessary to introduce to cater for travel demand growth, should the tram scheme not be implemented. This includes, for example, the closing of Shandwick Place to through traffic (private cars) both with and without the tram.

20. Table S.1.4 summarises the transport cost:benefit impacts.

TABLE S.1.4 SUMMARY APPRAISAL RESULTS OVER 60 YEARS

	Scheme 1a only - Economic impacts (£m PV, 2002 prices)	Scheme 1a + 1b - Economic impacts (£m PV, 2002 prices)
User Benefits (consumer)	301	529
User benefits (business)	129	200
Private sector provider impacts	-44	-15
Present Value of Scheme Benefits	385	714
Accident benefits	-12	-5
Present Value of Scheme Benefits incl. Accidents	374	709
Present Value of Scheme Costs	340	436
Net Present Value (£ m)	34	273
Benefit : Cost Ratio	1.10	1.63

21. There is a healthy NPV of **+£273m** and **£1.63** of benefits for each £1 of costs, for the full phase 1 scheme, indicating a scheme that offers good value for money in transport economic efficiency terms. The economic case for phase 1a alone is still worthwhile **+£34m NPV.** However, its value for money is much more marginal at **£1.10** for each £1 of expenditure.

22. Total transport benefits are weighted heavily in favour of those to public transport users. The case is not reliant on benefits to highway users although these are conservative, reflecting increase in development and traffic growth within the study area between 'without' and 'with' tram travel markets: this leads to a small increase in accidents also.

23. The key **Economic Activity and Locational Impacts** are projected to be:

24. **Employment development**: In 2011, more than 40,000 sq.m of employment development is anticipated as a result of the tram. This rises to more than 114,000 sq.m by 2015 but drops back to an additional 96,000 sq.m by 2020 as the development pipeline recovers in the "without tram" scenario. Post 2020, the development pipeline recovers further, resulting in a net gain of 34,000 sq.m with tram.

25. **Residential development**: More than 900 additional residential units are anticipated to come forward as a result of the tram (1a +1b) in 2011, rising to 5,250 by 2015 and 5,600 by 2020. The majority of these would be in Granton and therefore reliant on phase 1b. Post 2020, the development pipeline recovers, resulting in a net gain of 2,800 units with tram.

26. **Employment generation**: More than 930 jobs, in present value terms, are expected to be generated or brought forward by the development impact of the tram, after allowing for displacement of jobs elsewhere in Scotland. 590 of these can be attributed to phase 1a alone.

27. There is also evidence that residents of the regeneration area of Granton will have improved access to more and better jobs and this will lead to greater inclusion within the labour market: this again is dependent on Phase 1b.

28. The key **Environmental** impacts are:

- Improvement in air quality, traffic noise and CO2 emissions resulting from the transfer of car trips to public transport
- Cultural Heritage (Moderate Negative impact) relating to alignment through World Heritage Site and demolition/relocation of listed buildings
- Landscape (Major Negative impact) relating to World Heritage Site impacts, impact on open Greenbelt landscape and significant vegetation removal along railway corridors

29. Mitigation of environmental impacts would be maximised through sensitive design and construction practices.

30. In relation to the **Safety** objective, a very small increase in highway accidents is projected, reflecting an increase in the size of the travel market and vehicle kms in the "with-tram" scenario. Personal security will improve (moderate beneficial assessment) reflecting tram design elements (CCTV and help points at all stops and vehicles) and designed access arrangements aimed at enhancing security. The planned high use of inspectors on vehicles will assist this objective.

31. There are two key aspects to the **Integration** objective. The tram scheme will enhance the opportunity to make journeys on the Public Transport network through bus-tram service integration plans and ticketing arrangements, reflecting specifically designed stops and interchange facilities for effective integration with the bus and rail networks, most notably at:

- Edinburgh Airport
- Waverley, Haymarket and Edinburgh Park rail stations
- St Andrews Bus Station and the bus hubs at Ocean Terminal, Gyle Shopping Centre and Crewe Toll
- Expanded Park & Ride at Ingliston and potentially other locations

32. In relation to land-use policy and proposal integration, the scheme integrates positively with land-use policies and proposals as detailed in:

- National Policy – National Planning Framework (NPF) and Scottish Planning Policy (SPP17)
- Regional Policy – Developing SESTRANS Regional Transport Strategy and Edinburgh and Lothians Structure Plan 2015
- Local Policy – Edinburgh Local Plans and associated development proposals, most notably Leith Docks Western Harbour development, Granton Waterfront and Haymarket-Airport including Edinburgh Park/Gyle.

33. In relation to **Accessibility,** the tram scheme improves accessibility to identified key trip attractions/destinations from a substantial portion of Edinburgh e.g:

- George Street / Frederick Street junction – representing the focal point of the city centre (employment, shopping, leisure and access to Waverley rail station with integration with bus and rail) in terms of overall public transport accessibility;
- Haymarket rail station (integration, interchange with bus and rail)
- Leith Ocean Terminal (employment)
- Edinburgh Airport (employment, transport interchange)
- Gyle Centre / Edinburgh Park (Shopping / Employment).

34. Level boarding on all tram vehicles will enhance accessibility for the mobility impaired.

35. The formal Appraisal Summary Tables are included within Chapter 9 of the main report.

36. The **Revenue and Risk Analysis** indicates that:

- Healthy tram patronage and revenue can be generated and a positive TEL net revenue situation can be maintained
- Key revenue risks centre on development/planning growth, economic outlook and performance and public perception
- Some key levers are available to help mitigate risks on TEL revenue, most notably fares strategy, tram design and service integration refinements.

37. In **Conclusion,** a "reference case" Economic Appraisal suggests that the 1A+1B scheme offers good economic value for money with a **BCR of 1.6:1**

38. Scenario and sensitivity testing suggests that:

- 1A alone is a significantly poorer performing scheme but achieves BCR parity
- Planned economic/development growth being achieved is central to maximising benefits and patronage
- Tram design will need to deliver on quality/runtime if benefits are to be realised

39. EALI analysis indicates that **net** wider economic impacts will accrue from the tram scheme having taken account of economic impacts that might accrue in any case and displacement of these benefits from elsewhere in Scotland.

1. INTRODUCTION

This report sets out a STAG Part 2 appraisal for Edinburgh Tram. Following Parliamentary approval for each of Lines 1 and 2, further scheme development has identified the need for phasing of scheme implementation. Phase 1, the subject of this appraisal, comprises a trunk section from Newhaven to the Airport via the City Centre (Phase 1a), with a connection to Granton via the Roseburn corridor (Phase 1b).

Background

1.1 As a key component of the strategy of public transport investment in Edinburgh, CEC is seeking to develop a modern tram network. The tram system is being developed in stages and will focus on the major city transport corridors including links to Park and Ride sites and a number of significant committed development nodes.

1.2 The City of Edinburgh Council (CEC) has established a company, **tie**, which is responsible for the delivery of a number of major public transport schemes in the next 10 to 15 years, including the proposed tram network. During the period 2002-2004, **tie** developed proposals for three tramlines, comprising the following:

- Line 1, the Northern Loop, linking the City Centre with Granton and Leith;
- Line 2, west from the City Centre to serve Edinburgh Park and the Airport, with Park and Ride at its western extremities: this Line was intended ultimately to continue to Newbridge; and
- Line 3, connecting the City Centre with the south-east area of Edinburgh.

1.3 Each line was developed independently, with a separate, but parallel, network study providing the overarching framework for the development of trams in Edinburgh. On this basis, separate STAG (Scottish Transport Appraisal Guidance) appraisals and Parliamentary Bills were to be submitted for each line.

1.4 Development of Line 3 was suspended in 2004 and efforts focused on Lines 1 and 2. Parliamentary Bills, with associated STAG appraisals[1], were deposited for the two lines separately in December 2003 and following the standard objection period, Parliamentary inquires were held during 2004 and 2005. The respective Committees endorsed the Bills and these were subsequently passed in Parliament in Spring 2006.

1.5 In January 2006, CEC decided that the tram scheme should be implemented in phases, as shown in Figure 1.1. Phase 1 will involve development of the tram between the Airport and Leith Waterfront (Phase 1a) and also a section between Roseburn and Granton Square (Phase 1b). Phase 2 will complete the link between Leith and Granton in order to create a loop. The section between the Airport and Newbridge is Phase 3. This phasing reflects the contribution each makes to achieving long term

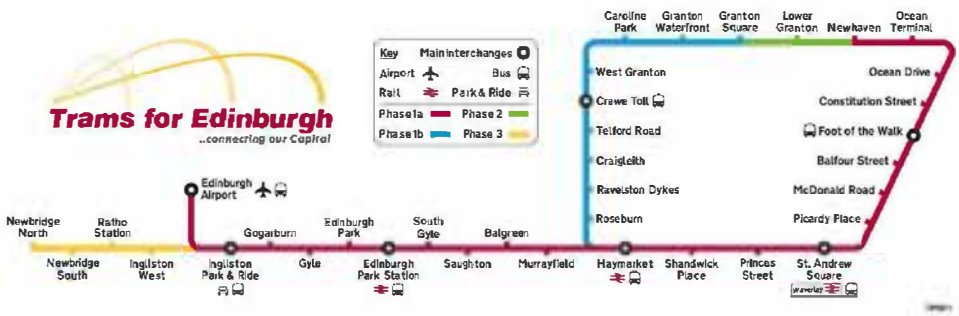
[1] STAG Appraisal: Line 1, **tie**/Mott MacDonald et al, 10th September 2004 and Edinburgh Tram Line 2 STAG report, tie/Faber Maunsell et al, 10th September 2004

objectives and the fit with Structure and Local Plans.

1.6 To maximise the benefits flowing from the tram, CEC have established Transport Edinburgh Limited (TEL) to take on the responsibility for coordinating the services of Lothian Buses, which is majority owned by CEC, and the tram. TEL has played a leading role in developing the phasing of Edinburgh Tram and in developing associated integrated bus networks.

1.7 As part of the phased development of this Tram network for Edinburgh, a Final Business Case (FBC), including a STAG2 appraisal, is to be presented to CEC and Transport Scotland (SE) for approval of Phase 1 in the first instance.

FIGURE 1.1 EDINBURGH TRAM NETWORK PHASING



The STAG appraisal process and this report

1.8 Scottish Transport Appraisal Guidance (STAG) is the official appraisal framework to aid transport planners and decision-makers in the development of transport policies, plans, programmes and projects in Scotland.

1.9 STAG has two parts:

- STAG1: initial appraisal and broad assessment of impacts, designed to decide whether a proposal should proceed, subject to meeting the planning objectives and fitting with relevant policies; and
- STAG2: detailed appraisal against the scheme and Government's objectives.

1.10 As previously noted, scheme development was taken forward in parallel for Lines 1 and 2, with full STAG2 appraisals being prepared for each line. These were used in the Parliamentary process, along with other material, to set out the rationale and case for the respective lines.

1.11 This report sets out the STAG2 appraisal of Phase 1 of the Edinburgh Tram network. Given that this is essentially a hybrid of Lines 1 and 2, the appraisal has built upon the work undertaken on the appraisals for these individual lines, with much of the existing material updated and reconfigured for the appraisal of Phase 1. Where the appraisal is based on the use of transport modelling outputs, such appraisal has been reworked from first principles. This applied to the following sub-objectives:

- **Environment:** Noise and vibration, and air quality
- **Safety:** Accidents (road traffic)
- **Economy:** TEE analysis
- **Accessibility:** Community accessibility and comparative accessibility

1.12 The sections setting out the development of Edinburgh Tram have been précised from the original STAG2 appraisals, with additional material added to bring the story up to date.

1.13 Given that Phase 1 comprises two sections 1a (Leith to Airport) and 1b (Roseburn to Granton), a STAG2 appraisal has been undertaken for the core route (1a) alone and for Phase 1 in its entirety (1a+1b). Where the appraisal is largely qualitative, the incremental impact of Phase 1b follows the appraisal of Phase 1a; where the analysis is largely quantitative, the appraisal is presented for the network in its entirety ie 1a or 1a+1b. Appraisal Summary Tables are presented in full for 1a and for 1a+1b.

Structure of this report

1.14 This report describes the various processes, issues and results from the STAG appraisal for the Edinburgh Tram scheme. This is set out in the following chapters:

- Planning objectives (Chapter 2);
- Problems and opportunities in Edinburgh (Chapter 3);
- Scheme History and STAG Part 1 appraisal (Chapter 4);
- The Edinburgh Tram network (Chapter 5)
- Consultation (Chapter 6);
- Scheme description (Chapter 7);
- The Do Minimum and Reference Case (Chapter 8);
- STAG2 appraisal (Chapter 9);
- Risk and Uncertainty (Chapter 10);
- Monitoring and evaluation (Chapter 11); and
- Conclusions (Chapter 12).

2. PROBLEMS AND OPPORTUNITIES

The view that there are problems with the transport system is the root of any transport proposal. The identification of such problems should include perceived problems as well as those that can be quantified through data analysis.

The purpose of this chapter is to set out the key problems and opportunities in Edinburgh. The main areas considered relate to:

- Socio-economic characteristics;
- Environment; and
- Transport.

The following sections deal with each in turn. An additional section sets out the potential opportunities that would accompany a transport scheme of this nature.

Socio-Economic Characteristics

2.1 The strength of Edinburgh's regional economy, with corresponding growth in population and jobs, is expected to continue. Economic growth is closely related to future labour supply and population growth, with a buoyant economy likely to result in both a high level of inward migration and a growth in commuting.

2.2 The following sections outline the socio-economic context for:

- Population;
- Car ownership;
- Employment;
- Income;
- Deprivation; and
- Education.

Population

2.3 At the 2001 Census Edinburgh's population was found to be 449,020. The consensus across sources of data on projected population is for a continued growth over the coming years. Capital Review Online[2] estimates that the population will increase to 456,246 by 2012 and 463,238 by 2018. The General Register Office (Scotland) estimates that Edinburgh's population will increase to 465,000 by 2011. The higher level of population growth appears to be more consistent with potential regional

[2] Capital Review Online is an online source of statistical information relating to Edinburgh, provided by City of Edinburgh Council. It is developed from data gathered in the 2001 Census: http://www.capitalreview.co.uk/economic_data.html

economic performance: sustaining the growth of the economy will require access to labour and skills in increasing numbers.

2.4 Figure 2.1 illustrates the variation in population density levels within the study area at Output Area level from the 2001 Census. Regarding the northern section of Phase 1a of the tram route high population densities are found in Newhaven, Leith and along Leith Walk. The New Town area north of Princes Street is also of high density. Although population along the Phase 1b Tram route in the north of the city is generally 'low' to 'medium', there are notable pockets of high density in West Granton/Crewe Toll, Pilton and Muirhouse. The areas of Granton and Leith Docks, whilst currently having low population levels and density, are the subject of major development plans (These are detailed in full at the end of this Chapter).

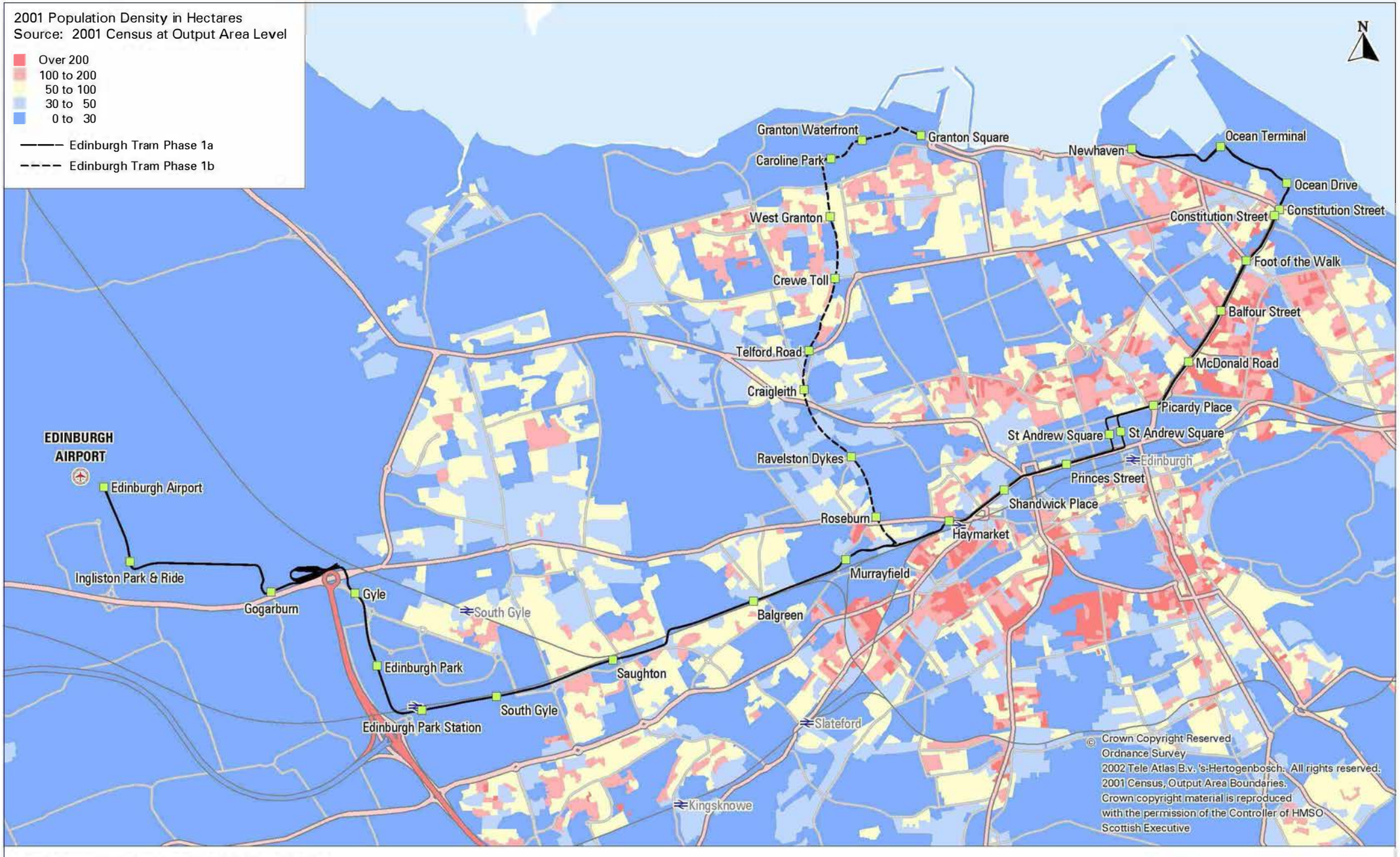
2.5 The city centre, in its function as the city's retail and business hub has, by its very nature, a low density. As the tram route moves west away from the city centre it passes the Haymarket and Gorgie areas which contain pockets of high population density as does the area around Saughton. The area beyond this to the west leading to the airport is, by its very nature of suburban outskirts/greenbelt land, of low density (0 to 30 people per hectare).

Car Ownership

2.6 At the end of the 1990s, Edinburgh experienced one of the fastest rates of growth in car ownership in Europe – the number of cars per 1000 population rose by 162% between 1971 and 1997. Comparing the results from the 1991 and 2001 census, the number of cars per 1000 population rose by nearly 20% in that period. However, 39.5% of households in Edinburgh do not own a car (according to the 2001 Census). By 2003 car ownership across the city had increased slightly, the figure for households with no access to a car fell to 37%.[3]

2.7 Figure 2.2 shows the distribution of non-car owning households for the study area (based on 2001 Census). Across most of the study area the areas of low car ownership are broadly correlated to higher population density. In part this reflects the compact nature of much of the City, which allied with the comprehensive bus system, makes car ownership less attractive than is the case elsewhere. However, it is also related to income and deprivation and this is covered below. As well as the city centre, areas where the proportion of households without access to a car are highest (over 50%) are concentrated along Leith Walk and throughout Leith, Newhaven and Granton. To the west of the city centre a corridor of low car ownership is noticeable to the immediate south of phase 1 of the Edinburgh Tram route, corresponding to areas of high population density including Haymarket and Gorgie (see paragraph 2.5). The corridor of low car ownership continues to the west encompassing the Saughton, and Balgreen areas which are subject to higher levels of unemployment and deprivation (see paragraphs 2.8 – 2.11).

[3] Capital Review Online: http://www.capitalreview.co.uk/economic_data.html



Edinburgh Tram STAG 2 Appraisal
Figure 2.1: 2001 Population Density in Hectares

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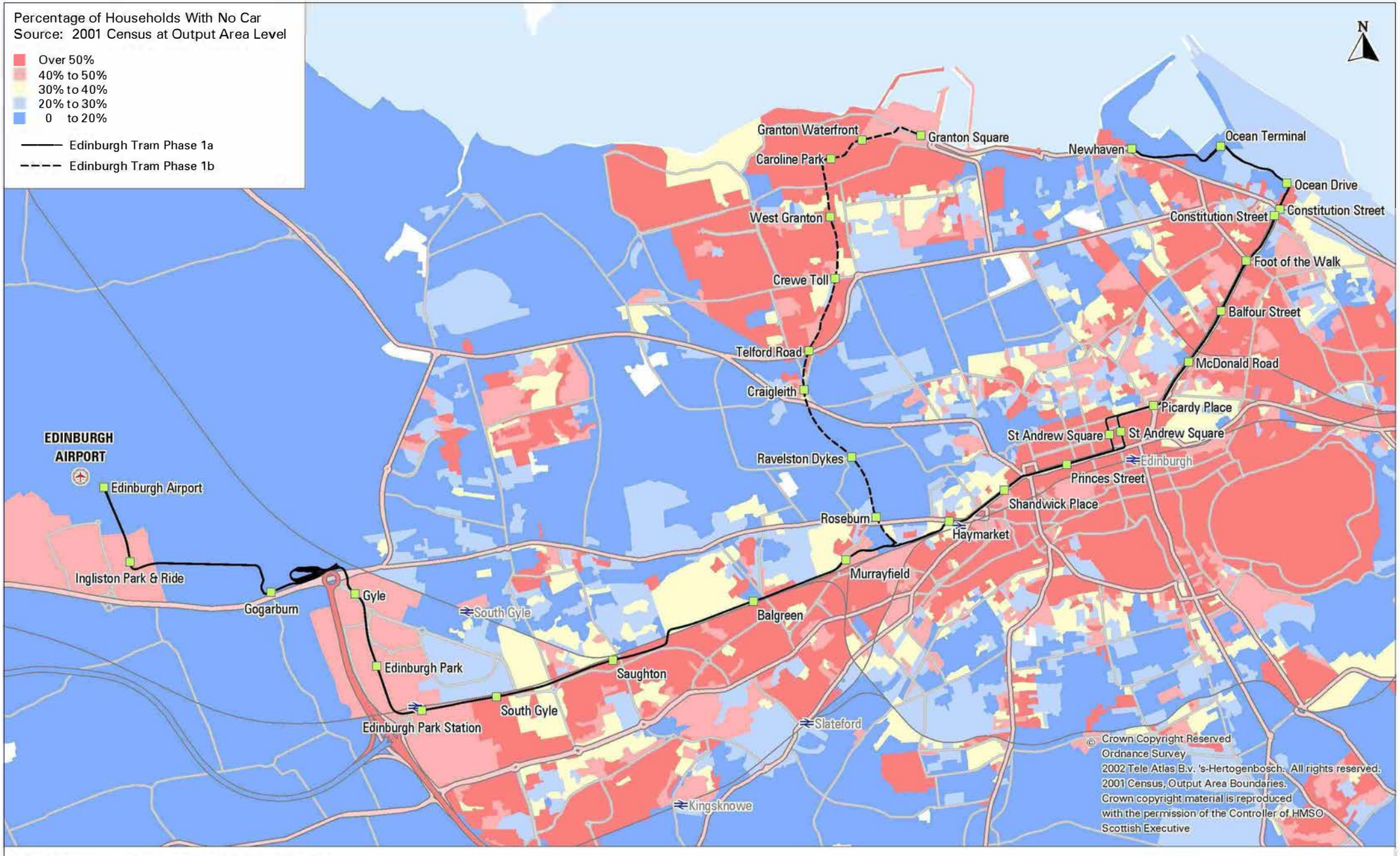

Edinburgh Tram STAG 2 Appraisal
Figure 2.2: Percentage of Households with No Car

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Employment

2.8 Unemployment is at a 25-year low and is expected to decline only slightly from its present level. In 2003 2% of Edinburgh's resident adult population were unemployed and seeking work, with 57% in full or part time employment or self employed. In turn, growing output would support substantial growth in real income and spending, leading to effects on demand for services, such as shops, leisure, health, education and, particularly, travel.

2.9 Figure 2.3 illustrates unemployment levels (from the 2001 Census) and their distribution. There are significant spatial variations in unemployment with the key concentrations of unemployment in north Edinburgh in pockets of Leith and, with more widespread areas, in Granton, Pilton and Muirhouse. Areas with lowest unemployment (0 – 2.5%) are broadly focussed north of the city centre including the New Town, and in corridors south of the city centre including Slateford, Morningside, Newington and Kingsknowe. In West Edinburgh there are areas of significant unemployment located along the proposed route for Edinburgh Tram Phase 1a, centred around the Balgreen, Stenhouse and Saughton areas. Lower levels of unemployment to the north of the western section of the tram route are evident in the Gyle and Edinburgh Park areas.

Income

2.10 Figure 2.4 shows the distribution of income across the city. As would be expected, the areas of lower income are correlated with areas of low car ownership and high unemployment. The tram route in the north of the city passes through Granton (on the Phase 1b route) and Newhaven and Leith (on the Phase 1a route) which are all shown to be relatively high in terms of the proportion on low incomes. As well as linking these areas of low income in the north east to the city centre, the western section of Phase 1a of the Tram would also link Saughton, Stenhouse and Balgreen, where income is relatively low, to the city centre and other key employment sites.

Deprivation

2.11 The area covered by the Waterfront Regeneration Initiative and surrounding neighbourhoods, notably the Granton, Pilton and Muirhouse areas, has a history of social deprivation and exclusion. This is shown in Figure 2.5, which illustrates the deprivation level for wards in Edinburgh, based on the Index of Multiple Deprivation (IMD) per ward. In North Edinburgh, Granton and surrounding area, which would be served by Phase 1b of the Tram, again features as one of the most deprived areas in the city. Leith and the northern section of Leith Walk, which would be dissected by Phase 1a of the Tram, are relatively more deprived than the majority of the city as are the areas around Haymarket and Saughton which would also be passed through by the Phase 1a route.

Education

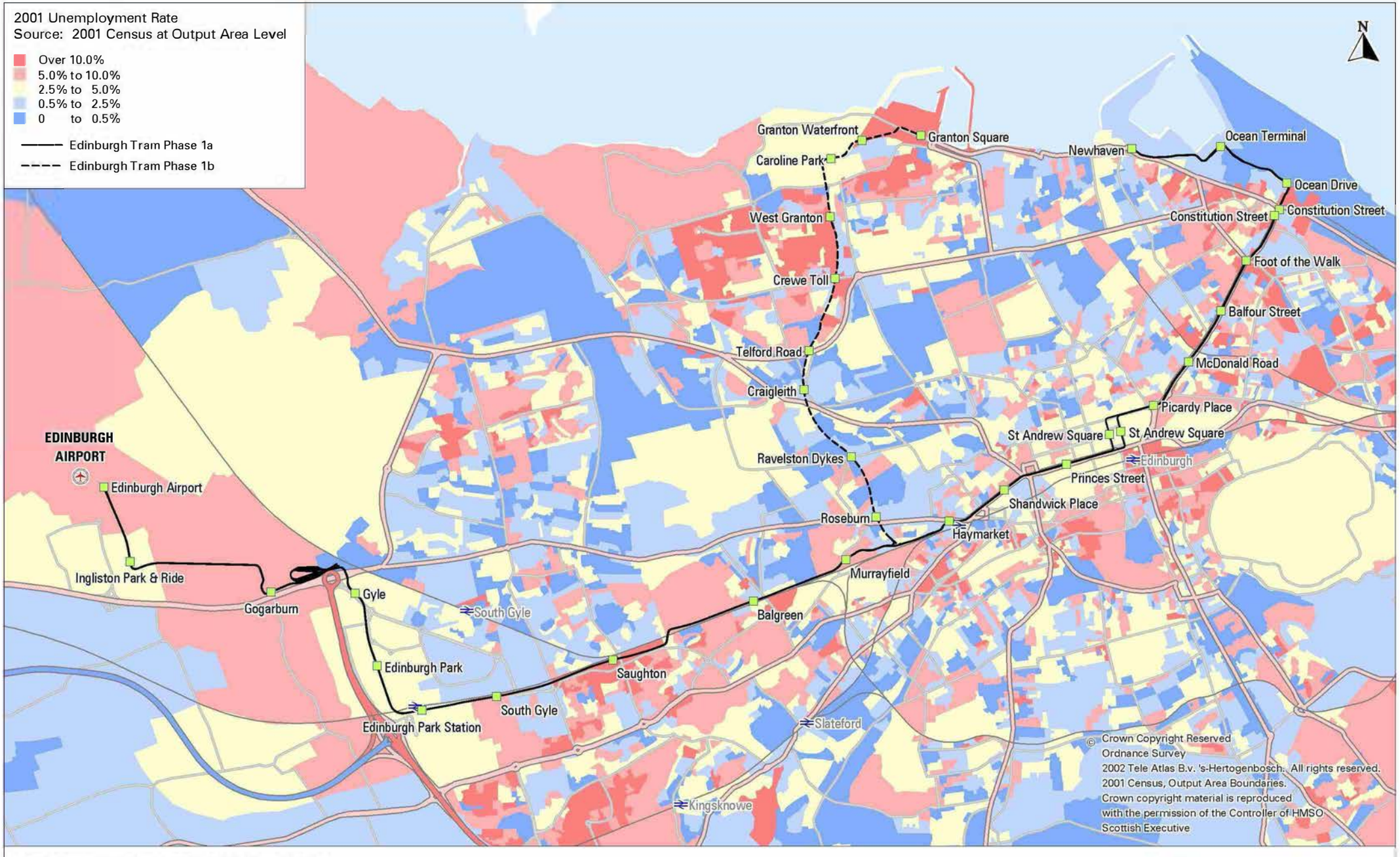
2.12 Figure 2.6 illustrates the level of education in the study area. As with the other indicators, the areas of Granton, Pilton and Muirhouse show poor levels of educational achievement amongst their populace, with Leith and the area surrounding Leith Walk also performing poorly compared to the average. West of Haymarket, Phase 1a passes through areas (Saughton and South Gyle) which have comparatively higher levels of educational deprivation compared to the central, north-western and southern areas of the city.

Socio-Economic Characteristics in North Edinburgh

2.13 Parts of North Edinburgh have particularly challenging social inclusion issues in comparison to other areas of the city. These are long standing problems which have, to date, not been successfully rectified. The areas economic and social problems are a reflection of its traditional reliance upon industries which have since declined and have, as yet, not been replaced. As a result of the significance of the social problems in the North Edinburgh area, it has been the subject of a policy initiative, which seeks to address social derivation issues. As such, there is a rich stream of data that illustrates the area's social deprivation compared with the rest of the City and Edinburgh. However, whilst the available research is quoted extensively below, it is important to note that social needs are not limited to the neighbourhoods covered by the data. Social deprivation spreads across much of the north of the City, including Leith, where, notwithstanding recent regeneration, social issues remain. The situation in the North Edinburgh Area Renewal (NEAR) area is typical of many parts of the north of the city.

2.14 As well as the areas covered by the Waterfront Regeneration Initiative, the surrounding neighbourhoods and North Edinburgh as a whole have a history of social deprivation and exclusion. As a result the redevelopment of the Waterfront area is intended to contribute to the regeneration of Granton and the surrounding areas. Granton, and its neighbouring areas of West Pilton, Muirhouse, Drylaw and Royston/Wardieburn suffer from significant levels of social deprivation. A 1999 study by Halcrow[4] produced an updated Economic and Social Profile of the NEAR area, covering these five areas. Although this study could now be considered somewhat dated, its conclusions have been verbally verified by NEAR in August 2006 during the update of this STAG appraisal.

[4] Halcrow Fox (1999) *Review of the Economic and Social Profile of the NEAR Area* – Final Report, and Technical Appendix: Survey Cross-Tabulations North Edinburgh Renewal. November 1999.



Edinburgh Tram STAG 2 Appraisal
Figure 2.3: 2001 Unemployment Rate (based on those who said they were "unemployed" in 2001 Census)

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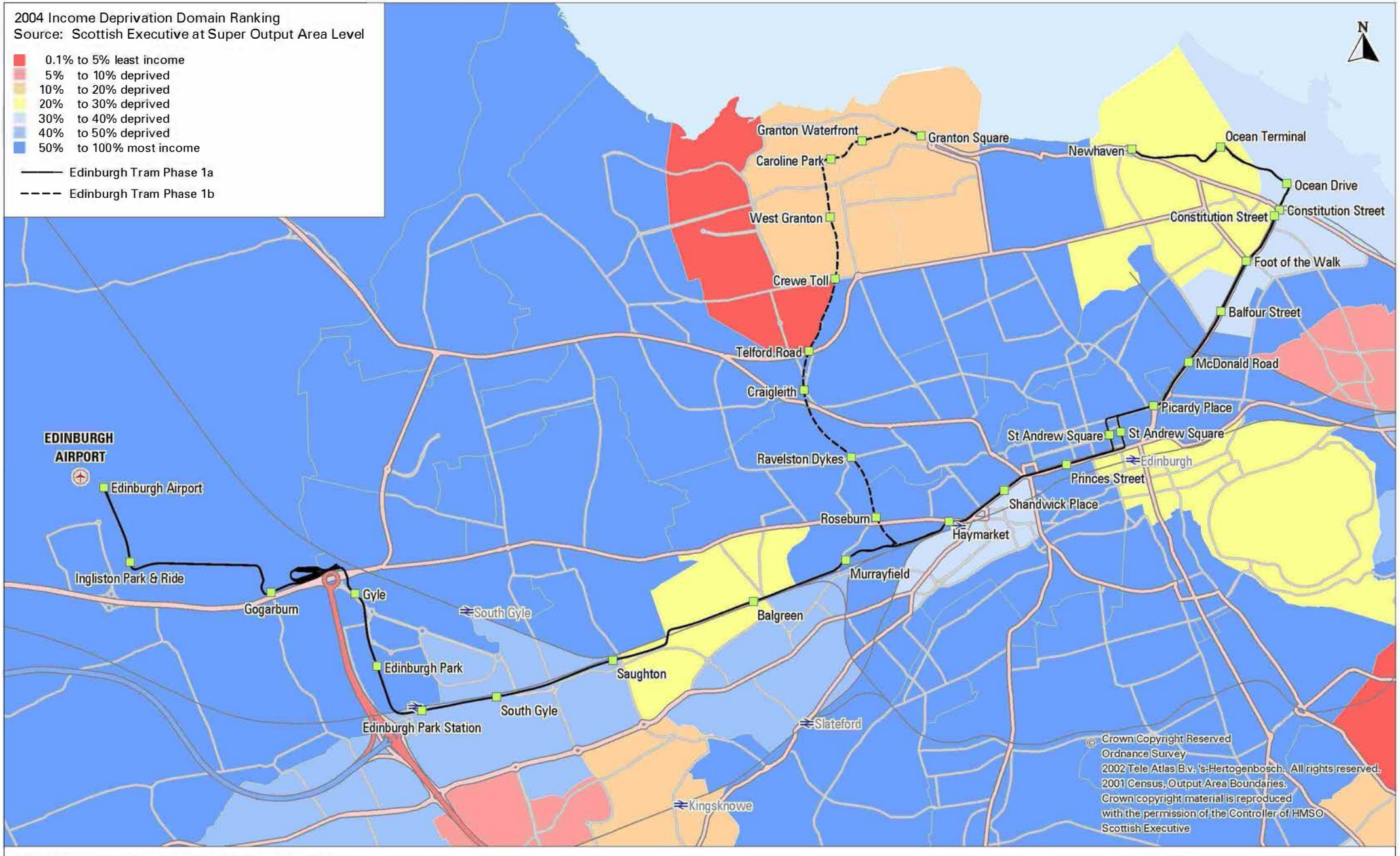

Edinburgh Tram STAG 2 Appraisal
Figure 2.4: 2004 Income Deprivation Domain Ranking

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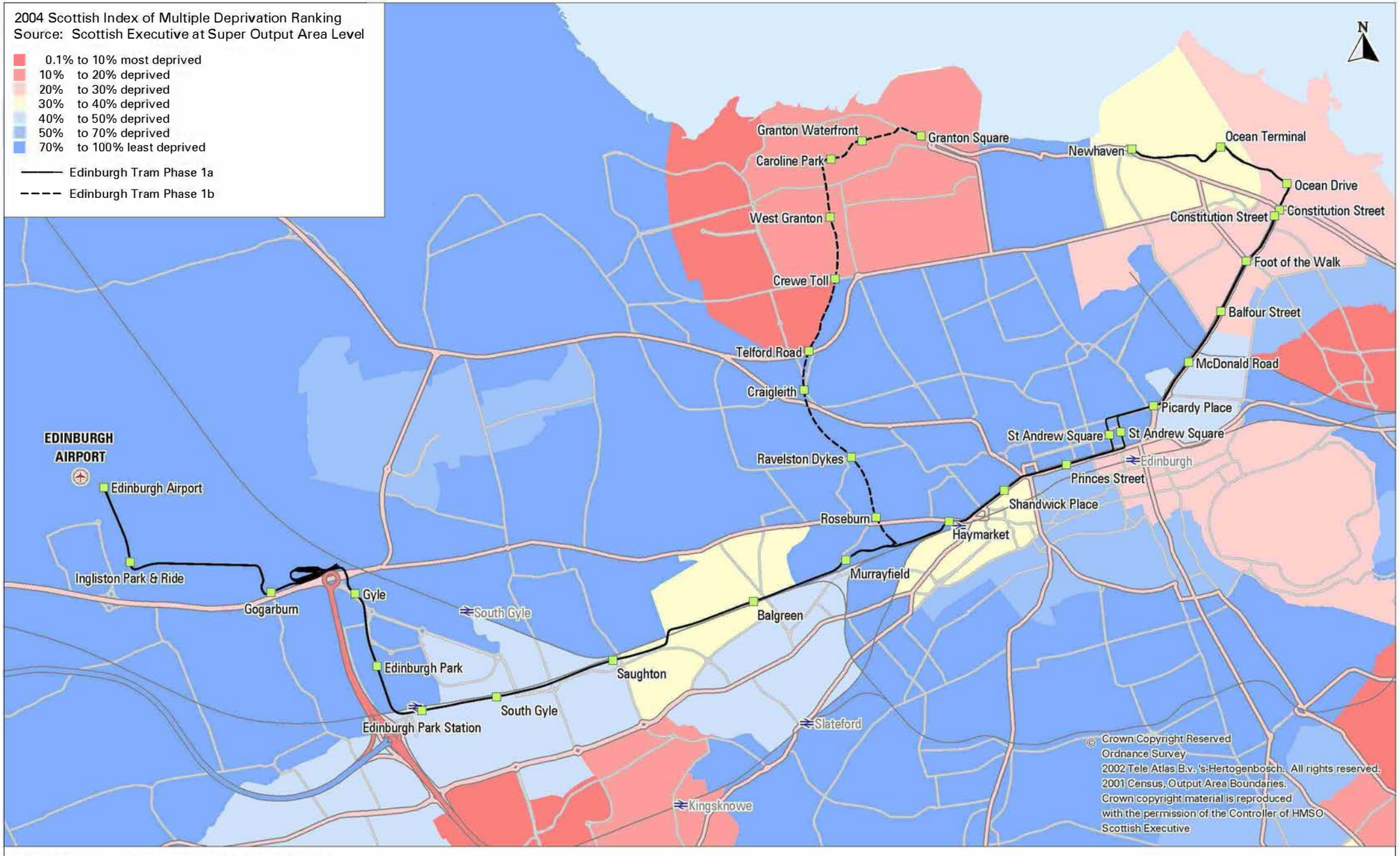

Edinburgh Tram STAG 2 Appraisal
Figure 2.5: 2004 Scottish Index of Multiple Deprivation Ranking

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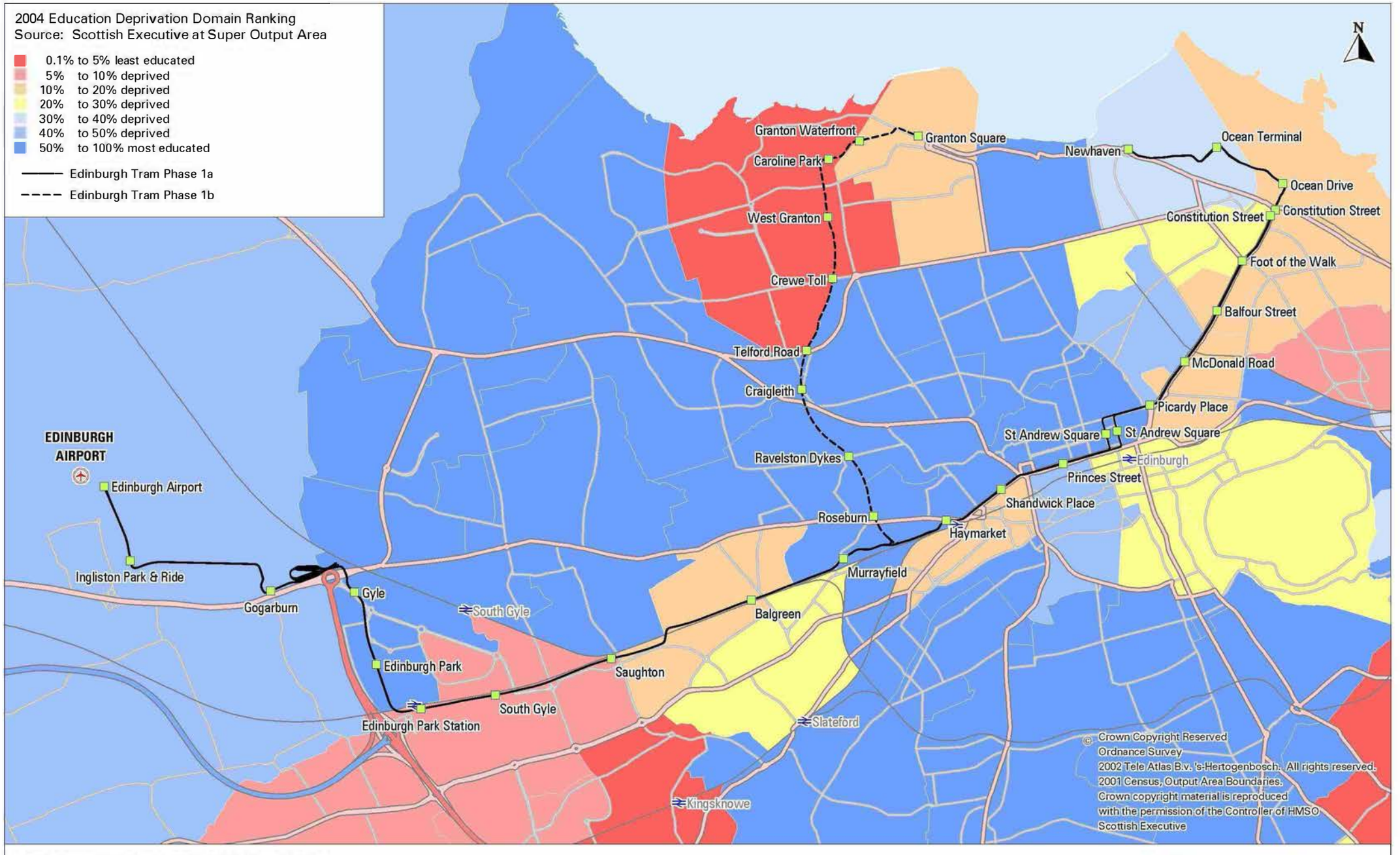

Edinburgh Tram STAG 2 Appraisal
Figure 2.6: 2004 Education Deprivation Domain Ranking

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2.15 The study highlighted some general social and economic characteristics of the NEAR area:

- North Edinburgh has larger household sizes than the city and national averages. There are also high proportions of large households with children, and elderly households in the area;
- The area had a younger population than Edinburgh as whole;
- 53% of respondents in the NEAR area rented housing from the local authority. Owner-occupied levels were low, at 28% of households in the area. The report noted the difficulties in developing a private housing market in the area, with market values of properties low. The proportion of respondents with housing from the Housing Association and Co-operative Sector is double the proportion in Edinburgh as a whole (at 11%, compared to 5% in Edinburgh). This reflects the growing significance of this sector in housing in the area;
- Access to a car varied amongst the areas surveyed. Overall, 66% did not have access to a car. This compares to 46% of Edinburgh residents with no access to a car, and 35% in Scotland overall. Therefore, the North Edinburgh area has significantly higher than average proportions of people with no access to private vehicular transport;
- Across Scotland, 12% of households do not have a bank or Building Society account. In the NEAR area, this proportion was 23%, suggesting a high level of exclusion with regard to financial services;
- Overall 22% had a net income of less than £3●● per month, with females faring worse than males – 29% of women in lowest income bracket, compared to 13% of men;
- The levels of qualifications in North Edinburgh were poor compared to the national average. Those with no qualifications were double the national average. In the NEAR area, 46% left school with no qualifications. Overall, only 22% had undertaken post school education.

2.16 In relation to employment, the following figures show the nature of employment patterns and modes of travel in the area:

- In the NEAR area 42% of adults in surveyed households were employed full-time, 12% part-time, with 22% unemployed and 13% retired. Unemployment figures for Edinburgh for 1997 suggested 4.5% unemployed in the city overall;
- Since the 1999 study unemployment in the NEAR area has fallen to approximately 9% when measured by proportion of the population in receipt of unemployment benefits. This increase in employment in the area, though, is in accordance with the caveat which suggests that the proportion of the population who are economically inactive, but not necessarily in receipt of benefits, is approximately 4●% (NEAR, 2●●6);
- Despite increased levels of employment in the NEAR area the gap between employment levels in Northern Edinburgh compared to the city centre remains significant, the NEAR area continues to have significantly higher unemployment rates to the rest of the city (Local Labour Market Information, 2●●6);
- The proportion of respondents employed part-time is lower than the Edinburgh average. Overall, differences between genders reflect wider trends, with 51% of males in full-time employment, compared to only 26% of females. More females are unemployed than males. However, females working part-time is much more

significant at 16% compared to 2% of male respondents;

- Compared to Edinburgh as a whole, the NEAR area has a low proportion of adults working in managerial, administrator and professional sectors. The majority of respondents were employed in the service and skilled trade sectors, with some variations across neighbourhoods;
- There are significant levels of long-term unemployment: 80% of the unemployed respondents had been so for longer than a year, higher than the official statistics of 24% (explained by unregistered unemployed in this survey) and 48% had been unemployed for longer than 5 years. Long-term unemployment was particularly prevalent in older age groups, especially between 45-54 years old;
- Overall in the NEAR area, most respondents worked in the city centre (29%), followed closely by the NEAR area (28%);
- When asked about mode of travel to work, overall the largest single proportion (36%) travelled by bus, followed by 31% travelling by their own car and 14% walking. Although this is considered a high modal share in favour of the bus in relation to the Scottish average, this proportion reduces significantly when looking at areas with lower levels of accessibility. For instance, the largest proportion of West Granton respondents travel to work by car (38%) with bus at 26%, walking at 15% and cycling at 11% (compared to an overall average of 4%);
- When asked about barriers to their ideal job, 21% stated access, the second highest obstacle after lack of experience. Access is likely to be a greater barrier to the new development and employment areas in the north of Edinburgh, without improvements in public transport provision;
- As a consequence of the research into modes of travel to work, the study concluded that employment patterns were shown to reflect public transport links. It also suggested that work patterns will continue to be affected by accessibility by bus and foot. The main growth areas were viewed to be service sector employment, in the city centre and at The Gyle and Edinburgh Park. The report stressed that better public transport links to the latter two locations in particular were required to enable access to opportunities, with relatively good public transport access currently to the city centre.

2.17 A study carried out by Oscar Faber (Oscar Faber, 2000) examining public transport options in North Edinburgh, reinforced Halcrow's findings. It stressed these communities' reliance on public transport and the desire for improvement in connections to areas of employment in Leith and the west of the city.

2.18 Previous studies that have examined the socio-economic characteristics have identified that the North Edinburgh area – defined as Muirhouse, West Pilton, West Granton, Royston/Wardieburn and Drylaw – is characterised by social deprivation and economic need. While there is an acceptance that improved transport provision will not address all of the needs of the area, there is also recognition that in tandem with other initiatives promoting housing, employment and urban regeneration, it can make a contribution to improving the well being of Northern Edinburgh. It is also important to note that while the available studies have concentrated on a sub-area of North Edinburgh, the socio-economic deprivation is not limited to the area covered by the NEAR study. Needs spread further a field, including into Leith where, notwithstanding the regeneration that has occurred there, areas of social deprivation remain.

Socio-Economic Characteristics in West Edinburgh

2.19 The West Edinburgh corridor has a relatively high population density and a growing population, creating favourable conditions for high quality public transport.

2.20 In a high proportion of the area over forty per cent of households do not have access to a car and are therefore dependant on public transport to gain access to employment shopping and leisure facilities. While this is similar to the Edinburgh average, low car ownership is concentrated in the southern part of the corridor. This area, particularly the Moat, Stenhouse and Sighthill wards, also experiences a high level of deprivation, low levels of educational attainment, and relatively high unemployment. This indicates that these areas are not fully sharing in the overall success of Edinburgh. The provision of high quality public transport would improve accessibility and assist in overcoming social exclusion and improved access to a wider range of employment opportunities.

Environment

Aims and Objectives

2.21 The overarching planning objectives for the study have been set out and discussed in Chapter 2 of this report. Environmental objectives are expressed within these aims and objectives, and are clearly established by the Government's environmental objective as one of the five key objectives for transport.

2.22 These objectives are supported by policies and aspirations at the regional and local level in statutory documents such as structure and local plans and the Local Transport Strategy (LTS), which have an environmental theme. The statutory development plan for the area through which the scheme passes comprises the Edinburgh and Lothian Structure Plan and several local plans. The core strategy of these documents is to facilitate more sustainable patterns of land use and development, which include protection and enhancement of the natural and built environment.

2.23 The draft LTS, updated to cover the 3 to 5 years from 2007, currently out for consultation, re-iterates a key aim stated in the LTS 2004 – 2007 which is to reduce the environmental impacts of travel. To support this, the document includes the following proposed objectives which relate to 'environment':

- To increase the proportion of journeys made on foot, by cycle, by motorbikes and by public transport;
- To implement the tram project;
- To reduce the need to travel, especially by car;
- To reduce the adverse impacts of travel, including road accidents and environmental damage; and
- To recognise the many roles that streets have for the community – as places that people live and work, as areas that people meet, shop and relax, as a setting for the city's built heritage, as well as routes for movement whether by car, bus, bicycle or on foot.

2.24 The LTS contains targets for air pollution and noise pollution from traffic which will be used to help monitor progress in achieving objectives. The Air Quality Objectives outlined in the draft LTS are:

- To work in pursuit of objectives set by the Air Quality (Scotland) Amendment Regulations 2002; and
- To contribute to national objectives for the reduction of greenhouse gas emissions.

2.25 An Air Quality Management Area (AQMA) has been set up by CEC, leading to the production of an Air Quality Action Plan (AQAP) at the end of 2002 following a period of public consultation. This plan, which is monitored annually, sets out how the objectives for NO_2 emissions in the area are to be pursued.

2.26 The City Local Plan for Edinburgh[5] sets out broad objectives for the city's environmental policy:

- To ensure that the unique qualities of the city, its built heritage and the character of its urban areas are safeguarded for the future;
- To protect important landscape and natural features of the environment, including the city's green belt setting;
- To protect and enhance the nature conservation and biodiversity interest of the city; and
- To minimise the adverse effect of development on natural resources.

Existing and Potential Environmental Problems

2.27 The relevant baseline environmental conditions for each of the environmental sub objectives is summarised in Chapter 9 of this report. This section on existing and potential problems therefore focuses on particular issues of significance for the environment in the vicinity of the proposed Edinburgh Tram's study area.

2.28 In relation to the environmental sub-objectives set out in STAG, the key environmental sub-objective which can be identified as a problem is city centre air quality. This has been specifically identified, since air quality can be related to quantitative standards (air quality objectives) such that exceedences of these standards (or predicted future exceedences) can constitute environmental 'problems'. Air quality is also an issue which receives public and media attention (it is therefore also a 'perceived problem'), particularly in terms of health implications, and one which is very clearly related to issues of city centre traffic growth and congestion in Edinburgh.

2.29 As a requirement of Part IV of the Environment Act 1995, local authorities have been required to complete a review and assessment of air quality to determine whether the air quality objectives are likely to be met, and where necessary designate Air Quality Management Areas (AQMAs).

[5] Edinburgh City Local Plan Consultation draft, City of Edinburgh Council, 2006: http://map.avinet.no/plans/eclp/contents.htm

2.30 The review and assessment of air quality report[6] for Edinburgh recommended that a single AQMA be declared which focused on the city centre and links directly to the other locations in order that an integrated action plan can be prepared. The designated AQMA centres on the Princes Street to Haymarket corridor but also encompasses Leith Walk to the east and extends as far west as Roseburn Terrance, encompassing Dalry Road and Gorgie Road.

2.31 Edinburgh city centre was declared an AQMA on the basis that the nitrogen dioxide objectives for the annual and hourly mean have been observed as higher than is acceptable. Studies in Edinburgh have shown that 88% of nitrogen oxides come from road transport with the remaining 12% coming from domestic heating and Edinburgh International Airport[7].

2.32 The CEC are currently monitoring pollutant levels in the western corridor of the city leading to the airport area, with a particular focus along Corstophine Road and St Johns Road, encompassing Drumbrae Roundabout. Monitoring is occurring with a view to creating a second AQMA in the west of the city.

2.33 Road traffic clearly makes the principal contribution to air pollutant emissions in Edinburgh, and the measures included in the proposed Edinburgh City Council Action Plan for the AQMA are directly related to the cause of the problem. These are:

- Reducing the amount of traffic; and
- Easing traffic congestion.

2.34 These objectives are clearly relevant to the overall planning objectives for the proposed scheme, which are addressed in detail in Chapter 2 of this report.

Summary of Environmental Impacts for Phase 1 of the tram

2.35 Problems relating to other environmental sub-objectives are less straightforward to identify through comparison of existing conditions with objectives and standards. For example, whilst periodic flooding in parts of the Water of Leith in the northern area of the city is known to be a problem, most of the locations where the proposed tram route crosses the watercourses are not flood prone, and existing bridges would be used. One exception is the Gogar Burn, which is a recognised Area of Importance for Flood Control, where new bridges would be built to accommodate the tram. Preventative measures and other mitigation will ensure the development of the scheme will not result in any significant impact on existing drainage systems or patterns. However, the scheme would not require provision for compensatory land.

2.36 Areas of contaminated ground are present along the route. In particular, along the disused railway land around Baird Drive and Haymarket, and the areas of made ground close to the Gogar Burn near Castle Gogar (a former landfill site, believed to

[6] Stage 3 Review and Assessment of Air Quality, City of Edinburgh Council, 2001: http://www.edinburgh.gov.uk/airquality

[7] Summary Air Quality Action Plan, City of Edinburgh Council: http://www.edinburgh.gov.uk/airquality

have been used for demolition material). Temporary impacts from the construction works will cause minor negative impacts on the land here, but assuming effective mitigation, the permanent impacts during the operation of the tram are expected to be neutral to minor.

2.37 There are a few protected species known to be present along the route, which could be impacted by the tram, including badgers, bats and otters. These are mainly on the western stretch from the city centre towards the airport and on the Roseburn corridor to Granton. Construction of the tram could cause significant temporary and permanent impacts to the badger, although appropriate mitigation has been identified to minimise this. This has been investigated and addressed in the Landscape and Habitat Management Plan[8] (LHMP). As a 'living' document, it evolves as the detailed design changes, guiding planning and implementation over the whole lifetime of the scheme.

2.38 The significance of the World Heritage Site designation of the city centre and its importance as a valued townscape is also a key factor in the environmental appraisal. This is therefore reflected in the appraisal against the appraisal sub-objectives relating to landscape/townscape, visual amenity and cultural heritage. The appraisal shows that the scheme is expected to enhance the local landscape in certain areas, yet have some adverse impacts to varying degrees in different locations along the route. The overall assessment is minor to neutral impact.

2.39 To make way for the tram, three sites have been identified to be demolished or relocated, including two Listed Buildings (The Caledonian Alehouse and the Heart of Midlothian War Memorial at Haymarket). These result in a major adverse impact on cultural heritage. Elsewhere along the route, impact on cultural heritage is relatively minimal.

Environmental Issues and Constraints

2.40 There are some environmental issues and constraints associated with the tram alignment, notably the potential impact when the tram passes close to Areas of Importance for Flood Control at the Gogar Burn, and over some sites of contaminated land. This impact will be mitigated by providing new crossings of the Gogar Burn and smaller un-named water courses or ditches in the vicinity of the Flood Control area; however no compensatory land will be provided in respect of flood related matters.

2.41 In the case of Line 1b there is potentially a significant biodiversity impact, where the tram is likely to affect the protected badger population. This has been addressed in the LHMP, where a separate Badger Mitigation Strategy has been developed, involving the construction of an artificial sett. Significant impacts on landscape/townscape include the demolition or relocation of listed buildings at Haymarket. However, simultaneously, the environment will be actively improved in many locations.

2.42 The extent to which the tram scheme can contribute to reduce environmental adversities (e.g. air pollution) is also influenced by other factors such as

[8] Landscape and Habitat Management Plan, by ERM for *tie* Ltd, first published June 2005 (accessible via **tie**website http://tt.tiedinburgh.co.uk/documents.html)

complementary measures to encourage use of public transport and reduce the demand for road traffic. In this STAG appraisal, where appropriate, they have been incorporated into the transport assumptions which underpin the predicted traffic flows (and therefore air quality effects) for the operation of the tram.

Transport

Public Transport

Bus provision

2.43 Edinburgh is served by some 135 local bus services using over 800 buses which call at over 2,000 stops. According to the 2001 Census, for Edinburgh residents using the private car or public transport for their journey to work, around 35% use bus[9]. Since Edinburgh has one of the highest rates of bus use per person in Britain, public transport is crucial in maintaining the accessibility and economy of the city centre.

2.44 There are a number of bus operators providing bus services in Edinburgh. The principal bus operator is Lothian Buses who provide an extensive network of bus services throughout the city. Other operators include First, Stagecoach, and Scottish Citylink. Existing services run predominantly on radial routes through the city centre which is based on a strong grid pattern. Problems of congestion have affected journey times and reliability. In order to try and mitigate the effect this has on bus journey times, bus priority measures have been implemented on core corridors throughout the city.

2.45 Despite the extensive bus network in the city, the percentage of trips to work by bus in Edinburgh (as a share of the total of private car and public transport) fell between 1991 and 2001 from 40% to 35% (2001 Census). However, since 2001, results from the Scottish Household Survey indicate a rise in the use of bus for journeys to work by Edinburgh residents from 36% to 39%[10]. Increasing bus use is also evident in Lothian Buses patronage, which has increased by over 25% since 1998[11].

2.46 The principal growth areas in the city at the Gyle, North Edinburgh and Kinnaird Park are inadequately served by buses from certain directions, with journeys by bus to these areas often requiring interchange between services.

2.47 Over the last decade CEC and its predecessor Lothian Region have introduced a number of measures, including the Greenways, in order to increase the attractiveness of journeys by bus in the city.

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[9] Travel To Work Patterns And Mode Of Travel To Work In Edinburgh & The Lothians 2001 - An Analysis Of The 2001 Census Travel To Work Data, City Development Department, City of Edinburgh Council, December 2004

[10] SHS Annual Reports available from www.scotland.gov.uk/topics/statistics/16002/14048

[11] Local Transport Strategy 2006 - Consultation Draft, CEC, 30th June 2006

North Edinburgh

2.48 A study of public transport in North Edinburgh[12] reviewed existing services and recommended a strategy, with particular reference to the two main developments in the area, Leith and Granton Waterfronts.

2.49 It was reported that concerns over the capacity of the current road network were expressed by Lothian Buses, who indicated that there were particular pinch points in the central area through which services ran to and from North Edinburgh. It was argued that these points impair their ability to deliver effective service provision to the area in question. These areas are:

- Lothian Road/Princes Street/Charlotte Square;
- Picardy Place and London Road/Leith Walk roundabouts; and
- George IV Bridge/The Mound/Lawnmarket.

2.50 Other areas along the routes were identified as causing problems for the running of service, mainly by lack of capacity caused by unrestricted on-street parking.

2.51 In the same study, representatives of CEC commented on the lack of clarity of bus services in the area, with ad-hoc provision being made by operators for new developments, and expressed the general view that North Edinburgh is the only part of the city to suffer from a lack of high quality service. The comment was also made that the current road network in North Edinburgh hindered the development of a high quality bus service.

2.52 The study mapped accessibility to a set of defined strategic destinations (categorised under travel, education, employment, retail, leisure and health) from four local centres in North Edinburgh, namely Granton, Muirhouse, Newhaven and Leith. The mapping exercise clearly showed a low level of direct services to destinations in the West of the city, notably Haymarket, Gyle, Edinburgh Park, Sighthill and Hermiston Gait, as well as the Airport. This limited accessibility to the west is a recurring theme in several studies carried out on transport in the North Edinburgh area, and has implications for access to employment and social inclusion.

2.53 The study recommended new and improved public transport services to and from North Edinburgh, as well as within, in the short to medium term. The strategic links (which should be aligned with the development areas) forming the core of the strategy were identified as the "Roseburn Link", utilising the Southern Access Road and the former railway solum via Haymarket, and from Newhaven and Leith to the city centre.

2.54 A review of the North Edinburgh Public Transport Strategy[13] suggested that new direct public transport services from Granton to the Gyle, Edinburgh Park and the airport should be considered, as the strategy appeared to focus mainly on improved links to and from the city centre, and on east-west corridors. The same review

[12] North Edinburgh Public Transport Strategy – Final Report, Oscar Faber, 2000

[13] Review of the North Edinburgh Public Transport Strategy, Colin Buchanan and Partners, 2000

emphasised certain issues in connection with the North Edinburgh public transport strategy, such as the need to meet an incremental build-up of demand for public transport as a result of the development in North Edinburgh, by phasing additional capacity. The review agreed that a segregated public transport corridor would be required in the long-term.

2.55 Leith Walk is the principal bus corridor connecting northern districts to the city, with eight frequent services connecting the city centre to Leith. There are a further three frequent[14] services on Inverleith Row corridor, and four frequent services operating along the Crewe Road South corridor. All these services operate at high frequencies, with most routes running at either 4bph or 6bph. Low floor buses already operate on many routes and are continuing to be introduced as the fleet is renewed.

2.56 Since 2000 the existing Greenway on the Leith Walk corridor has been supplemented by the introduction of the Leith to Straiton Quality Bus Corridor, which consists of a package of measures to improve the quality and reliability of bus services along the A900/A701/A7 corridor and connects North Edinburgh to the south of the city via the city centre. These measures include real time passenger information signs, bus priority, P&R, and interchange facilities at key locations along the corridor (including Elm Row). Bus priority measures are also being introduced to improve conditions on the Inverleith Row and Crewe Road South corridors. The city centre pinch points that were highlighted in the North Edinburgh public transport strategy have been addressed by the introduction of city centre measures, which include the removal of westbound general traffic on Princes Street.

West Edinburgh

2.57 Current bus services in west of the city predominantly operate along radial routes from the city centre. As with other areas of the city, many services cross through the city centre and their journey times and reliability are susceptible to congestion on the road network. The A8 and A71, which both operate as Greenways, are the principal on-street bus corridors to the west. Bus route interchange points are at Drumbrae, Haymarket Station, Edinburgh Park and The Gyle Shopping Centre. There are further interchanges at the Ingliston Park & Ride site and at Edinburgh Airport.

2.58 Nine services operate on the A71 corridor and seven services on the A8 corridor, including Lothian Buses' *Airlink* service to Edinburgh Airport from the city centre. All of these services operate at frequencies of at least two to six buses per hour, seven days a week. Five routes across the two corridors operate 24 hours a day. There are also a number of other daytime and evening services in the area, which run on lower frequencies.

2.59 Greenways have improved bus travel, especially to and from the city centre, the Gyle area and Edinburgh Airport. However, traffic congestion in the corridor is reaching the point where the effectiveness of the Greenways at junctions is being undermined, and this problem is likely to worsen in future as traffic volumes increase further.

[14] Frequent – Headway equal to or less than 15 minutes

2.60 Fastlink was opened in 2004 and has improved the quality of bus services between Edinburgh Park, the city centre, and North Edinburgh. It provides an off road two-way, guided busway between Broomhouse and Stenhouse Drive and bus priority in the Gyle area and between Stenhouse Drive and West Approach Road. Lothian Buses Services 2 and 22 (Edinburgh Park to The Jewel and Ocean Terminal respectively) use the guided busway. Buses operating on the busway have been fitted with horizontal rubber wheels that guide the bus between fixed kerbs either side of the concrete busway.

2.61 On the A71 corridor the Hermiston P&R site offers bus based park and ride facilities for those travelling into the city from the south west. It is served by four of Lothian Buses' services, including a new express service, which together provide a bus service from the Park and Ride facility to the city centre every five minutes. The site has some 470 spaces, with average usage currently around 300 cars per day.

2.62 The A8 is Edinburgh's busiest corridor and it is now served by the Ingliston P&R site which provides bus based park and ride facilities for those travelling to the city from the west. It has a new branded express bus service and is also served by the Lothian Buses Service 35, which links the P&R site to the Airport, the Gyle, Edinburgh Park, and to Ocean Terminal via the Old Town. The site has some 535 spaces, with average usage currently around 400 cars per day.

2.63 To the north of the A8 the A90 is the principal route linking the city to Fife and the north of Scotland via the Forth Road Bridge. An innovative bus priority scheme has been installed on this corridor, which has resulted in significant improvements for buses travelling into and out of the city. The success of this scheme has helped nurture and underpin the growth of patronage of the Ferrytoll P&R in Fife.

Rail provision

2.64 There are 11 railway stations[15] within the city area, and the rail network is important for medium and long distance travel to the city centre.

2.65 The main rail terminals are Waverley in the city centre and Haymarket to the West of the city centre. Although Edinburgh has rail links to the south and the north, trains arrive at Waverley from the west and east. Trains bound for Berwick and England exit the city to the East, before turning South down the coast. Trains bound for Fife and the north of Scotland exit the City to the West to allow access to the Forth Rail Bridge. As a result access by rail is a significant issue for the Western section of the proposed tram route, but does not impact upon the north of the city.

2.66 Rail services have, to date, played a limited role in serving the needs of the corridor from the city centre to the West. Until recently the only station within the corridor outside the city centre, was at South Gyle on the Fife line. This provides a useful railhead for medium to long distance trips to and from the area, but the service is not sufficiently frequent for it to contribute significantly to movements within the

[15] Excluding Musselburgh.

corridor.

2.67 The more recently opened Edinburgh Park station on the Edinburgh-Glasgow line appears to be playing a similar role to South Gyle, but will generate a need for high quality local public transport as a feeder to the station.

2.68 Stations are also located at Wester Hailes, Kingsknowe and Slateford on the southern edge of the corridor. These are served by an hourly stopping service from Edinburgh to Glasgow. The role of these stations in catering for the intra Edinburgh needs of the corridor is also limited.

2.69 The Edinburgh Airport Rail Link (EARL) would create direct rail services linking Edinburgh Airport to the rest of Scotland. Once constructed it will be possible to travel on trains from the Airport to destinations to the north, west and south, including Glasgow, Stirling, Perth, Fife, Inverness, Dundee and Aberdeen, as well as Edinburgh itself and onwards to England. The proposed link includes the construction of a railway station at the main terminal at Edinburgh Airport and trains would arrive and depart via a tunnel. The estimated outturn capital cost of the scheme is between £550 million and £650 million. A Private Bill for the scheme was introduced to the Scottish Parliament in March 2006 and this has passed the In-Principle stage. The next phase is that a reporter has been appointed to hear evidence in November/December 2006 with the expectation that the Bill will be passed in around May 2007.

2.70 Haymarket is currently the subject of a major study examining its potential as a major transport hub linking train, tram and bus services. The study, being undertaken by CEC with funding provided by the Scottish Executive, will look at options for improving facilities and linking up public transport choices at the station as part of an integrated transport system.

2.71 Heavy rail has a significant role to play in catering for longer distance trips to and from West Edinburgh but is not suited to playing a major role in meeting the demand for travel within the corridor. Along with South Gyle, the more recently opened Edinburgh Park station and proposed Edinburgh Airport Rail Link are likely to increase the need for high quality local public transport within the corridor.

Private Transport

Highway network

2.72 The principal routes into the city centre form the north and west comprise the A90 Queensferry Road, A8 Corstorphine Road, A71 Calder Road/Gorgie Road, and A900 Leith Walk. The principal east – west route north of the city centre is the A902 Ferry Road. The A903 and A901 provide access to the Forth shoreline area; the latter also provides an alternative east – west route serving Leith Docks. A new Southern Approach Road, constructed on the alignment of the former railway solum to Granton Harbour, has been introduced to serve the Granton development area. In general, the roads in the area are predominantly single carriageways with frontage development.

2.73 The A8 Glasgow Road which runs through the centre of the West Edinburgh corridor is one of the key radial routes in Edinburgh. It serves a significant area of suburban

Edinburgh and major land uses such as Edinburgh Airport, Edinburgh Park, The Gyle Centre and Murrayfield. It is a major route into the city from West Lothian and beyond. It feeds into the City of Edinburgh Bypass at Gogar and parallels the main Edinburgh to Glasgow railway to Haymarket. The A8 is also one of Edinburgh's Greenways, offering bus priorities through various traffic management measures and provision of dedicated road space.

2.74 The A900 Leith Walk consists of four traffic lanes for most of its length, two of which are Greenways dedicated to buses, taxis, and cyclists for 11 hours during the day. Leith Walk provides passage for those travelling from the city centre to Leith, Newhaven, and Granton.

Car demand and congestion

2.75 Combined with frequent junctions and access points, travel speeds are typical of such dense urban areas, with low speeds and congestion during the peaks. During the 1980s and 1990s, commuting into Edinburgh by car rose by 53%, with traffic volumes increasing, for instance by 52% on the A8 at Gogar and by 31% at Barnton in the ten years to 1995[16]. Between 1991 and 2001, Census data indicates that commuting by car in Edinburgh rose by over 16%. Since 2001, data from the Scottish Household Survey indicates that the share of commuting by car for Edinburgh residents has declined marginally.

2.76 Levels of peak hour traffic into the city centre have remained static in recent years. Limited traffic growth has occurred (both spatially and temporally) only where there has been the available capacity to do so. This reflects the impacts of capacity limitations and restrictions on growth in car use to the city centre and increasing car ownership and economic dispersal outwith the centre.

2.77 Between Leith Walk and Queensferry Road, the crossings of the Water of Leith act as pinch points to north-south traffic. North-south traffic has to cross or use in part a number of heavily trafficked east-west routes. The area experiences significant 'rat running', with many alternative routes along roads often unsuitable for heavy volumes of traffic.

2.78 Forecast trends in traffic and congestion point to an overall growth in traffic levels of 11% from 2005 to 2011, with a further 26% to 2031; the consequential impacts on congestion would be greater than this. Of this growth, the largest impacts will be concentrated on those areas of highest growth, and consequently the highest congestion increases are expected to be on the strategic routes serving the areas of major economic activity around the city: west Edinburgh, the Waterfront, the South East Wedge and the city centre. Such increases in congestion will have commensurate effects on bus journey time and reliability.

[16] City Plan for Edinburgh, CEC, 1999

Opportunities

2.79 In addition to addressing the socio-economic, environmental and transport problems of Edinburgh as described in the previous sections, a rapid transit scheme can also contribute to the fulfilment of development opportunities that exist in north and west Edinburgh.

2.80 As part of the demand forecasting and appraisal process for Edinburgh Tram, a thorough and robust review of planning opportunities has been undertaken involving CEC planners. This has considered the likely range of development possible at the various sites identified and the potential impact that Edinburgh Tram might have on the overall scale of development. The following sets out the most likely considered level of development with Edinburgh Tram in place.

2.81 Central Edinburgh development opportunities are set out in Table 2.1. Given the already dense nature of much of the central area, the opportunities are relatively modest in scale and spread throughout the central area.

TABLE 2.1 CENTRAL EDINBURGH DEVELOPMENT

Location	Residential (Units)	Office/ Business (Sq m)	Retail (Sq m)	Hotel (Rooms)	Commercial (Sq m)	Leisure (Sq m)	Other (Sq m)
St. James Centre		-8,000	8,000				
Princes Street			13,000				
St Andrews Sq			6,000				
New Street	200	17,200	5,100	200			
East Market Street		21,000					
Waverley Station			40,000				
Fountainbridge/ Edinburgh Quay: Fountain North	640	17,100	2,005				5,100[17]
Fountainbridge/ Edinburgh Quay: Freer Street	190		850		4,800		
Fountainbridge/ Edinburgh Quay: Fountain South	1,000	30,000	5,000			5,000	
Edinburgh Quay		5,500	400				
Morrison Street Haymarket		21,390	3,350			750	
Quartermile	689	37,200	8,000	250			
Total	*2,719*	*141,390*	*91,705*	*450*	*4,800*	*5,750*	*5,100*

[17] Student Halls.

2.82 The biggest development opportunity in Edinburgh is the redevelopment of the Granton and Leith Docks areas. Whilst substantial development has already taken place, notably at Leith, the overall aspirations for these areas are very considerable, as detailed in Table 2.2. The development potential is focused on residential use, with some 25,8●● units envisaged. Nearly 35●,●●● square meters of other uses complete the development potential.

TABLE 2.2 NORTH EDINBURGH DEVELOPMENT

Location	Residential (Units)	Office/ Business (Sq m)	Retail (Sq m)	Hotel (Units)	Commercial (Sq m)	Leisure (Sq m)	Other (Sq m)
Granton Waterfront	7,800		40,400		130,000	8,800	65,000[18]
Western Harbour, Newhaven	3,000		6,000		41,500		
Leith Docks	15,000	30,000	20,000				
Total	*25,800*	*30,000*	*66,400*	*0*	*171,500*	*8,800*	*65,000*

2.83 Planned development in west Edinburgh is outlined in Table 2.3. The significant development planned in the office/business sector would have a considerable impact on Tram patronage levels.

TABLE 2.3 WEST EDINBURGH DEVELOPMENT

Location	Residential (Units)	Office/ Business (Sq m)	Retail (Sq m)	Hotel (Units)	Commercial (Sq m)	Leisure (Sq m)	Other (Sq m)
Edinburgh Gate, New Bridge		50,000					
Newbridge North					50,000		
Ratho Park		3,350					
Edinburgh Park		200,000		168			
Heriot Watt Research Park							174,000[19]
Sighthill Park						14,300	
Total	*0*	*253,350*	*0*	*168*	*50,000*	*14,300*	*174,000*

[18] Hotel, cultural use and education.

[19] Research Park extension and campus extension.

2.84 The data presented above pertains to the most likely development scenario and has been utilised in the demand forecasting for Edinburgh Tram. An associated maximum planning scenario has also been developed, where there is potential for further expansion in these areas, over and above the most likely considered. The additional development potential is set out in Table 2.4. Of note, an additional 6,400 residential units are possible in North Edinburgh, with potential for significant additional office/business and commercial space across the three areas.

TABLE 2.4 ADDITIONAL DEVELOPMENT POTENTIAL ARISING FROM MAXIMUM DEVELOPMENT

Location	Residential (Units)	Office/ Business (Sq m)	Retail (Sq m)	Hotel (Units)	Commercial (Sq m)	Leisure (Sq m)	Other (Sq m)
Central Edinburgh	615	23,410	29,695	50	200	3,750	0
North Edinburgh	6,400	20,000	26,100	0	78,500	1,200	15,000
West Edinburgh	0	50,000	0	0	15,000	0	0
Total	*7,015*	*93,410*	*55,795*	*50*	*93,700*	*4,950*	*15,000*

3. TRANSPORT PLANNING OBJECTIVES

Establishing transport planning objectives is central to the development of options and to the testing and appraisal of those options. The performance of options against objectives will determine which options become proposals to be taken forward to the full appraisal process.

The transport planning objectives are fundamental to the STAG 1 appraisal. In addition it is necessary to test proposals against the Scottish Executive's five objectives of environment, safety, economy, integration and accessibility, and other relevant external objectives. The transport planning objectives are used at both the option testing stage and in the Part 1 appraisal stage to determine the preferred options to be taken forward. The Part 2 appraisal contains an updated assessment against the transport planning objectives, but there the focus is on the Executive's 5 objectives.

The aim of this chapter is to describe the process involved in developing the transport planning objectives. The objectives developed are based principally on the identified opportunities, problems and constraints in the waterfront - city centre – airport corridor, which were discussed in the preceding chapter. The development of objectives also takes cognisance of the requirements of STAG and takes into account objectives and policies from the relevant planning documents. These documents are reviewed before setting out the transport planning objectives.

STAG Requirements

3.1 STAG appraisal is not simply completion of the Appraisal Summary Tables. It is a holistic process that begins from identification of problems and issues, development of transport planning objectives and the generation and sifting of options, all of which take place prior to appraisal. Therefore a key requirement is to provide a rationale for the selection of particular project proposals, and that rationale must be traceable back to the issues to be addressed and the transport planning objectives determined by the promoter of the project.

3.2 The STAG appraisal process requires that proposals are tested against two sets of objectives:

- The planning objectives established by the planner (planning strategy); and
- The Government's five objectives (environment, safety, economy, integration and accessibility).

3.3 In addition, the integration objective requires testing against other relevant external objectives relating to transport, land use or wider policies (local, regional and national policy framework).

3.4 STAG suggests that, when setting objectives in complex situations, there should be layers or levels of objectives. Levels should comprise strategic and operational level objectives and possibly intermediate objectives below which should also be linked to the strategic level aims. While strategic level objectives are concerned with final

(policy) outcomes, the lower levels of objectives can relate to outputs from particular strategies and / or to the inputs used.

3.5 CEC has clear strategic objectives enabling projects to be categorised as part of particular strategies. This is beneficial in taking forward the projects through the STAG appraisal process. However, a further explicit process is needed for developing an option appraisal which addresses the requirements of a STAG appraisal. This process underlies the rationale for the project, by testing outcomes against objectives, assessing likely costs and value for money, and considering deliverability and fundability.

3.6 In order to support the development of its integrated transport policy, the Government has established five appraisal objectives in STAG, which are used when authorities and agencies develop and appraise new transport proposals. Thus, planning objectives are required to satisfy the five overarching national objectives for transport:

- Environment;
- Safety;
- Economy;
- Integration; and
- Accessibility.

3.7 The approach adopted in this report is based on the fundamental principles of the STAG appraisal process which states that, at all stages of the process, consideration of the proposals should be:

- Objective Led: Considering the objectives of other policies;
- Open Minded: Inclusive and integrated with policy areas; and
- Auditable: Well structured and clearly referenced.

3.8 In order to develop the required rationale and to provide a STAG driven basis for categorisation of projects, the following section sets out the overall vision for transport in the area, derived from the aims and objectives of transport and other planning documents at all levels. From this base the planning objectives for the STAG appraisal are developed.

Planning and Policy Framework

3.9 This section will examine the planning and policy framework set out in the objectives from relevant plans and strategies relating to the area affected by the Edinburgh Tram. It will examine polices from the transport sphere and other relevant policy areas, and incorporate objective setting at National, Regional and Local levels, leading on to setting planning objectives for the development of the Edinburgh tram.

National Context

3.10 Transport policy frameworks and structures for delivery have recently undergone a period of substantial change in Scotland, which has included the formation of a new national transport agency, named Transport Scotland. As well as the pending National

Transport Strategy (NTS) which will guide transport policy across the country, this section will make reference to guidance and strategies at the national level which will also have an impact on the planning objective setting for the proposed development of the Edinburgh Tram.

National Strategy and National Planning Guidance

3.11 Consultation on National Transport Strategy (2006)[20] proposed a number of high level transport objectives, which were originally outlined in the most recent Transport White Paper 'Scotland's Transport Future' (2004).[21] The NTS consultation period closed on 13 July 2006 and the strategy is scheduled for publication in October 2006. The high level national objectives for transport are set out below:

- Promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency;
- Promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network;
- Protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimise emissions and consumption of resources and energy;
- Improve safety of journeys by reducing accidents and enhancing personal safety for pedestrians, cyclists, drivers, passengers and staff; and
- Improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport.

3.12 To support the high level objectives, a number of specific transport goals are suggested in the consultation for the National Transport Strategy, again giving an indication of what the transport goals in the final NTS will comprise;

- Facilitate economic growth;
- Promote accessibility;
- Promote choice and raise awareness of the need for change;
- Promote modal shift;
- Promote new technologies and cleaner fuels;
- Manage demand;
- Reduce the need to travel; and
- Promote road safety.

3.13 Planning objective setting specifically in relation to transport is addressed further in Scottish Planning Policy 17 (SPP17) Planning for Transport.[22] A new Planning

[20] Scotland's National Transport Strategy: A Consultation, The Scottish Executive, 2006: http://www.scotland.gov.uk/Publications/2006/04/20084756/0

[21] Scottish Transport White Paper - Scotland's Transport Future, The Scottish Executive, 2004: http://www.scotland.gov.uk/library5/transport/stfwp-00.asp

[22] Scottish Planning Policy: SPP17 Planning for Transport, The Scottish Executive, 2005: http://www.scotland.gov.uk/Publications/2005/08/16154406/44078

Advice Note (PAN) 75: Planning for transport (2005)[23], accompanies SPP17. This contains more specific guidance than SPP17, and refers to the importance of integration of land use planning with transport, taking account of environmental aims and policies, and policies on economic growth, education, health and the objective of a fairer, more inclusive society.

3.14 Within SPP17, land use planning is stated as an important tool in:

- Reducing the need for travel by relating land use to transport facilities;
- Enabling access to local facilities by walking and cycling;
- Encouraging public transport access to developments; and
- Supporting essential motorised travel.

3.15 As stressed in SPP17, the general hierarchy of priorities for individual travel accessibility development should be walking, cycling, public transport and then finally private cars. SPP17 suggests that access to jobs and facilities across the wider urban area should be a prime consideration. Accessibility of new developments is an important issue, and one that has historically been difficult to measure definitively.

National Economic Development Objectives

3.16 The national strategy for promoting economic development 'The Way Forward: Framework for Economic Development in Scotland' (FEDS)[24] was originally presented to the Scottish Parliament in June 2000, and has since been refreshed in September 2004. The objectives within this framework are split into two types: the principle outcome objectives and the enabling objectives.

3.17 The Principle Outcome Objectives are as follows:

- Economic growth - with growth accelerated and sustained through greater competitiveness in the global economy;
- Regional development - with economic growth a pre-requisite for all regions to enjoy the same economic opportunities, and with regional development itself contributing to national economic prosperity;
- Closing the opportunity gap - with economic growth a pre-requisite for all in society to enjoy enhanced economic opportunities, and with social development in turn contributing to national economic prosperity; and
- Sustainable development - in economic, social and environmental terms.

3.18 The achievement of these desired outcomes depends upon a complex array of economic drivers. Establishing the underlying conditions and context for economic growth to flourish is, therefore, a critical step. There are four key enabling objectives:

[23] Planning Advice Note: PAN 75 – Planning for Transport, The Scottish Executive, 2005: http://www.scotland.gov.uk/Publications/2005/08/16154453/44538

[24] Framework for Economic Development in Scotland, The Scottish Executive, 2004: http://www.scotland.gov.uk/Publications/2004/09/19872/42430

- A stable and supportive macroeconomic environment;
- A facilitating national economic context: encompassing the physical, human and electronic infrastructure;
- Dynamic competitiveness in Scottish enterprises; and
- Economic policies and programmes to secure the social, regional and environmental objectives.

National Sustainable Development Objectives

3.19 'Choosing our Future: Scotland's Sustainable Development Strategy',[25] was published in December 2005. The key aim of the strategy is to present methods by which Scotland can adhere to the common, UK wide sustainable transport aim laid out in the 'One Future – Different Paths' document in March 2005.[26] This is an important policy to adhere to in development of the tram, its principal aims, as outlined below, should therefore be borne in mind:

"to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations."

West Edinburgh Planning Framework

3.20 The Scottish Executive is currently preparing a National Planning Framework,[27] which will identify West Edinburgh as a location where it is in the nation's interest to promote a co-ordinated approach to planning. West Edinburgh is considered to be of national importance in economic, transport, and environmental terms. The nature and scale of development, both existing and committed, is significant to the regional and Scottish economy. Established land uses such as Edinburgh Airport, RBS Headquarters campus and the Royal Highland Showground play a national or regional role, and have aspirations for long-term growth. The existence of Edinburgh Airport, and the road and rail routes that connect West Edinburgh to the rest of the country place it in a strategically important location.

3.21 The West Edinburgh Planning Framework[28] defines a key objective as being:

"the need to improve public transport accessibility to established development sites and reduce congestion."

3.22 The Scottish Executive, CEC and Scottish Enterprise Edinburgh and Lothian have worked with the stakeholders to prepare a long-term strategic planning framework for the area, which was published in 2003. The Framework has served as an input to the

[25] Choosing our future: Scotland's Sustainable Development Strategy, The Scottish Executive, 2005: http://www.scotland.gov.uk/Publications/2005/12/1493902/39032

[26] 'One Future – Different Paths', The UK's Shared Framework for Sustainable Development, HM Government, 2005: http://www.sustainable-development.gov.uk/publications/pdf/SD%20Framework.pdf

[27] National Planning Framework for Scotland: Guidance for the spatial development of Scotland to 2025, 2004, http://www.scotland.gov.uk/Publications/2004/04/19170/35317

[28] West Edinburgh Planning Framework, Scottish Executive, 2003: http://www.scotland.gov.uk/Publications/2003/03/16751/19944

development plans for the area and will also be a material consideration in development control decisions.

Edinburgh Airport Outline Masterplan

3.23 The Outline Edinburgh Airport Masterplan,[29] prepared by BAA Edinburgh, was circulated for consultation in 2005 and published in July 2006. It is prepared in line with the expectations of the White Paper 'The Future of Air Transport'[30], published by the Department for Transport in December 2003. A core theme of the Airport Masterplan, as outlined in the White Paper is the fact that:

"ensuring the provision of adequate airport capacity in Scotland, whilst taking full account of environmental concerns, is an important priority for the Government and the Scottish Executive".

3.24 The aim is for sustained and responsible growth of Edinburgh Airport to 2030. Within this broad aim for the development of Edinburgh airport, BAA Edinburgh developed the Edinburgh Airport Surface Access Strategy in consultation with SESTRAN, which set three broad objectives relating to surface access:

- To increase the percentage of passengers using public transport from 16% to 25% by 2007;
- To reduce single-occupancy car journeys by staff from 88% to 78% by 2007; and
- To develop an integrated transport strategy.

Regional context

3.25 In terms of regional transport planning CEC forms part of the South East Scotland Regional Transport Partnership (SESTRAN), while for local development and land use planning it falls within the Edinburgh and Lothian's Structure Plan area. Objectives of each of these bodies, laid out in their strategies, will be outlined in this section.

Regional Transport Objectives

3.26 Under the Transport Act (Scotland) 2005 the Regional Transport Partnerships became statutory bodies. This new legislation has set up seven statutory RTPs of which SESTRAN is one. CEC is one of eight member councils of SESTRAN (the others being: Clackmannanshire Council, East Lothian Council, Falkirk Council, Fife Council, Midlothian Council, Scottish Borders Council and West Lothian Council).

3.27 SESTRAN had previously produced an RTS published in 2003,[31] this is now in the process of being updated under the new statutory arrangements. The new RTPs are

[29] The Outline Edinburgh Airport Masterplan, BAA Edinburgh, 2006: http://www.edinburghairport.com

[30] The Future of Air Transport, DfT, 2003: http://www.dft.gov.uk/stellent/groups/dft_aviation/documents/divisionhomepage/029650.hcsp

[31] Regional Transport Strategy for the South of Scotland, SESTRAN, 2003: http://www.sestran.org.uk/regional_transport_strategy.html

tasked with producing their RTSs by April 2007, which will set out objectives for the region over the next 20 years.

3.28 The current overall policy principles adopted by SESTRAN are:

- Promote and develop travel awareness and information, encourage walking/cycling, promote better health and fitness and encourage the use of public transport;
- Improve safety for all road and transport users;
- Reduce the environmental impacts of travel;
- Enhance community life and social inclusion, and
- Encourage the use of the most economic, effective, environmentally friendly and efficient modes for freight transport.

Structure Plan

3.29 CEC is linked with East Lothian, Midlothian and West Lothian to form the 'Edinburgh and the Lothians Structure Plan 2015',[32] which was approved by Scottish Ministers in June 2004. A key theme of the Structure Plan is the provision of appropriate measures for accessibility to developments, which has in part included safeguarding of land for potential future transport infrastructure enhancement or development.

3.30 The Structure Plan has adopted a number of Strategic Aims relating to the overall policy setting framework, taking into account policies at national and local levels:

- Maintaining and enhancing economic competitiveness;
- Promoting a more inclusive society;
- Protecting and enhancing the natural and built environment; and
- Integrating land use and transport.

3.31 Within the section of the Structure Plan specifically relating to the role of transport in relation to development, a number of transport specific objectives have been set:

- Ensure that the location and design of new development, especially major new development, reduces the need to travel by car and encourages the use of public transport, walking and cycling;
- Maximise accessibility for all in the community by foot, cycle and public transport;
- Manage car use through parking policies, particularly by applying development control maximum parking standards, in conjunction with public transport improvements;
- Encourage the movement of freight by rail and sea or, where road freight is dominant, along the strategic road network;
- Support transport strategies by safeguarding land for improvements to transport

[32] Edinburgh and the Lothians Structure Plan 2015, City of Edinburgh Council et al, 2004: http://www.edinburgh.gov.uk/CEC/City_Development/Planning_and_Strategy/Structure_Plan/EDINBURGH_AND_THE_LOTHIANS_STRUCTURE_PLAN_2001.HTML

networks and prioritizing the provision of new transport infrastructure required to support the development strategy; and

- Ensure that development caters for its transport needs.

Local Policies

3.32 As will be identified in this section there is an extensive hierarchy of local planning documents applicable to the implementation of the Tram on a city wide and area specific level. Initially the city-wide, corporate level documents are reviewed. These cover all policy areas and set out CEC's vision and strategic objectives for the city as a whole over the coming decades. A number of 'subject specific' planning documents are then reviewed, the Local Transport Strategy is clearly a key document in this field, but plans and policies focussing on community safety, health and economic development are also discussed. A number of more specific plans focussing on either general strategic aims, or specific policy fields, for particular areas of the city which will be affected by the Tram are also included.

Edinburgh's vision

3.33 CEC's vision for Edinburgh is presented in the 'Building a Better Edinburgh' document[33] (June 2003) which outlines the overall vision CEC has for development in the city. This over-arching vision, which covers all policy areas, informs planning and objective setting at all other levels and across all policy areas of council planning. CEC's vision is that Edinburgh, by 2015, will:

- Lead the most successful and sustainable city region in Northern Europe;
- Sustain the highest quality of life of any UK city competing with the best in the world;
- Keep and attract the people needed to drive its talent and knowledge economy and provide every citizen with the best personal opportunities for work, education and development; and
- Be a safe and tolerant, creative and connected city, promoting the well being of both people and place.

3.34 The vision for the city recognises the importance of transport for the economy of the city. At the same time it seeks a major change in the way transport needs are met in order to achieve central objectives relating to the sustainability of the city and its environment, safety in using transport and the need to promote greater social inclusion.

3.35 CEC has a well developed vision for transport over the next 20 years. This is outlined in the Local Transport Strategy, and is developed in accordance with the overall vision for the city.

[33] Building a Better Edinburgh, City of Edinburgh Council, 2003: http://www.edinburgh.gov.uk/internet/Council/Council_publications/Council_policies_and_plans/CEC_the_edinburgh_city_vision

Corporate Plan

3.36 CEC's Corporate Plan; 'Edinburgh 2007',[34] was agreed by CEC in September 2003. It sets out the vision for Edinburgh and CEC's priorities. It provides direction for the Departmental Service Plans and covers manifesto commitments made by CEC Administration. The plan also sets out the performance agenda for CEC and how progress will be measured over the four years of the plan.

3.37 Transport is presented as an important issue in the Corporate Plan with "making sure that the City has modern effective transport arrangements" stated as a key theme. CEC's priorities, outlined in the corporate plan are as follows. The position of maintenance and improvement of transport infrastructure underlines the key role that CEC sees transport to take in the development of the city:

- Developing and supporting the provision of a quality transport infrastructure;
- Responding to the effects of the local housing market by improving the supply of affordable housing;
- Responding to labour shortages coupled with improving access within the employment market;
- Improving the quality of the public realm particularly in the city centre; and
- Maintaining competitive advantage over other cities in the tourism market through ongoing investment in services, facilities and infrastructure.

Local Transport Strategy

3.38 The current LTS covers the period 2004 - 2007,[35] consultation on an updated LTS to cover the three to five years from 2007 closed at the end of August 2006.[36] Publication of the renewed LTS is anticipated in late 2006.

3.39 CEC has stated its vision for transport within the Local Transport Strategy (LTS) as follows:

- Edinburgh aspires to be a city with a transport system that is accessible to all and serves all. Edinburgh's transport system should contribute to better health, safety and quality of life, with particular consideration for vulnerable people such as children, and elderly and disabled people: it should be a true Citizen's Network. The transport system should support a strong, sustainable local economy.
- CEC will seek to maximise people's ability to meet their day-to-day needs within short distances that can easily be undertaken without the need to use a car. The city should develop and grow in a form that reduces the need to travel longer distances, especially by car. Choice should be available for all journeys within the city.

[34] Edinburgh 2007, City of Edinburgh Council, 2003: http://www.edinburgh.gov.uk/internet/council/council_publications/CEC_corporate_plan_edinburgh_2007

[35] Local Transport Strategy 2004 – 2007, City of Edinburgh Council, 2004: http://www.edinburgh.gov.uk/CEC/City_Development/Transport_and_Communications/LocalTransportStrategy2004to2007/home1.html

[36] Local Transport Strategy Consultation Draft, City of Edinburgh Council, 2006.

3.40 The aims proposed in the draft LTS from 2007 are:

- To support a sustainable and growing local and regional economy;
- To improve safety for all road and transport users;
- To reduce the environmental impacts of travel;
- To promote better health and fitness; and
- To reduce social exclusion.

3.41 These general aims relate closely to overall national and local priorities for the economy, environment and social policy, set by the Scottish Executive and CEC respectively. They have been developed into a series of more specific objectives for the transport system:

- To facilitate reliable and convenient access to the city and movement within it, in particular by reducing congestion;
- To increase the proportion of journeys made on foot, by cycle, by motorbikes and by public transport;
- To implement the tram project;
- To reduce the need to travel, especially by car;
- To reduce the adverse impacts of travel, including road accidents and environmental damage;
- To recognise the many roles that streets have for the community – as places that people live and work, as areas that people meet, shop and relax, as a setting for the city's built heritage as well as routes for movement whether by car, bus, bicycle or on foot;
- To improve the ability of people with low incomes or mobility impairments to use the transport system; and
- To ensure that the road, footway and cycle network are of a standard suitable for safe and comfortable movement.

The Edinburgh City Local Plan

3.42 The Edinburgh City Local Plan Consultation Draft[37] was approved for consultation purposes by the Planning Committee on 9 March 2006. The public consultation period ran from 2 May 2006 - 30 June 2006. The Plan sets out policies and proposals for future land use change and development in the period to 2015 at least. This is the first local plan covering the whole of the city. Currently there are five local plans covering different parts of the area, all adopted at various times in the past. The most up-to-date is the South East Edinburgh Local Plan, adopted in 2005. These will all be replaced when the new Edinburgh City Local Plan is adopted.

3.43 The transport objectives laid out in the consultation draft of the local plan are:

- To minimise the distances people need to travel;

[37] Edinburgh City Local Plan Consultation draft, City of Edinburgh Council, 2006: http://map.avinet.no/plans/eclp/contents.htm

- To maximise the accessibility of communities to jobs and essential services;
- To minimise the detrimental effects of traffic and parking on communities and the environment; and
- To support the provision of necessary infrastructure.

3.44 The Consultation Draft of the Local Plan makes specific reference to development of a tram network as a key issue for a sustainable public transport system, citing it as an alternative to travel by private car.

3.45 The Central Edinburgh Local Plan was adopted by CEC in May 1997 and will be reviewed as part of the Edinburgh City Local Plan.

The North East Edinburgh Local Plan Alteration

3.46 A consolidated version of this plan was published early in 2005. It contains CEC's policies and proposals for the development and use of land in the north east of the city including the communities of Leith, Portobello, Newhaven, Trinity, Craigentinny, Northfield, Willowbrae and Joppa. The Local Plan was reviewed in 2000 and an alteration introduced to reflect the changing development opportunities in the area. The main change was the major development opportunity in Leith Docks Western Harbour.

3.47 The plan fully recognises the importance of developing a high quality transport network to serve the major developments including the provision of a possible Light Rapid Transit system and depot within the plan area.

Draft West Edinburgh Local Plan

3.48 The Draft West Edinburgh Local Plan[38] (2001) focuses on the development opportunity at Granton Waterfront and outlines the need for improved transport infrastructure linking the area to the city centre and beyond as an objective in the process of development for the area.

3.49 Within the existing transport framework in Granton, the Masterplan[39] proposes a three tier public transport structure, as follows:

- A strategic link between the city centre and the Waterfront with three stops (close to the local centre on the Plateau, on the eastern side of the Park, and the Harbour/Granton Village);
- A spinal east-west route for the extension of the main bus routes of the area through the site; and
- A series of loops interacting with these two systems, to be operated by local buses.

[38] Draft West Edinburgh Local Plan, City of Edinburgh Council, 2001: http://www.edinburgh.gov.uk/CEC/City_Development/Planning/Draft_West_Edinburgh_Local_Plan/west_local_plan_contents.html

[39] The Granton Masteplan, City of Edinburgh Council: http://www.edinburgh.gov.uk/CEC/Corporate_Services/Corporate_Communications/waterfrontintro/index.html

Waterfront Edinburgh: Granton Masterplan

3.50 In January 2006, Waterfront Edinburgh Ltd submitted a Master Plan and Strategic Environmental Assessment (SEA) to the City of Edinburgh Council. The proposal comprises a mixture of land uses including housing, offices, hotels and commercial space, cafes, bars and shops. Within the plan a number of objectives are laid out regarding the urban form of the proposed developments and their impacts on the surrounding infrastructure;

- The development of a high level of accessibility, especially for a strategic public transportation system back to the City centre;
- The implementation of sustainable development policies;
- The stimulation of high-quality architecture, landscape and public realm design; and
- The promotion of a rich mix of development.

Finalised Rural West Edinburgh Local Plan 2003

3.51 The Rural West Edinburgh Local Plan[40] was approved by CEC in 2003, superseding the first finalised plan of 1999. The area covered by the plan is a key location in the transport network of east central Scotland, including strategic links between the city and the west and north of Scotland and beyond. It is consistent with the Structure Plan of 2004. The plan comprises a written statement and a proposals map. The plan seeks to achieve the relevant elements of CEC's Local Transport Strategy which apply to the Rural West Edinburgh area:

- To reduce reliance and use of the private car and maximise accessibility for all, through careful location and design of new development and the provision of dedicated infrastructure to encourage walking, cycling and public transport use;
- To improve road safety and enhance the quality of the environment, particularly for pedestrians and cyclists through the introduction of appropriate traffic management measures and provision of dedicated infrastructure;
- To improve public transport linkages between the city and the major traffic generators in Rural West Edinburgh;
- To encourage the movement of freight by rail wherever possible; and
- To safeguard land for new transport infrastructure where this can be fully justified in strategic terms, while ensuring that adverse environmental effects are avoided.

Leith Docks Development Framework

3.52 The document[41] sets out a long-term vision and framework for the phased redevelopment of Leith docks. It was prepared in initial form by Forth Ports plc within a context set by the CEC and subsequently edited by the Council both prior to and

[40] The Finalised Rural West Edinburgh Local Plan, City of Edinburgh Local Plan, 2003: http://www.edinburgh.gov.uk/CEC/City_Development/Planning_and_Strategy/RWELP/RWELPmenu2.html

[41] The Leith Docks Development Framework Final Version: http://download.edinburgh.gov.uk/Leith_docks/LDDF_Main_Text_App1.pdf

following a public consultation process. The framework addresses an area of approximately 170 hectares covering Leith docks, in Forth Ports' ownership, and the surrounding area, including part of the historic core of Leith.

3.53 The overarching objective of the vision for this area is as follows:

> *"To provide an extension of Leith and the city which integrates the old and new areas in a mixed, balanced and inclusive waterfront community while responding to contemporary aspirations, concerns and ideas regarding urban planning"*

Community Planning Strategy

3.54 There are two main aims of Community Planning, which can be described as:

- Making sure people and communities are genuinely engaged in the decisions made on public services which affect them; allied with
- A commitment from organisations to work together, not apart, in providing better public services.

3.55 The first Community Plan for Edinburgh was published at the start of 2000. This has been refreshed with the publication of 'A Community Plan for Edinburgh – The Key Challenges 2004 - 2010'.[42] This provides an assessment of the big issues that face the city, presents key challenges including the need for better services and quality of life, and provides partner agencies with a framework by which to tackle these. A key focus within the plan is on sustainable development. To this end the plan calls for widespread production of green travel plans. In relation to transport the objectives of the plan are at a general level; "To improve transport" is one of the ten key challenges identified, with implementation of the Tram specifically mentioned as a milestone within this challenge.

Edinburgh Community Safety Partnership Strategy 2005 – 2008

3.56 The vision for the Community Safety Partnership is to ensure that Edinburgh is a safe place to live, work and visit.[43] A key aim is that community safety is written in to the service plans of all public services across the city by 2008. Prevention of accidents and reducing the fear of crime are aspects of the city transport system directly referred to in the community safety strategy. Under the appraisal heading 'safety' they should form key considerations regarding how well the tram would perform regarding safety.

Joint Health Improvement Plan

3.57 The requirement to produce a Joint Health Improvement Plan (JHIP) came from the Scottish Executive in 2002 as part of a national drive to develop and co-ordinate

[42] A Community Plan for Edinburgh, City of Edinburgh Council, 2004: http://download.edinburgh.gov.uk/CommunityPlanning/Edinburgh_community_plan_2004_2010_.pdf

[43] Community Safety Partnership Strategy, City of Edinburgh Council, 2005: http://www.saferedinburgh.org.uk/admin/pubs/Strategy%20Plan.pdf

health improvement capacity and activities in each local authority area. The 'Working for a Healthier Edinburgh: Edinburgh Joint Health Improvement Plan (JHIP) 2003-2006'[44] expresses the important role of the main Community Planning partners in making Edinburgh a healthier city. It is an integral part of both the City Community Plan (produced by the Edinburgh Partnership) and the Lothian Local Health Plan (produced by the Lothian NHS Board).

3.58 The overall objectives for Joint Health improvement planning are;

- To engage all sectors and communities in the city in joint action to improve the health and wellbeing of Edinburgh residents;
- To engage all sectors and communities in tackling health inequalities in the city; and
- To prioritise joint actions which make a positive impact on improving health and wellbeing and on reducing health inequalities.

West Edinburgh Local Community Plan (Draft)

3.59 The West Edinburgh Community Planning Partnership is in the process of updating the West Edinburgh Local Community Plan[45] which was released in draft form in April 2006. The plan outlines a vision for West Edinburgh by 2012 to be a place where:

- There is a vibrant community and a wide range of opportunities for people to take part in public life;
- People are valued, healthy, and feel in control;
- People are given a wide range of learning and training opportunities;
- Local services and amenities are of an excellent standard and responsive to people's needs;
- The environment is safe, clean and well maintained and housing meets the Edinburgh standard; and
- People can fully enjoy the benefits of Edinburgh's economic growth.

3.60 In order to achieve this vision the Planning Partnership has outlined six priorities:

- Supporting children, young people and families;
- Improving health and well being;
- Building community capacity;
- Making neighbourhoods safer, cleaner and more attractive;
- Promoting economic prosperity; and
- Providing learning opportunities.

[44] Working for a Healthier Edinburgh, City of Edinburgh Council, 2003: http://www.nhslothian.scot.nhs.uk/publications

[45] The West Edinburgh Local Community Plan (Draft), West Edinburgh Community Planning Partnership, 2006: http://www.wecpp.myed.org/?page=6073

3.61 The document also outlines a desired outcome to be improvement of the availability of public transport in West Edinburgh.

Developing Transport Planning Objectives

3.62 Transport planning objectives define what the "planner" or promoter wishes to achieve in terms of the problems to be addressed and the outcomes to be achieved. The process of developing these objectives has been informed principally by the identification of specific opportunities, problems and constraints:

- The potential for future growth of the Edinburgh economy, which is dependent on access to labour and to suitable development sites, allied to the need to adopt a denser form of urban development in order to reduce the need to travel
- Forecast growth in traffic congestion and lengthening journey times on key corridors in the city, especially along and close to the key development corridors
- The need to achieve and sustain higher levels of mode switch from car to public transport especially in development corridors
- The potential for relatively dense residential and commercial development in the waterfront and for further commercial development between the city centre and the airport
- Constraints imposed on development at the waterfront by the land use planners because of the inability of a bus based transit system to handle the volumes of demand which would arise between the waterfront and the city centre-airport corridor if the waterfront were developed to its full potential
- The strong desirability of retaining as much new development within this corridor, in order to maximise the economic benefits of dense development, to minimise the need to travel by retaining residential developments within the city and especially within the corridor and to avoid use of less environmentally suitable land use options outside the city for residential developments.
- Issues of social inclusion affecting disadvantaged communities located close to the new waterfront development areas which would benefit from access to employment opportunities generated by both residential and commercial developments.

3.63 To enable an integrated and holistic approach to generating and testing options it is essential that these issues together with the above policies are all considered in preparation of the transport planning objectives for the corridor. These objectives are expressed as strategic objectives; under these are more specific operational objectives which are also used as the basis of evaluation (see Chapter 10). The transport planning objectives are shown below.

- **To support the local economy by improving accessibility** – To achieve an integrated, efficient, accessible and quality public transport system that promotes economic growth to the local community, improving its performance and competitiveness. This is fundamental to achieving both the social inclusion and economic development elements of the transport vision, through:
  - Improved access to the public transport network; and
  - Improved access to employment opportunities.
- **To promote sustainability and reduce environmental damage caused by traffic** – To encourage more sustainable travel and comply with the targets set by

the Air Quality Amendment Regulations. This is fundamental to achieving the environmental, sustainability, health and fitness and traffic aspirations, through:

  - Increasing proportion of journeys made by public transport, cycling and walking; and
  - Reducing local and global emissions (improving air quality and reducing contribution to greenhouse gases).

- **To reduce traffic congestion** – To enable cars to be used efficiently, reducing congestion and delays on key routes. This is fundamental to the achievement of economic development and environmental aims of the vision, through:
  - Reducing number of trips by car; and
  - Reducing traffic volume on key routes.
- **To make the transport system safer and more secure** – To aim at less deaths by road traffic accident, by reducing vehicle volumes, speeds and making roads safer for both users and non-users. This is fundamental to the achievement of the safety elements of the vision, through:
  - Reducing traffic accidents.
- **To promote social benefits** – To take the new system as an opportunity to promote social and community benefits, which are fundamental to the respective elements of the vision, through:
  - Improving liveability of streets, maximising their role as the focal point of local communities; and
  - Reducing social exclusion, by improving the ability of people with low incomes, no access to car, the elderly or those with mobility impairments to use the transport system.

4. SCHEME HISTORY: OPTION GENERATION, OPTION SIFTING AND STAG APPRAISAL

The purpose of this Chapter is to set out the process from the setting of the transport planning objectives through option generation and sifting to the development of proposals for a tram scheme for Edinburgh.

Introduction

4.1 The concept of a network of tram lines in Edinburgh was first outlined within the Integrated Transport Initiative (ITI) developed by CEC to achieve the aims set out in the Local Transport Strategy. Development work on the ITI initially began in the late-199●s, with Scottish Executive 'Approval in Principle' being achieved in 2●●2.

4.2 During this period, Waterfront Edinburgh Limited (a joint venture between CEC and Scottish Enterprise Edinburgh and Lothian) commissioned the Feasibility Study for a North Edinburgh Rapid Transit Solution[46]. This study examined the technical and economic case for a high capacity transit system serving north Edinburgh. At this time the rationale for such a system was the predicted inability of a conventional bus-based system to carry the expected volume of public transport movements between the major development area of North Edinburgh and major employment areas.

North Edinburgh route – Line 1

Development and sifting

4.3 The above mentioned feasibility study was undertaken for Waterfront Edinburgh Limited and was led by a Steering Group that involved the City Council. This study was charged with the task of considering options for public transport to link the Waterfront development sites in North Edinburgh (at Granton and Leith) with the City Centre.

4.4 The objectives of the study were:

- To develop and to establish the economics of a comprehensive public transport solution comecting the Waterfront project site with the City Centre, considering all practicable modes of transport and combinations of modes;
- To recommend a solution and an appropriate procurement route; and
- To develop and outline business case supporting the recommendations

4.5 The study and report were developed in accordance with The Scottish Executive's Guidance for Public Transport Fund bids and the draft STAG. In that context, the study:

[46] Feasibility for a North Edinburgh Rapid Transit Solution, Andersen, Steer Davies Gleave and Mott MacDonald, 2001

- Reviewed the transport and land use policies, aims and objectives for Edinburgh and the wider environs;
- Set out existing problems in North Edinburgh;
- Developed a set of options to address the objectives and problems and undertook outline appraisal of each;
- Consulted with stakeholders (including CEC, local community groups and businesses);
- Define a Preferred option, with more detailed appraisal; and
- Considered the financial, procurement and risk transfer options.

4.6 The feasibility study considered a range of issues, including:

- Technology options – bus based systems, guided bus and rail based rapid transit;
- Alignment and route options – Granton – Haymarket, Granton – St. Andrews Square, the full Northern Loop; and
- Potential demand and revenue – demand and revenue forecasts were made for each of the three route options and for guided bus and light rail transit technologies.

4.7 While only the first draft of STAG was available at this time and was not in official use, the approach adopted complied with STAG's objectives based planning approach, working from problems through to objectives and the development of possible options to achieve these objectives.

4.8 The development and sifting of the options was made in the context of technical, operational, patronage, cost and integration issues and in the ability of the options to satisfy the planning objectives. The study confirmed that a conventional bus based public transport network would not be a feasible medium term option as a way of linking the waterfront development areas to the city and to major employment sites. This finding reflected the forecast level of working age population growth in the area, potential public transport patronage and the impact on current bus operations of a significant increase in bus use on key corridors in central Edinburgh arising from demand for public transport on the part of the concentration of population in the waterfront area.

4.9 The option assessment indicated that a tram solution offered better outcomes than a guided bus system. This was due to a range of factors including tram being able to deliver a step change improvement along its whole route (whereas guided bus would operate as a normal bus for much of its length), institutional difficulties of establishing guided bus concessions and issues surrounding attractiveness to the private sector. Further appraisal indicated that in general, a full loop option offered the highest potential for solving the identified problems, take advantage of the opportunities and address the transport planning objectives.

4.10 This option sifting process resulted in a Preferred Option being identified: it should be noted that in contrast to common current practice, STAG 1 was not used to sift options: this reflects the then status of STAG.

4.11 The Preferred Option was the full Northern Loop using LRT technology. Following

this, a preliminary STAG appraisal of the preferred option was presented as part of the feasibility study. It should be noted that the draft STAG guidance was issued in July 2001, contemporaneously with the feasibility study report. The appraisal contained within the feasibility study was therefore undertaken in accordance with STAG; however, strictly speaking it is not a STAG1 appraisal.

4.12 This appraisal is set out in Appendix A (note that the structure and layout follows the draft STAG guidance and may differ from the full guidance issued in September 2003). The appraisal was accepted by CEC and the Scottish Executive, from whom funding was made available further to develop the scheme.

Subsequent development and consultation

4.13 The preferred option of a tram network was explored further in the "Edinburgh LRT Masterplan Study" commissioned by CEC and undertaken by Arup. This study indicated that a larger tram network could be feasible, within which the priority would be to develop the Northern Loop, which could be followed by lines to the west and the south-east of the city centre.

4.14 This option development process was revisited during 2002 as part of the development of Line 1 to STAG2 level and this broadly confirmed the Preferred Option, subject to potential alignment variants at George Street/Princes Street and Telford Road/former railway solum.

4.15 These options were taken forward to public consultation in order to ensure robust and inclusive decision-making, whilst simultaneously undertaking more detailed technical analysis to inform the more detailed variant level development and sifting process. Following the consultation and further analysis, the Preferred Options were identified as Princes Street and the former railway solum respectively, and a single preferred route alignment was therefore identified. This single option was then carried forward to a detailed STAG2 appraisal; the resultant AST is set out in Appendix A.

West of city route - Line 2

4.16 As with the Northern scheme, which became Line 1, the original concept of a second mass transit route running westward from the city centre was the ITI developed by the CEC. Having established a tram scheme as the Preferred Option to address the needs of the waterfront development area, and with a desire to make public transport use as seamless as possible, it was logical to consider a linked tram scheme to serve the westward route. As discussed below, the option of a bus based scheme was also assessed.

4.17 The refining of a preferred tram network was further undertaken through the LRT Masterplan study undertaken by Arup. This study identified a route that would serve the Corstorphine / Murrayfield and South Gyle / Stenhouse to city centre movements as well as providing other links to the city centre and within West Edinburgh. The study demonstrated that the West Edinburgh corridor should be a priority for investment. It also revisited the available technologies and, like the Line 1 feasibility study, concluded that LRT (or Tram) was the appropriate choice for a city of Edinburgh's size. The Part 1 Appraisal Summary Table (AST) arising from this work

is reproduced in Appendix B.

4.18 By the time that Arup's work was completed, the 'Fastlink' Busway scheme was committed. Accordingly Arup considered whether further investment in tram was worthwhile. They concluded that the tram would generate significant additional performance and reliability benefits and would lead to a significant further modal shift from car to public transport. While not part of this appraisal, Arup also confirmed the potential integration benefits of providing a network of tram routes. They also pointed out that the on-street bus priority measures that are a key feature of Fastlink would remain after conversion of the guideway element to tram.

4.19 In addition to the overall Masterplan Study, Arup prepared a document entitled "West Edinburgh Tram: Prospectus to Scottish Executive" in April 2002. This set out the arguments for building WEBS first and subsequently developing West Edinburgh Tram. This demonstrated that the benefits from tram were significantly greater than those of WEBS, but that the benefits of the latter were sufficient to cover the capital costs within 4 years. Overall Arup concluded that there was a strong case for West Edinburgh tram as the second stage of development of public transport in the corridor. The prospectus was accepted by the Scottish Executive as the basis for offering PTF funding for the further development of the tram scheme.

Detailed assessment of route variants

4.20 Once the case had been made in principle for Line 2, the starting point for the detailed development of Line 2 was to examine and select the Preferred Route Corridor through West Edinburgh. During this phase of the study, over thirty route options were defined and three basic corridors identified as follows:

- North – along the A8;
- Central – a similar corridor to that used for the City of Edinburgh Rapid Transit generally following the heavy rail line from West Edinburgh to the city; and
- South – following the A71 and Western Approach Road.

4.21 Initial route development identified some 30 alignment options, with a very large number of combinations being possible from these. In some stretches of the route (for example from Newbridge to Gogar Roundabout) the options were similar but on slightly different alignments. Between Gogar Roundabout and the city centre there were distinctly different choices to be made between 'corridors' (for example a northerly corridor along the A8, a second 'central' corridor generally following the Edinburgh-Glasgow railway and previously developed CERT corridor, and a third southerly one following in part the A71). It was essential to reduce the options and combinations to a manageable number for onward analysis towards a preferred route.

4.22 All 30 alignment options were appraised using appraisal methods consistent with STAG, with impacts scored using professional judgement. Overall, the intention was to provide a relative comparison between options; the preferred route corridor arising from this work and which was taken forward to public consultation was the central corridor, which broadly follows the alignment of CERT. Some sub-options remained and these were carried forward to public consultation:

- Princes Street/George Street;
- The Roseburn to Carrick Knowe section;
- Gogar Roundabout; and
- Near to the Airport.

4.23 Following the consultation and further analysis, a single preferred route alignment was identified and this was then carried forward to a detailed STAG2 appraisal. The resultant AST is presented in Appendix B.

5. DEVELOPMENT OF EDINBURGH TRAM DURING THE PARLIAMENTARY PROCESS

This Chapter sets out the development of Edinburgh Tram during and following the Parliamentary process for Lines 1 and 2. The key developments set out are those that relate to the proposed phased implementation, recognising current affordability constraints, and the creation of Transport Edinburgh Limited, a new company set up by CEC to oversee the integrated operations of Lothian Buses and Edinburgh Tram.

Project Phasing

5.1 The final STAG reports for Lines 1 and 2 were produced in September 2004 and contained relatively minor updates and revisions from the first version issued in November 2003, with the promoted schemes remaining essentially unchanged.

5.2 During 2005 the key funding and affordability issues were addressed in the context of a fixed SE grant of £375m, a substantial contribution from CEC and the financial risks which will have to be borne by either CEC or SE. The conclusion reached was that although Tram Line 1 only or Tram Line 2 only had a high degree of deliverability within the constraint of a fixed SE grant of £375m, a network of Lines 1 and 2, with or without the Newbridge Shuttle, was unlikely to be affordable in one phase of construction and that a phased approach to procurement and delivery would be implemented.

5.3 Taking a prudent view on capital cost estimates and funding sources, an examination was undertaken by a number of parties — **tie**, CEC, TEL (see below), Lothian Buses, Transdev (the tram operator) — to assess optimum construction phasing. This work was validated by the SE. The parties determined through reasoned argument and professional judgement which phases within the totality of lines 1 and 2 would be the best to proceed with, assuming that Royal Assent was granted for both Bills.

5.4 Consideration has been given to a range of options for first phase network construction and to the pattern of construction of subsequent phases. This work indicates that the line from Newhaven to Edinburgh Airport (phase 1a), via Haymarket and Princes Street, gives the best balance of costs and benefits and presents a high probability of being financially viable when integrated with Lothian Buses services. This first phase of the tram development could be extended to include the section of Line 1 from Roseburn to Granton Square (phase 1b).

5.5 Phase 1a would provide the core support for the city economy and would directly link the major growth centres at the Airport/Gogarburn/West Edinburgh and Leith Waterfront with the city centre. It would provide access to the major housing and commercial developments under construction and planned and would underpin the role of these developments in sustaining the Edinburgh's role as a growing successful capital city.

5.6 The link to Leith will serve two thirds of the waterfront development contained in the

area that runs across the Leith waterfront between Newhaven and the eastern end of the Victoria Dock in Leith. Two thirds of the totality—approaching 20,000 houses plus shops and offices—is within that arc. The tram will serve that area extremely well. Figures have changed during the consideration of the Bill and Forth Ports has made revised proposals for Leith Docks. Under the latest proposals, a community the size of Bathgate will be built in Leith Docks.

5.7 The advantages to CEC in achieving its vision for the city and in securing transport infrastructure stemming from this proposed first phase of the tram are:

- The tram would be a world class gateway to the city for visitors arriving at the Airport, providing access to all modes of transport;
- Direct access to the major shopping destinations of the Gyle, Ocean Terminal and the city centre and to the Royal Bank of Scotland's new international headquarters at Gogarburn;
- Access for existing communities to employment, leisure, shopping and other opportunities;
- The line would link with existing transport hubs at Edinburgh Park, Haymarket and Waverley Railway Stations and at the Bus Station in St Andrew Square to give first class interchange for local and long distance trips;
- The line would serve an expanded 'Park and Ride' at Ingliston increasing the catchment area of the tram and further reducing the demand for car travel in the city;
- The Roseburn Street tram stop would serve Murrayfield and Tynecastle stadia, giving access to international and national sporting and other events;
- This first phase would provide the core infrastructure on which expansion of the network would be built and could include in the future the proposed Line 3 linking the city centre with the new Royal Infirmary and the key development areas in South Edinburgh.

5.8 The development of this core section of Lines 1 and 2, as a first phase, is fully supported by TEL and Transdev, the tram operator.

5.9 The resulting first phase (Phase 1a) represents a good "fit" with the Structure and Local Plans. This is also the case with Phase 1b, which CEC wishes to construct at the same time as Phase 1a. Here the key 'driver' is the need to link the Granton Waterfront with the rest of the network and the rest of the city-region. Granton is linked to the network at Haymarket via the Roseburn corridor, which also serves the new Telford College, the Western General Hospital, Craigleith retail park and other key destinations.

Transport Edinburgh Limited

5.10 It has always been a critical element of the planning for the tram system that the operations of bus and tram (and other modes) should be as fully integrated as possible. Edinburgh is in an almost unique position, in that the main bus operator in the city is majority owned by the public sector. Recognising the unique opportunity this presented, CEC decided to establish Transport Edinburgh Limited ("TEL"), to take on the responsibility for coordinating the services of Lothian Buses and the tram.

5.11 TEL is the single economic entity within which both the tram and Lothian Buses will operate. As a result of the common ownership of both Lothian Buses and the Edinburgh Tram, TEL will ensure complete integration of bus and tram services in a single network, avoiding unnecessary duplication and at the same time maximising passenger benefits through a fully integrated ticketing regime and marketing of the integrated network. TEL will take full advantage of the continuing engagement of Transdev, the tram operator, whose experience of tram and other public transport operation complements the expertise available in Lothian Buses.

5.12 TEL has played a leading role in the work carried out to date in assessing the economic and financial viability of the Phase 1a tram integrated with bus services and is assisting the Joint Revenue Committee contractor to define the parameters and inputs to the patronage and revenue modelling process to inform the optimal tram and bus network. TEL has also been engaging in consultation with third party bus operators.

5.13 TEL is committed to the implementation of integrated ticketing between the tram and Lothian Buses with fare parity between the two systems.

6. CONSULTATION

Participation and consultation is central to the ethos of STAG. A well planned and well executed participation and consultation strategy will lead to better proposals and greater support for their implementation.

Extensive consultation was undertaken during the development of Lines 1 and 2 and this is summarised below. This continued through the Parliamentary process, notably the management of and negotiation with objectors to the Bill. A separate strand during this time and subsequently has been the creation of Community Liaison Groups to inform further development of the scheme.

Objectives and consultation process

6.1 Extensive consultation has been undertaken in respect of the Edinburgh Tram network. **tie** appointed a specialist advisor, Weber Shandwick, to develop and implement an overall strategy for public relations and communications, for both Lines 1 and 2.

6.2 The main objectives of the consultations were to inform stakeholders about the proposals, and to allow stakeholders to express their views on the proposals and therefore contribute to the assessment and preparation of final route designs. The consultation process also aimed to raise awareness and understanding of, and interest in, the proposals amongst stakeholders, and to build support where possible. In addition, the consultation process was intended to enable misconceptions and negative perceptions amongst stakeholders and the wider public to be addressed.

6.3 The consultation process involved three main groups and many methods of consultation. This is summarised in Table 6.1.

TABLE 6.1 CONSULTATION TO DATE

Groups	Methods	Who involved?
Clients	Steering group meetings	**tie**
	Monthly progress meetings	CEC Transport and Planning division
	Small meetings	Scottish Executive
Stakeholder	Letters	Environmental (e.g. Murrayfield Flood Defence)
	Telephone conversations	Statutory
	Meetings	Heritage (e.g. Historic Scotland)
		Transport (e.g. Network Rail)
		Community (e.g. Scottish Rugby Union)
		Business (e.g. Royal Bank of Scotland)
		Public Utility (e.g. British Telecom)
		Emergency services
		Disability
		Technical (e.g. Traffic Interface Group)
Public	Media launch	General public
	Leaflets	
	Website	
	Freefone number	
	Consultation with Political Representatives & Community Organisations	
	Exhibitions	
	Public meetings	

Results of the consultation for Line 1

6.4 The main findings were that 84% supported the concept of the tram in Edinburgh. The key points raised by the Line 1 consultation are summarised below.

Route-alignment concerns:

- Princes Street/George Street – Princes Street was supported by 66% of respondents.
- Telford Road/Former railway solum – Responses from the public within the zone of influence of the route options favoured the former railway solum along the Roseburn corridor. When taking into account all parties, the picture switched in favour of Telford Road, particularly because of cycle groups, who were concerned that there might be an adverse effect on the cycleway if the former railway solum were used for the tram route.
- With regard to proposed stops on Line 1, 83% of the respondents considered them to be well placed and convenient.
- There was concern about existing traffic problems and the plan for road realignment for Lower Granton Road. A desire was expressed to relocate the tram from this section.
- Trinity Crescent and Starbank Road also emerged as sections causing concern about width of carriageway, conflict with traffic and loss of parking.
- On Leith Walk and Constitution Street concerns were expressed about impact of

the tram on bus services and about traffic management generally.

- The use of the Roseburn to Crewe Toll railway corridor was noted as impacting on wildlife, conflicting with cycling, having safety risks (of cyclists beside trams), and impacting on adjoining housing.

Environment-related concerns:

6.5 The following concerns were expressed:

- Noise levels during the day, depending on road traffic flows, and noise from depots.
- Air Quality Management Area (AQMA) could be designated in the city centre due to predicted future exceedences of nitrogen dioxide levels.
- The need for measures to contain contaminated run-off during construction and operation was identified; Sustainable Urban Drainage Systems (SUDS) measures should be considered.
- The presence of a SSSI at Wardie Shaw was noted.
- Appropriate assessment of potential works to seawall at Trinity Crescent required by SNH due to impacts on Firth of Forth SSSI/SPA.
- Roseburn corridor is an important habitat for animals (protected species and scheme impacts are significant).
- Potentially contaminated areas of land identified along the route corridor.
- Greater archaeological sensitivity in the coastal and Forth port areas. Important archaeological areas east of Constitution Street.

Other concerns:

- There was a need to ensure that tram operation will not adversely affect servicing and deliveries to businesses.
- Integrated ticketing should be available for bus and tram travel. Tickets should also be available through shops.
- It was observed that the west side of the loop, Roseburn to Granton would provide a welcome new public transport link which is not available at present;

Results of the consultation for Line 2

6.6 The key points raised by the Line 2 consultation are summarised below.

- 86% supported the **route** of Edinburgh Tram Line Two, while 14% did not support the route.
  - The main reasons given for supporting the Edinburgh Tram Line Two route were: it would provide a vital link to the Airport; Links with existing public transport; it would alleviate congestion in West Edinburgh; it would provide a good link to Gyle Centre, business parks, RBS and Royal Highland Showground; and would benefit the tourist industry.
  - The main objections to the Edinburgh Tram Line Two route were; proximity to residential properties; requirement for Compulsory Purchase Orders (CPOs) in some areas; there was seen to be no need to extend to tram to Newbridge (perception there would be few users in this area). The route does not cover some heavily populated areas where likely tram users reside, for

example Gorgie, Dalry and Corstorphine.

- 86% supported the **proposed stops** on Edinburgh Tram Line Two, whereas 14% had some objections to the stop locations.
  - The main reasons given for supporting the Edinburgh Tram Line Two stops were: they are thought to be well placed; and good balance between accessibility and speed.
  - The main objections to the Edinburgh Tram Line Two stops were: too few stops; and concern over increased parking at stops.

6.7 There were specific points mentioned by stakeholders, which were reported in more detail:

- Network Rail generally approved of the principle of the tram, although it had a few concerns: e.g. the Haymarket depot - access will be restricted from Russell Road and Roseburn Street and affects diesel tanks at Roseburn St.
- Her Majesty's Royal Inspectorate's main concerns included:
  - Bridge construction – at Russell Road and Balgreen Road. Requirement to improve vertical clearances.
  - Gogar Depot – feasibility of locating the main line depot adjacent to the Airport (issues over electromagnetic compatibility, lighting, OHLE and buildings interface with safety flight envelope, ensuring no "credible" risk of collision between aircraft and depot).
  - Tram/road/pedestrian interface – issues over management of vehicle and pedestrian movements, sight lines, safe clearances;
- Historic Scotland/ Edinburgh World Heritage: main concerns were regarding the tram scheme fitting into the streetscape with minimum impact, especially the impact of overhead power infrastructure, cables, fixings and supports. This fed into the development of the Design Manual for the development of the tram.

6.8 In specific areas (Murrayfield, Gogarburn, the Airport Area and Newbridge), locally specific stakeholders were consulted. The results of this are summarised in Table 6.2 below:

TABLE 6.2 STAKEHOLDER CONSULTATION RESULTS FOR LINE 2

Murrayfield	Main points raised
Scottish Rugby Union (SRU)	Tram movements will have impact on crowds during major events at the Murrayfield Stadium, but only about a quarter of an hour before kick off and half an hour after the match. There are 14 major events a year. If the SRU back pitches are required for the Edinburgh Tram Line Two route, any losses in land area would need to be recovered elsewhere. The pitches are liable to flooding. The SRU indicated that flood protection walls would be required if the back pitches were to be used for tram stabling.
CEC Murrayfield Flood Defence	The north option would run over a flood retention area of approximately 300m in length. The tram route would need to be designed to ensure that flood capacity of this retention area is not reduced.
Edinburgh Park Limited / New Edinburgh	Positive view of tram. Feel it is desirable for the tram to run as close to the adjacent road as possible to allow for landscaping to be provided between the tram and Edinburgh Park buildings. The stop location in the middle of Edinburgh Park would be required to be of a high quality architecturally and in keeping with the surroundings.

Murrayfield	Main points raised
Limited	
Scottish Equitable	Positive view of tram. About 50% of their staff currently use public transport to get to work. Scottish Equitable mentioned that their only concern regarding the introduction of a tram system is the physical visual impact.
British Telecom (BT)	Positive view of tram. The main concerns from BT were over the depth of construction and thus the likely impact on buried services, plus the visual impact of the tram on Edinburgh Park.
The Gyle Centre	Very positive views were expressed as the tram stop at the Gyle Centre would facilitate access for both staff and customers. The option which crosses South Gyle Broadway and passes through the Gyle Centre would have an impact on the Gyle car park, as the trams are currently proposed to run across the car park area. The GMC pointed out that the Gyle Centre area is already very congested, and it may be preferable to reconfigure bus movements instead of trying to bring the tram to the current bus interchange.
Gogar Burn	
Royal Bank of Scotland (RBS)	RBS were concerned about some broad-brush route alignment issues and specific issues in relation to the bridge over A8. Further discussions were suggested on a high level between **tie** Board Chair and top bank officials.
Airport Area	
New Ingliston Ltd	Positive view of tram.
BAA - Edinburgh Airport	Approved of tram in principle, but some specific concerns. The proposed tram route running to and from Newbridge via the Airport raises a general concern over the interface between two-way tram movements, pedestrian movement between the Airport and trams and buses. BAA indicated that any tram proposals should be consistent with, and not constrain, their future expansion plans
Royal Highland Showground (RHASS)	The Showground receives 1.2 million visitors each year and the RHASS are keen to see the introduction of the tram scheme to help offset the loss of land and parking facilities (that are required for events) by transporting customers to and from the city centre.
Newbridge	
Edinburgh Gate (development site)	A representative from Edinburgh Gate expressed positive support for the introduction of trams. It was felt that the route via Ratho station could serve the Edinburgh Gate development. It was also suggested that due to space restrictions in certain locations and the fact that the tram would have to run shared on street, a one-way system for the Newbridge loop could be considered.
Impacted Property Report	Residents and businesses that may be affected in some way by the preferred corridor were contacted or visited about the tram route. This research found that resident groups in Baird Drive and Whitson Road registered opposition as the tram would closely affect their properties.

6.9 There was additional 'focused' consultation with the public on areas of the route which had not been fully defined or where additional alignment options or queries had arisen (Russell Road overbridge; Baird Drive; Depot; Gogarburn; and Newbridge). These areas were subsequently subjected to a further round of consultation and engineering scrutiny to ensure that the route taken forward complied with the scheme requirements and objectives.

6.10 The consultation did result in changes to the then proposed routes. The highlights of these are listed below:

- At Ingliston, proposals now terminate the main tram route at the Airport Terminal building, with any service to Newbridge being provided by a shuttle service from Ingliston.
- At Gogar, Option B, which avoids Gogar roundabout and is the most popular option, has been recommended as the final proposal.
- For Roseburn/Carrick Knowe, **tie** is proposing Option B (north of the railway line), in line with the response to the public consultation.
- For the Airport alignment, the preferred route is a principal service terminating at the airport, connecting at Ingliston Park & Ride with a shuttle service to Newbridge.

6.11 There was further technical work undertaken which, together with the consultation outcomes, influenced the Final Route proposals.

Parliamentary Process

Edinburgh Tram (Line 1) Bill (introduced by City of Edinburgh Council)

6.12 The Edinburgh Tram (Line 1) Bill was promoted in the Parliament on 29 January 2004 by CEC. Following its introduction, there was a 60 day period for objections, which ended on 29 March 2004. This resulted in 206 admissible objections.

6.13 The Edinburgh Tram (Line 1) Bill Committee was established and met for the first time on 30 June 2004. The Committee published its Preliminary Stage Report on 16 February 2005, which was debated by the Parliament on 2 March 2005. At the debate of 2 March 2005, Parliament agreed the general principles of the Bill, and that the Bill should proceed as a Private Bill[47]. On 3 March 2005 the Parliament passed a financial resolution on the Bill.

6.14 The Committee then commenced the Consideration Stage of the Bill. This stage involved the consideration of objections and the detail of the Bill[48]. At the start of Consideration Stage, the Committee grouped those objections which, in its opinion, were the same or similar. The result of this process was that of the 192 outstanding objections that remained following the conclusion of Preliminary Stage, 47 groups were subsequently agreed by the Committee.

[47] Private Bill Process Flowchart: http://www.scottish.parliament.uk/business/committees/tram-one-tram-two/papers-04/tram-line-guidance.pdf

[48] Consideration Stage initially a 10 stage process. 1. Objections Grouped; 2. Lead Objectors Identified; 3. Promoter and Lead Objectors submit a list of topics, a witness list, a witness summary and details of any amendments; 4. Committee selects witnesses; 5. Timetable for Evidence Set; 6. Promotor and Lead Objector submit Witness Statement; 7. Witness statements passed to other parties; 8. Revised Witness Statements submitted; 9. Committee Consideration commences; 10. Committee reports

6.15 Following informal discussions between the clerks and objectors, the Committee also agreed the 'lead objectors' for each group, to have responsibility for coordinating that group's provision of evidence. Where an objection was not or could not be grouped, the original objector automatically became the lead objector for that "group". The Committee had to arbitrate between the interests of the promoter and the interests of each of the remaining objectors and report on each outstanding objection[49].

6.16 The Consideration Stage Report was published on 1 March 2006, and in this report, the Committee gave its decision as to whether to uphold or dismiss each objection. Several objections were withdrawn before and during this first phase of Consideration Stage, as a result of negotiations between the promoter and objectors.

6.17 After the Committee had commenced Consideration Stage, it received a request from the promoter for it to consider a proposal to change the alignment of the tram route at two points – in the Haymarket Yards area and the Ocean Terminal area – which would take it outwith the limits of deviation. The Committee agreed that both these proposals merited consideration, meaning that it had to be made aware of any relevant arguments and objections in relation to each altered route. The promoter advertised the proposed route changes, notified affected parties and produced revised and supplementary accompanying documents explaining what the proposed amendments would involve. A new objection period was established and 5 objections were received.

6.18 During the course of the Consideration Stage, these objections were withdrawn and accordingly the Committee agreed in its Consideration Stage Report published on 1 March 2006 that these proposed route changes should be made to the Bill

6.19 At Final Phase, there was a final consideration of the Private Bill and a decision whether to pass or reject it was taken at a meeting of the whole Parliament. The Bill was passed following the Final Phase debate held on 29 March 2006.

6.20 The Bill received Royal Assent on 8th May 2006.

Edinburgh Tram (Line Two) Bill (introduced by City of Edinburgh Council)

6.21 The Edinburgh Tram (Line Two) Bill was promoted in the Parliament on 29 January 2004 by CEC. Following its introduction, there was a 60 day period for objections ended on 29 March 2004. This resulted in 85 admissible objections.

6.22 The Edinburgh Tram (Line 2) Bill Committee was established and met for the first time on 29 June 2004. The Committee published its Preliminary Stage Report on 9 February 2005, which was debated by the Parliament on 23 February 2005. At this debate of the 23 February 2005, Parliament agreed the general principles of the Bill,

[49] The Committee held meetings in the Scottish Parliament on 21 and 27 June, 5, 13, 19, 27, 28 September, 3 and 25 October, 7, 8, 14 and 29 November and 5 December 2005, at which it took oral evidence from the promoter, objectors and their witnesses. The Committee also took oral evidence at joint meetings with the Edinburgh Tram (Line 2) Bill Committee on 14 June and 1 November 2005. These meetings were limited to consideration of objections identical to both Bills

and that the Bill should proceed as a Private Bill.

6.23 The Committee then commenced the Consideration Stage of the Bill. At the start of Consideration Stage, the Committee grouped those objections which, in its opinion, were the same or similar. The result of this process was that of the 77 outstanding objections that remained following the conclusion of Preliminary Stage, 57 groups were subsequently formed by the Committee. The Committee also agreed "lead objectors" for each group, to have responsibility for coordinating that group's provision of evidence.

6.24 Several objections were withdrawn before and during this first phase of Consideration Stage, as a result of negotiations between the promoter and objectors.

6.25 After the Committee had commenced Consideration Stage, it received a request from the promoter for it to consider a proposal to change the alignment of the tram route at two points - in the Haymarket Yards area and the Gyle area - which would take it outwith the limits of deviation. Such changes, if agreed by the Committee, would necessitate amendments to the Bill.

6.26 A new objection period was established and seven objections were received. The Committee subsequently agreed that the notification carried out by the promoter and the revised documents it produced were adequate, and that all the new objections should progress to Consideration Stage.

6.27 All of the objections in respect of the amendment at the Gyle were subsequently withdrawn and although not all of the objections in relation to the route change at Haymarket were withdrawn, the Committee agreed in its Consideration Stage Report published on 21 December 2005 that the route be amended as sought.

6.28 The Committee noticed that the essence of many objections to Line 2 related to the compulsory acquisition of the objectors' land and rights in land, and the adverse local environmental impacts that objectors consider they will suffer. Having regard to all of the evidence, the Committee was satisfied that the benefits of the scheme outweighed the disbenefits and that an appropriate balance has been struck between the rights of those adversely affected by the scheme and its benefits to the wider community.

6.29 On 3 March 2005 the Parliament passed a financial resolution on the Bill. The Consideration Stage Report was published on 21 December 2005 and the Bill was passed following the Final Phase debate held on 22 March 2006.

6.30 The Bill received Royal Assent on 27 April 2006.

Objection Management

6.31 Not all objections were resolved during the parliamentary process. **tie** made extensive efforts to negotiate with objectors to try and reach agreement. As a result of these negotiations many objections were withdrawn. **tie** sent the objector a letter in comfort giving assurances to that individual/business that what had been agreed in the negotiation process would be put in place. Where negotiation was unsuccessful and **tie** and the objector reached a point where there was no further discussion, **tie** issued a