

Edinburgh Tram Project

The City of Edinburgh Council

30 June 2011

1 Purpose of report

- 1.1 This report sets out options for the future of the Edinburgh Tram project. The report makes recommendations about the governance, financing and programming of the project and proposes a revised scope and timetable for the first phase of line 1a. Subject to funding approval, this could be completed from Edinburgh Airport to St. Andrew Square/York Place by 2013 with revenue services beginning from the spring of 2014. The costs of completing the project to St. Andrew Square/York Place are compared with the other options available to the Council, within the constraints of the contract between tie Ltd and the infrastructure contractor – Bilfinger Berger Civil (UK), Siemens plc and CAF – (BSC).

2 Summary

- 2.1 The strategic rationale and business case for the tram project has been subject to further external review and validation. The costs of terminating the project, or continuing under the terms of the existing contract, have also been examined in detail. Neither option is likely to be materially less expensive than completing the first phase of Line 1a. Accordingly, it is recommended that the Council should pursue the completion of the first phase of Line 1a to St. Andrew Square/York Place, subject to identification and confirmation of funding. A diagram of the route is shown in appendix 1.
- 2.2 It has been the intention throughout this process to be open and transparent, but in light of the continuing negotiations, and the commercial sensitivity of the financial information, all the figures cannot be made public at this stage. Arrangements have been made to brief all members and share this information on a confidential basis until final legal settlement is reached.

Contribution to Outcomes

- 2.3 The Edinburgh Tram project will contribute to several of the National Outcomes in the Council's Single Outcome Agreement with the Scottish Government. It will make Edinburgh a more attractive place in which to do business; contribute to sustainable place making; help protect and enhance the city's built and natural environment; reduce the local and global impact of the city's consumption and production; contribute to the lowering the carbon impact of

travel; and provide a public transport option that need not be dependent on fossil fuels. It is clear from recent economic impact studies, and experience elsewhere, that the Tram Project will act as a major catalyst for economic development along the length of the route, particularly in West Edinburgh.

3 Main report

- 3.1 Edinburgh is a growing city, with a population of around 486,600, forecast to rise to 543,325 by 2030. The city is an economic success story. Edinburgh has 15,735 private enterprises and supports over 315,000 private sector jobs. The city's role as an economic driver and employment hub attracts over 100,000 daily inbound commuters. Edinburgh's rail stations handle 22.9m passengers every year, with Waverley (19.3m) and Haymarket (1.8m) accounting for most of these.
- 3.2 Glasgow benefits from around 49.5m rail passenger journeys per annum on the Strathclyde Partnership for Transport network (SPT), plus a further 6m on its subway system. However, Edinburgh has had a smaller level of historic investment in heavy rail. The tram will help to address Edinburgh's infrastructure deficit and facilitate the city's economic growth.
- 3.3 The Scottish Government is currently supporting a programme of railway improvements across Scotland's Central Belt, including 350 km of rail electrification and over 20 complex rail projects. By 2016, the aim is to have 13 trains per hour running between Glasgow and Edinburgh with journey times reduced to 37 minutes on the fastest services.
- 3.4 The completion of the planned rail/tram interchange at Gogar (Edinburgh Gateway) will be pivotal to the success of the current Edinburgh-Glasgow Improvement Programme. Edinburgh Gateway will link passengers from the Fife line and North East Scotland to the airport within 5 minutes and, following completion of the Dalmeny Chord, will also link travellers from the Central Belt and Glasgow to the Airport.
- 3.5 Edinburgh Gateway will enhance rail/air transport integration and reduce the need for journeys by private car to the airport. It will also improve commuting options into the city, by serving the major employment centres at the Gyle, Edinburgh Park and RBS Gogarburn.
- 3.6 As Edinburgh has grown, the city's demand for public transport has increased. Annual passenger numbers at Waverley Station have risen from 14.2m in 2004/05 to the current level of 19.3m. A further increase of 40% is forecast by 2020.
- 3.7 In addition to commuter traffic, Edinburgh is the second most frequently visited UK city by overseas tourists. The city generated 3.52m visits from UK and overseas visitors in 2009/10, 23.5% of the Scottish total. Air passenger numbers at Edinburgh Airport were around 9m in 2010 and are forecast to rise to almost 13m by 2020.
- 3.8 As pressures on the city's transport network grow it is clear that low-carbon, rapid mass transit solutions will be required. The vast majority of European

capitals have tram, light rail or underground systems. Edinburgh, Valletta (Malta) and Belfast are amongst the few exceptions.

- 3.9 Trams provide a fast, quiet, safe and reliable system of public transport, with no pollution emissions at the point of use. Daily car/private vehicle trips in Edinburgh are forecast to rise from around 160,000 at present to 180,000 vehicles by 2016, adding to congestion and air quality concerns.
- 3.10 Experience of tram usage in other cities has shown that a notable percentage of new patronage occurs as a result of modal shift from cars and other private vehicles. This will be an important consideration for Line 1a, with modal shift from cars using the Ingliston Park and Ride facility forecast to take a significant volume of cars off the city's road network daily.
- 3.11 Edinburgh has an excellent bus network. Lothian Buses has a fleet of over 600 buses with an average age of 4.9 years and carried 109m passengers in 2010. The integration of bus and tram services in Edinburgh will provide the opportunity for seamless connections across the key modes of public transport in the city.
- 3.12 Trams are popular in other European cities, from long established systems such as Vienna which carries over 200m passengers each year, to modern systems such as the Manchester Metrolink which has recently expanded from 32 to 80 trams vehicles. In Dublin, a 2010 residents' survey showed an overwhelming 98% level of public support for and satisfaction with their tram network – known as LUAS.
- 3.13 There is clear evidence to support the view that rail based transport systems enhance the value of adjacent properties.
- 3.14 A review of evidence by AECOM in 2011 identified four general rules relating to the relationship between rail-based transport systems and property values:
 - Rail-based transport systems can positively affect property values;
 - Properties within walking distance of stations experience the largest uplift in value;
 - Property value uplifts increase as transport systems mature; and,
 - Properties in densely-populated areas experience the largest uplift in value.
- 3.15 Research into the impact of light rail upon property values in various European cities, by Buck Consultants International, identified further positive relationships:
 - Light rail has the greatest impact upon the property values of lower-priced residential properties.
 - The greatest rises in the property values of commercial properties were found in peripheral areas with no alternative public transport.

- 3.16 In addition to improving accessibility, rail-based transport systems can indirectly impact on property values by enhancing the image of areas and making them more attractive locations.
- 3.17 The findings of a number of studies into the relationship between rail-based transport stations and property values are summarised below:
- The value of residential properties along the DART light rail line in Dallas, USA increased by an average of 32.1% between 1994 and 1998, while the value of commercial properties increased by an average of 24.7%.
 - The value of residential properties in the catchment areas of the Naples Metro system in Italy increased by an average of 37.8% between 2001 and 2005. The value of commercial properties rose by an average of 57.7%, while the value of retail properties rose by an average of 31.1%.
 - Property values along the Hiawatha light rail line in Minneapolis in the United States increased by an average of 83% between 2000 and 2004, compared to 61% for the city as a whole.
 - The value of properties within 500 to 2,000 metres of a LUAS light rail system station in Dublin in Ireland is on average between 7% and 17% higher than properties in other areas. The value of properties close to stations rose by an average of 54% between 2002 and 2005.
 - The value of residential properties located close to commuter rail stations in the Netherlands is on average 25% higher than the value of properties located 15 kilometres or more from a station.
- 3.18 The environmental case for trams is also important. Trams carry around 3 times as many passengers as buses and, according to DEFRA, have around one third the greenhouse gas emissions, per passenger, of cars. Scotland has set the most ambitious carbon reduction commitments anywhere in the world – 42% by 2020. As part of a wider programme of sustainable transport, trams can help Edinburgh reduce its carbon emissions.
- 3.19 Trams can also help unlock economic regeneration. Economic Infrastructure drives competitiveness and supports growth by increasing productivity, reducing business costs, diversifying means of production and creating jobs. Dublin's experience was of a 25% increase in footfall around Grafton Street and a 15% increase in city centre retail spend. The key development zones in the West Edinburgh corridor will be reliant upon tram line 1a to unlock new investment and create jobs to fill a growing employment gap in the city.
- 3.20 West Edinburgh is home to some of Scotland's most productive businesses and supports over 43,000 jobs, including major employers such as BT, Diageo, Aegon, JP Morgan, HSBC, the Miller Group, Logica, Astra Zeneca and RBS. Economic analysis undertaken by Biggar Economics indicates that West Edinburgh has the potential to create an additional £4.4bn in Gross Value Added (GVA) for Scotland's economy by 2030 and 3,600 new jobs. Early investment in enabling infrastructure, including the tram, will be critical to unlocking the investment potential of West Edinburgh and the associated

development benefits. Tram line 1a can also help to bring forward the development of the southern end of Edinburgh Park, as well as protecting around 1,400 full time jobs in businesses in Edinburgh Park with lease expiry dates occurring over the next eight years.

- 3.21 The development of the Tram network will be complemented by other sustainable transport measures including the expansion of park and ride sites; the promotion of active transport (walking and cycling); moves towards low emission and electric vehicles; and the use of intelligent transport management systems to aid personalised journey planning. Without such measures, the city will experience serious congestion difficulties as it grows. Trams, developed as part of a broader sustainable transport policy, can therefore provide major benefits to Edinburgh from an economic, social and environmental viewpoint, whilst enhancing the city's image, reputation and quality of life.

Contractual Issues

- 3.22 The award of preferred bidder status for the main infrastructure contract for the Edinburgh Tram network was made, in June 2007, to Bilfinger Berger Civil (UK) and Siemens plc. A period of almost 12 months elapsed between preferred bidder stage and financial close. During this period, there were significant negotiations about commercial matters including the management of risks arising from incomplete design work.
- 3.23 Utility diversions also remained incomplete at financial close, presenting additional risk. In the spring of 2008, tie Ltd agreed that responsibility for completion of design work should be novated to Bilfinger Berger Civil (UK) and Siemens plc (BBS).
- 3.24 The Spanish manufacturer of the tram vehicles – CAF – also had its contract with tie Ltd novated to BBS at this time, with the result that tie Ltd subsequently entered into one major contract for all infrastructure related construction, with BSC.
- 3.25 The Council gave its formal approval for the Edinburgh Tram Project on 13 May 2008. BSC immediately commenced the mobilisation of sub-contractors to begin the infrastructure construction programme. Claim related disputes were evident from an early stage, testing the respective parties' understanding of the terms of the contract. Difficulties were exacerbated by delays with utility diversion works; slow progress in clearing design related activities; and problems with sub-ground conditions during utility diversion works.
- 3.26 These problems culminated in a stand off between the parties with regard to infrastructure works on Princes Street; this was resolved, following difficult negotiations, by an agreement for work to be done on the basis of tie Ltd meeting demonstrable costs for the works.
- 3.27 The current status of the project is that cumulative expenditure of £461m had been incurred as of 21st May 2011. The key expenditure headings and project deliverables are as follows:

Areas of Expenditure	£
Infrastructure	198,226,898
Tram Vehicles	47,899,805
Utilities	70,425,728
Land	4,807,286
Project management	79,577,755
Other resources	24,784,593
Design	33,057,471
Traffic management	2,655,447
Total	461,434,982

3.28 From early 2009, tie Ltd began to test key principles within the contract by referring claims to adjudication using the agreed dispute resolution process. Subject matter experts in areas of construction law and civil engineering adjudicated on individual disputes. Whilst this process enabled tie Ltd to achieve a reduction on some claims originally submitted by BSC, it became clear that resolving disputes through external adjudication would not be easy or straightforward.

3.29 During 2010, tie Ltd pursued a twin track approach of asserting its legal position through the contract, whilst progressing discussions aimed at securing a guaranteed price for project completion. The failure to achieve a successful resolution through either approach led, ultimately, to the Council's emergency motion of 18 November 2010, which instructed the Council's Chief Executive to initiate mediation talks amongst the parties to the contract.

3.30 Mediation talks were held from 8-12 March 2011 at Mar Hall Hotel, Renfrewshire, and the terms of a framework, timetable and process for commercial settlement of the disputes and differences between the parties were agreed in outline. If the settlement fails due to lack of funding the existing contract will automatically terminate.

Option Appraisal

3.31 There appear to be three main options available to the Council and tie Ltd at this stage. These are:

- (i) to continue to attempt to secure the completion of the project under the existing contract;
- (ii) to separate from the current contract and pursue matters either through the courts or by agreeing a commercial settlement with BSC, outside of the courts (this option would require decisions to be made subsequently)

about whether the project should be cancelled entirely or re-procured, either immediately, or at some point in the future); or,

- (iii) to complete the project as far as St. Andrew Square/York Place on the basis of the terms outlined during the mediation talks, with a sub-option to complete only to Haymarket at this stage.

Option (i): Status Quo

3.32 The option to persevere with the existing contract and continue to completion is likely to be fraught with practical difficulties including the prolongation of claims disputes and change related issues. The main risks would include:

- a lack of certainty on timescales for completion and eventual cost;
- the possibility that tie Ltd could lose key points of contractual principle through the dispute resolution process;
- extra expenditure on project management and legal costs, which could otherwise be avoided; and,
- a prolonged period of disruption and uncertainty for the city, with no guarantee of a positive outcome.

3.33 The costs of this type of attrition are difficult to estimate. Experience suggests that there would be a high likelihood of continuing contractual disputes and extension of time claims, if this route were to be taken. The Council has worked with McGrigors to assess the key costs likely to be incurred and information on this is included in the confidential appendix.

Option (ii): Separation

3.34 The option to separate from the current contract, either by mutual agreement and settlement of costs, or by unilateral termination of the contract on specific grounds provides no guarantee that there will ever be a return for the sunk investment of £461m incurred to date.

3.35 However, the potential benefits of a **mutually agreed** separation are:

- the likelihood that a final cost could be agreed to settle with the BSC; and,
- the ability either to re-procure immediately, to mothball and re-procure at a later stage, or to cancel the project entirely, reinstating land and removing redundant structures, where required.

3.36 Whilst this option could provide certainty in the short term and would offer future flexibility, the costs of settlement would produce no value for the city and in the event that the project were cancelled there could be no certainty that a fresh procurement exercise would proceed. Separation by unilateral termination of the contract by tie Ltd could lead to a protracted legal dispute that could be very costly and with no clear outcome, creating uncertainty for Council finances and unquantifiable contingent liabilities. In the case of project

termination liabilities will have a direct impact on the Council's revenue budget and could not be supported by borrowing or alternative methods of private finance.

- 3.37 tie Ltd asked McGrigors, legal advisors during the mediation, to assess the costs of separation, taking account of advice prepared for tie Ltd by Cyril Sweett. This assessment has been externally checked and validated by construction, project and cost management consultants, Faithful and Gould. Information on these costs are included in the confidential appendix.

Option (iii): Progress to St. Andrew Square (York Place)

- 3.38 The completion of the first phase of line 1a from the Airport to St. Andrew Square/York Place is the only option that will, with a strong degree of certainty, produce a tram line for Edinburgh, as the first building block of a future network.
- 3.39 Under this option all existing claims would be settled by means of a settlement agreement. This agreement would also seek to amend the terms of the existing contract in order to reduce its scope and re-adjust the risk profile. Its terms are being carefully negotiated with the assistance of Ashurst; London based legal specialists on tram and light rail projects. A summary of the proposed terms and current state of negotiations is contained in the confidential appendix.
- 3.40 Whilst negotiations (both between the Council and Infracore and also within Infracore itself) are not yet complete the intended commercial position has been set. If the Council is minded to proceed with this option the proposal is for the settlement agreement, once finalised, to be entered into subject to funding. To facilitate this it may be necessary to extend the timescales for MoV4, referred to in the May Council report, which deals with priority works at key locations, to give time for the negotiations to be finalised.
- 3.41 The costs for the Airport to Haymarket section are now established, following the completion of the 'off street' design, and have been incorporated into the calculation of a lump sum price for this section, as agreed during mediation talks.
- 3.42 The costs for the incomplete sections between Haymarket and St. Andrew Square have been identified and an 'on-street' contract price agreed, plus a substantial risk allowance to cover variable elements, such as utilities and ground conditions. This is based upon a worst case scenario informed by the previous experience of sub ground conditions, in Princes Street. This element of the price is variable and a proposed pricing mechanism has been defined. Details of this are in the confidential appendix, but total costs are estimated as between £725m and £773m, dependent on the risk allowance.
- 3.43 Work is underway to map potential utility and other sub-ground obstructions in the Haymarket to York Place section and prepare appropriate design solutions; this process will increase price certainty, and reduce the size of the required risk allowance prior to contractual close.
- 3.44 The benefits of option (iii) include:

- the completion of a working tram line connecting the Airport to the city centre and the realisation of the £461m investment already made in the project;
- the potential for major improvements in public transport access to West Edinburgh via the Edinburgh Gateway inter-modal station at Gogar;
- a significant reduction in car journeys into Edinburgh and a consequential reduction in carbon emissions, relative to what would otherwise be likely to happen;
- the protection of around 500 jobs directly associated with the Tram construction and further minimum 147 jobs from Tram operations and the ability to unlock major investment and development in West Edinburgh with the potential to create 3,600 jobs and contribute up to £4.4B in Gross Value Added (GVA) to the Scottish economy by 2030;
- the opportunity to provide a modern, green, efficient transport connection from Scotland's principal tourism gateway – Edinburgh Airport - into the heart of Scotland's capital city on a basis comparable to other top ranking European cities which are competing with Edinburgh for investment, trade and tourism revenue;
- the opportunity to have the first trams running on the test track near the depot before the end of 2011 and a full open for revenue service by 2014.

3.45 The main risks of this option are:

- the opportunity cost for the public purse of the extra capital that the Council will need to source and commit to complete to St. Andrew Square/York Place (although costs will also be incurred for attrition or separation of a similar amount);
- the possibility, post mediation, that the infrastructure contractor could fail to deliver: although this risk exists in every infrastructure project;
- the risk that the disruption to the city during the 'on-street works' between Haymarket and St. Andrew Square/York Place would further alienate business and public opinion.

Option (iii): Sub Option Progress to Haymarket only

3.46 In addition, a sub-option to complete Line 1a only as far as Haymarket has been examined. This service, whilst costing less in capital terms to complete, (estimated costs of £700m) would be loss making and would require a substantial subsidy year-on-year going forward. It would also fail to deliver a tram into the city centre, compromise tram/bus integration in the city and would not provide the same scale of tram/rail integration to the national rail network.

3.47 In conclusion, the option to complete the project to St. Andrew Square is believed to yield the best prospect of a return on investment, relative to the

original aims of the project. The cost of this option exceeds the available budget. Contingency plans have been drawn up to finance a portion of the necessary funding. Not all of this contingency would be available for the option to Haymarket. However, in both cases the Council will need additional help to bridge the gap, either from the Scottish Government, or from other external sources.

Funding Proposals

- 3.48 As evidenced in the appraisal of the main options, there is no option that will avoid the need for additional expenditure on the tram project. The legal position is such that significant additional funds will be required to be paid out, either in the event of separation followed by cancellation, separation followed by re-procurement or by continuing with the existing contract.
- 3.49 The Council's original commitment to the project was for £45m. This was to be funded, primarily, through a mix of developer's contributions and capital receipts. The current position with regard to the original funding commitment is highlighted in the table below;

CEC Contribution Breakdown	Planned Contribution	Achieved Contribution
	£m	£m
Council Cash	2.5	2.5
Council Land	6.2	6.2
Developer Contributions – Cash	26.6	6.9
Capital Receipts (Development Gains)	2.8	0.0
Capital Receipts	6.9	2.0
Total	45.0	17.6

- 3.50 Certain contributions were anticipated from the section of the route to the north and east of York Place. Although development projections have changed, the total developer contributions anticipated over the life of the project remain achievable. Council has previously determined to fund interim shortfalls through prudential borrowing and this issue can now be closed out on the basis that forthcoming contributions will be used to offset borrowing costs, wherever possible.
- 3.51 The capital costs for the completion of the project, under the Settlement Agreement, have now been established. Included within these costs is an element of sunk investment for developing revenue services beyond St. Andrew Square.
- 3.52 It has previously been reported to Council that contingency planning had been undertaken to identify further finance for the project up to £600m. The additional increase in project cost will require the Council to secure funding beyond the previous contingency planning arrangements: from surpluses in the business plan and headroom in the Council's Long Term Financial Plan. There

would be no surpluses under the Haymarket sub-option and the headroom would be needed to part fund the required subsidy.

- 3.53 Council officers have reviewed options for securing additional funding for the project. The main funding routes available to the Council are:
- the use of prudential borrowing funded from surpluses on operations and financial headroom in loan charges in the Council's Long Term Financial Plan;
 - additional grant funding from the Scottish Government/Transport Scotland; and,
 - Alternative private funding sources: although this would be almost certainly be more expensive than public funding and would not necessarily deliver the integrated public transport solution that is fundamental to the business case.
- 3.54 Future capital allocations from the Scottish Government are, at this stage, uncertain and may not be known in advance of the September spending review. This review will determine Council specific allocations to be made in December 2011.
- 3.55 In any event, the allocation of additional funding for the tram would incur 'opportunity costs' for the Council which will become more significant as funding requirements increase.
- 3.56 Given the current decision making timetable, further engagement will be needed with the Scottish Government before a funding package for the project can be concluded. As part of this process it has been agreed to further investigate all funding options and it is proposed to carry this work out in consultation with Transport Scotland and the Scottish Futures Trust. The Scottish Government's current position is that they remain committed to a grant of up to £500m. Once clarity on funding is established, the proposed solution will be brought back to Council.

Business Case

- 3.57 Some of the underlying assumptions behind the business case for tram line 1a have changed since the project was first conceived. Following the Council's approval of the project in May 2008, the collapse of global financial markets, precipitated by inflated asset prices, based on easy access to credit, has created a situation in which assumptions about the pace of development of Edinburgh's Waterfront require to be reviewed. Land values on the Waterfront have fallen by up to 80% since 2007 and prospects for recovery in the short term are poor. The number of new housing starts in the city fell from 2,529 per year in 2006/07 to 1,557 in 2009/10¹. Whilst the underlying demand for housing, on the back of continuing population growth, remains strong, the

¹ New housing starts for 2006/07 (2nd quarter 2006 to 1st quarter 2007) was 2,529. New housing starts for 2009/10 (2nd quarter 2009 to 1st quarter 2010) was 1,557. **source:** Housing Statistics for Scotland - all sector new build (Scottish Government): <http://www.scotland.gov.uk/Topics/Statistics/Browse/Housing-Regeneration/HSfS/NewBuildAllSector>. Data on private and local authority new building are provided by quarterly returns from councils (NB1 and NB2) and data on new housing provided by housing associations are drawn by the Scottish Government from data on the administration of housing support grants.

supply side is expected to be constrained for the next few years due to continuing liquidity constraints as banks repair their capital reserves.

- 3.58 A significant part of the business case for tram line 1a was based upon the forecast population growth from new communities on Edinburgh's Waterfront. It is clear that this growth is likely to be slower than forecast. As a result, it is appropriate that the business case for line 1a should be thoroughly and independently reviewed.
- 3.59 Council officers instructed the consulting firm, Atkins, to review the tram business case to test the impact on operating revenue forecasts arising from the need to deliver line 1a in incremental phases, with a first phase to St. Andrew Square/York Place. The project costs and patronage forecasts have also been reviewed for a subsidiary option from the Airport to Haymarket. Estimates have also been prepared for passenger revenues and the extra capital construction costs for tram service options terminating at the foot of Leith Walk, or at Ocean Terminal or Newhaven.

Location	Section Length	Cumulative Length
Airport to Haymarket	11.26km	11.26m
Airport to St Andrew Square	2.14km	13.40km
Airport to Foot of the Walk	2.40km	15.79km
Airport to Newhaven	2.69km	18.48km

- 3.60 Atkins reviewed the modelling tools used in the original business case to test their fitness for purpose. They have also tested the key assumptions made in the business case, as refreshed in 2010, and looked at the outputs from the modelling work undertaken on passenger number forecasts, and the associated benefits across the wider road user network. Members will recall that independent consultants, senior staff at Lothian Buses and Council Officers were all involved in the production of this refreshed business case. Lothian Buses senior staff remain supportive of the option to build to St. Andrew Square/York Place, but have expressed concerns about the operation of a subsidised route finishing at Haymarket.
- 3.61 All costs were expressed on a basis comparable to the original business case, and take account of the impact of inflation. The headline conclusions are that:
- building tram line 1a from the Airport to Haymarket would deliver a line with an annual operating loss initially of £4m, getting no better than a £3.1m annual loss over the life of the project, requiring ongoing subsidy and therefore providing no capacity to contribute to the capital shortfall;
 - completing tram line 1a from the Airport to St. Andrew Square/York Place would deliver a line which can make a positive contribution (on average £2m annually after the initial ramp up period) to the combined tram and bus business. Both Department of Transport and Transport Scotland recommend discarding sunk investment costs when assessing

Benefit Cost Ratios (BCR) for infrastructure projects. On this basis the BCR to St. Andrew Square/York Place is **2.2:1**;

- the additional capital cost of completing tram infrastructure to the foot of Leith Walk is currently estimated at £100m and, to Newhaven, £160m, based on a bill of quantities priced against a schedule of rates and a risk allowance of 100%. Please note that these figures differ to the capital figures in the Atkins Summary, Appendix 3, as additional allowance has been made for risk. Intrusive studies would be required to achieve a more precise estimate. By way of comparison the recent 4km extension to the LUAS in Dublin cost €150m. Any decision on further investment beyond St. Andrew Square/York Place ought to be based on a new business case and market conditions at the time.

3.62 Each of these incremental stage options would drive increases in tram patronage, strengthening fare box revenues and operational profitability.

3.63 However, it is likely to be several years before a case could realistically be made to extend tram line 1a beyond St. Andrew Square/York Place and it would, therefore, be prudent to prepare a fresh business case for each incremental phase of line 1a that might be considered in future years. Given, also, the need to build public confidence in the project, and the likely timescale to extend the line, it may also be prudent to explore other ways of funding these sections of the route. It would also be necessary to establish a detailed risk management plan for any works east of York Place, in light of previous on-street experience.

Princes Street Remedial Works

3.64 As reported to Council on 16 May, a specific outcome of the mediation process was an agreement by the infrastructure contractor to carry out, at its expense, a rectification plan to repair the deficient sections of Princes Street, as explained in the May 2011 Council Report.

3.65 It was initially proposed that this work would commence in July 2011, subject to consultation with the city centre business community and other stakeholders.

3.66 As a result of feedback received in the course of stakeholder consultation, and discussions with political Group Leaders, a decision was taken to postpone the start of the remedial work on Princes Street until September, immediately following the conclusion of Edinburgh's summer festivals.

3.67 The infrastructure contractor has written to the Council asserting its right to commence the work in September to remediate defective areas that represent a potential safety risk. In the meantime, temporary patch repairs will continue to be carried out, where required.

3.68 The revised programme for Princes Street will see remedial works take place from September until the end of November 2011, starting again in early January 2012 until the summer. The infrastructure contractor has indicated that if the work were to be postponed further it would impact the overall completion date and give rise to potential claims for prolongation of work. It is important that it is understood that the Infrastructure contractor has a right of

access to Princes Street, under the terms of the contract, to carry out the above works, irrespective of a decision on any of the options noted in this report.

- 3.69 Further details of the proposed Princes Street programme will be communicated to elected members once the detailed work programme has been agreed. Close consultation will be maintained with city centre stakeholders about necessary mitigation actions to ensure that access routes and deliveries to shops, offices, hotels and restaurants can be maintained and the public can be kept fully informed about how to move around the city centre during the works.
- 3.70 A detailed plan will also be drawn up for the Winter Festivals period when the infrastructure contractor will move off site leaving Princes Street as a pedestrianised area throughout December.
- 3.71 There are no plans to provide compensation for businesses affected by tram construction works. Businesses directly affected by a fall in property values may be able to seek temporary rates relief, and Council Officers have brought this matter to the attention of the Rates Assessor. Every effort will be made to promote the message that Edinburgh remains 'open for business'.

Picardy Place to Newhaven Reinstatement Work

- 3.72 One consequence of building Line 1a in phases, with the first phase terminating at St. Andrew Square/York Place, is that temporary road and pavement reinstatement works, carried out in the section of Line 1a from Picardy Place to Newhaven, notably in areas such as Constitution Street, Leith will need to be properly rectified. The temporary repairs were only designed to last for the duration of the Traffic Regulation Orders, put in place for the tram works.
- 3.73 The delayed completion of tram infrastructure in this section of Line 1a, means that work will need to be done to repair temporary reinstatements, and address specific defects and drainage repairs arising from the Multi-Utilities Diversion Framework Agreement (MUDFA) works, as well as removing and replacing temporary traffic management measures, including traffic signals.
- 3.74 This work will need to be funded primarily by re-prioritising the Capital Roads Maintenance Programme.
- 3.75 The total cost of reinstatement and repair works in the Picardy Place – Newhaven section is estimated to be between £2.3m - £3.4m, subject to decisions on the scope of works and proposed finishes.
- 3.76 The proposals for dealing with repair and reinstatement works for the Leith Walk section will be reported to the Council's Transport Infrastructure and Environment Committee later this summer.

Edinburgh Gateway Station

- 3.77 The completion of Edinburgh Gateway Intermodal Station will be critical to the successful future integration of train and tram services, in particular, for travellers using Edinburgh Airport and commuters to places of employment in West Edinburgh.

- 3.78 The proposed Edinburgh Gateway Station will facilitate the interchange of passengers from the central Scotland and Fife and North East Scotland (including Perth, Dundee and Aberdeen) rail networks to the tram, and onward to destinations across Edinburgh. Edinburgh Gateway is a Network Rail Scotland project funded by Transport Scotland, on behalf of the Scottish Government, and will be project managed by Network Rail Scotland, the ultimate client.
- 3.79 It had been intended that the completion of Edinburgh Gateway would be synchronised with the tram infrastructure programme. However, the current intention of Transport Scotland is to commence work on the station once the tram infrastructure at Gogar has been completed. This approach will ensure that interface risks which may have arisen from two, simultaneous construction projects can be avoided.
- 3.80 The current expectation is that the Edinburgh gateway project will go out to competitive tender via the Official Journal of the European Union (OJEU) in 2012.

Future Governance Arrangements

- 3.81 In light of the difficulties experienced in managing the delivery of the tram project through tie Ltd, as an arms length, Council-owned company, it is proposed that the governance arrangements for the management of the tram project should be revised.
- 3.82 The proposed changes respond to the findings of the interim report on the Edinburgh Tram Project by Audit Scotland in March 2010. They also deal with issues that emerged during the mediation talks about improving behaviours of the parties and ways in which project governance can be made simpler, and more streamlined. This is also intended to reduce project management costs for the project.
- 3.83 The revised governance model proposed is shown at Appendix 2; this also shows how the key project workstreams will report into a new unified organisational structure. Under these arrangements, the Council would become firmly established as the owner of the project, and its principal sponsor.
- 3.84 The proposed arrangements reflect the best practice guidance issued by the Office of Government Commerce and will follow PRinCE2 project management principles.
- 3.85 Under the proposals, a Joint Project Forum will be established. This Forum will bring together the principal representatives of all the key parties involved in the delivery of the project. The Forum will be chaired by the Council's Chief Executive, who will fulfil the role of Investment Decision Maker on behalf of the Council, as client.
- 3.86 The Joint Project Forum will include the key decision makers from the infrastructure suppliers – Bilfinger Berger Civil (UK), Siemens plc and CAF. Lothian Buses, as the proposed end user and operator of the tram, will also be

represented, as will Transport Scotland as the main funder on behalf of the Scottish Government.

- 3.87 Once the new arrangements have bedded down, the Joint Project Forum would meet every three months. In effect, this represents a return to the project partnering, collaborative approach to managing the project, which was intended when the contract was originally let.
- 3.88 The Forum will provide clear strategic leadership and direction to the project and will be supported operationally by a Joint Project Delivery Group, drawn from the Council's Transport service, tie Ltd, Lothian Buses and the infrastructure contractor.
- 3.89 The Joint Project Delivery Group will be tasked with managing the operational delivery of the project and reporting on progress against programme and budget. Major issues requiring consideration at a strategic level would be escalated to the Joint Project Forum.
- 3.90 The importance of effective arrangements for political scrutiny of the Tram Project is clear, and elected members need to have the opportunity to question the arrangements for managing the project and accounting for public funds. To this end, it is proposed that an Audit Committee should be set up, chaired by the Leader of the Council, and attended by Transport Scotland, and by elected members from each party group on the Council.
- 3.91 The final part of the revised governance model would be the establishment of a Stakeholder Forum, through which the Council, as Project Sponsor, together with the contractors can manage key relationships with stakeholders directly impacted by the tram project, including organisations such as BAA Edinburgh Airport, Henderson Global Investors (St James Centre), Forth Ports and other groups such as the Edinburgh Business Forum, Essential Edinburgh, the Federation of Small Businesses (Scotland) and the Edinburgh Chamber of Commerce, as well as representatives of local communities in areas impacted by the tram. Future arrangements for the day to day stakeholder liaison along the construction route are yet to be finalised between the Council and the infrastructure contractor.
- 3.92 The revised governance arrangements proposed will have implications for the existing relationship between the Council, TEL and tie Ltd. Following agreement at Mar Hall, major progress has been made in clearing the vast majority of design consents for the project. The infrastructure contractor has also agreed a self certification regime that will deliver the completed work to meet the employer's requirements.
- 3.93 To support this new approach, an independent Certifier has been appointed. This role was identified to assist project control. The role provides services in an independent, fair and impartial manner, although the Certifier carries a duty of care to the Council.
- 3.94 Key to this service has been identifying a realistic programme and financial profile introduced within the mediation process. Project control is executed through a managed process, chaired in an impartial, consensual style of site management.

- 3.95 The key project drivers of design, consents, programme, risk, construction and commercial are dealt with at weekly project control site meetings. The meetings resolve matters of project management in a tightly managed way. This process is an integral component of the operational project governance arrangements. Where required, any unresolved issues will be referred to the Joint Project Forum for consideration.
- 3.96 In light of the new approach, the role of the Tram Monitoring Officer will also change. The role will be more closely aligned to that of the Independent Certifier, and have a more active organisational role on the Joint Project Delivery Group. This role will now be undertaken by the Council's Traffic and Engineering Manager.
- 3.97 The method of measurement and payment for the construction works has also been simplified. A significant consequence of these developments is that there will be a reduction in the level of staffing resources required within tie Ltd. To that end, tie Ltd has initiated consultation with its staff about a programme of voluntary redundancies.
- 3.98 As a result of the changes above, and if the Council agrees to proceed with completion to York Place, the current operating agreements will need to be amended to: reflect the new governance arrangements and allow commitments to be incurred in line with the new budget estimates, once funding is secured. This will require further detailed work once the Council has determined which option is to be pursued. However, it will not be permitted for expenditure to exceed the currently approved budget before a further report is considered by Council.
- 3.99 In parallel with the above proposal, discussions are ongoing with senior management of Lothian Buses on the future management of the trams. Subject to the staff consultation, it is proposed that Edinburgh Trams Limited (ETL) staff should move across to Lothian Buses to continue the process of preparing for operations, ensuring a smooth transition. The Council as shareholder would welcome tie Ltd and Lothian Buses preparing for this transfer at the earliest possible stage.

4 Financial Implications

- 4.1 As previously reported to Council, there have been contingency plans prepared for up to £55m above the current committed funding. These plans would be funded through a combination of the surpluses from the business plan and the Council's long term financial plan. The increase in capital costs would clearly require the funding envelope to be pushed further, resulting in additional opportunity costs and/or revenue costs to support further borrowing.
- 4.2 The proposal to have a service to St. Andrew Square will result in a surplus of up to 10 trams, until further phases are eventually delivered. These would have a potential value through sale or leasing of £25m.
- 4.3 Based on the recommendations of this report, the estimated further funding gap on the project will be between £100m - £148m, with revenue consequences to support borrowing potentially between £7.1m - £10.6m. The funding gap includes a risk provision within the overall cost forecast of £77m. For the

Haymarket sub-option the funding gap appears less, but the loss of contingency funding and the need for revenue subsidy means the potential overall revenue consequences are increased.

4.4 **Should the project be terminated separation and cancellation costs will create a significant funding gap to be met from revenue, with a potentially higher risk to the sums for grant support already received from Transport Scotland.**

4.5 Discussions with Scottish Government have taken place. It has been agreed to further investigate all funding options and it is proposed to carry this work out in consultation with Transport Scotland and the Scottish Futures Trust. The Scottish Government's current position is that they remain committed to a grant up to £500m.

5 Equalities Impact

5.1 The proposals and recommendations described in this report could contribute to the public sector general equality duty to: (i) advance equality of opportunity. There is no distinct relevance in respect of the general duties to; (ii) eliminate unlawful discrimination, harassment and victimisation, or; (iii) foster good relations.

5.2 The relevance score for the specific proposals and recommendations described in this report is: (i) one for relevance to equalities legal duties; (ii) three for level of public concern expressed by equalities groups, and; (iii) one for relevance to significant negative impact on the quality of life of equalities groups.

5.3 Consequently, matters relating to this report will be included in the ongoing full equalities impact assessment that is being undertaken of the Edinburgh Tram project.

5.4 It should also be noted that due care has been taken with regard to accessibility issues arising out of the proposed Princes Street works. In this regard, an Equalities Statement and Accessibility Statement has been published on the Council's website and distributed to relevant partner organisations.

6 Environmental Impact

6.1 The Council's local transport strategy (2007-2012) emphasised the important role that a modern transport system would play in supporting the economic, environmental and social development of the city and the key contribution of the tram network to the city's future.

6.2 A full Scottish Transport Appraisal Guidance (STAG) review was undertaken at the Parliamentary Approvals Stage in 2003; this demonstrated how the Council, as promoter of the tram, had satisfied government objectives in terms of environmental, safety, integration, accessibility and economic concerns.

6.3 An updated STAG report, in 2006, concluded that despite the predicted increase in the city's population and traffic growth to 2026, there would be a

small, net improvement in air quality across the city as a whole, as a result of the introduction of the tram.

- 6.4 The STAG report acknowledged that within this overall net improvement there would be areas where air quality would deteriorate as a result of the displacement of traffic from the tram routes.
- 6.5 The Council remains committed to ensuring that any such air quality issues are properly monitored and addressed.
- 6.6 As a result of concerns expressed by residents of the Moray Feu, following the temporary diversion of traffic during the MUDFA utility works, additional air quality monitoring has been carried out on Great Stuart Street since July 2009 and, following the Tram Sub Committee meeting of 28 February 2011, additional air quality checks have been introduced in this area to include monitoring on building facades and at basement level.
- 6.7 The data from the existing and additional air quality monitoring levels in this neighbourhood will become available in the first quarter of 2012.
- 6.8 The tram itself has no carbon emissions at the point of service delivery and has the potential to contribute to the city's strategy for low carbon growth as electricity generation in Scotland transitions from fossil fuels to renewable energy sources.
- 6.9 As part of a broader sustainable transport strategy within the city the tram will, therefore, make a positive overall contribution to the environment by encouraging modal shift from private vehicles to public transport and mitigating the impacts of population growth and commuter and visitor generated traffic.
- 6.10 Air quality, especially in neighbourhoods which may receive traffic displaced from the tram route as a result of traffic regulation orders, will need to be carefully monitored and managed so that any issues can be dealt with and properly mitigated.

7 Conclusions

- 7.1 As the options set out above illustrate, the incremental delivery options for tramline 1a have been examined, in accordance with the guidance of the decision of Council from 24 June 2010.
- 7.2 The June 2010 report highlighted to Council that the Project had run into contractual difficulties and that issues of cost, programme and scope had emerged as risks to the successful delivery of the Project, made clear by the stalemate that developed in the autumn which led to the call for mediation. It is from this base that the current efforts to seek a solution have been undertaken.
- 7.3 As agreed by Council on the 18 November 2010 Motion (item 23), mediation has been undertaken to resolve the dispute that emerged in the Project and to work towards delivery of the Council's stated goal of a Tram line that runs from the Airport to Newhaven.

- 7.4 As a result of the mediation process, three options have become better defined: attrition, separation, or settlement. In the simplest terms: attrition would leave the Council at significant exposure to risk on a final cost; separation would still leave the Council with a situation where additional cost would be incurred and project completion could not be guaranteed. The recommended settlement would also incur additional cost, but with the benefit of delivering an asset for the city, concluding the current contractual difficulties, providing a revenue generating service, and enabling those works currently in the ground to be concluded.
- 7.5 In providing Council with an understanding of the available options and a recommendation on how to progress, a guiding principle has been how to secure Best Value from this point in this project. In that context, it is significant that both Department of Transport and Transport Scotland advice recommends discarding sunk investment costs when assessing Benefit Cost Ratios (BCR) for infrastructure projects. The BCR for completion to St. Andrew Square, computed on this basis is **2.2**.
- 7.6 Consideration of Best Value is a difficult balancing act which has included consideration of contractual matters that are commercially sensitive, and needed to be looked at from the perspective of what is best for the City, the Council and the Project. The revised project management arrangements will reassert the Council's role as client and sponsor of the Project, as explained in paragraphs 3.81 to 3.99.
- 7.7 The scale and complexity of the current situation requires direct, assertive action, as was recognised by Council in November. Following the work undertaken by officers, a clear course of action has now been established. Agreement to pursue Option (iii) (Airport to St. Andrew Square/York Place) would allow the Council to pursue to conclusion the Settlement Agreement with BSC. It is proposed that the terms of the settlement should be delegated to the Chief Executive to take forward, following consultation with political group leaders.
- 7.8 In the period before a full settlement agreement can be concluded, TEL/tie Ltd will need to continue to operate with the authority to progress the priority works, in accordance with MoV4, and to incur expenditure accordingly, until the end of August 2011.
- 7.9 To ensure that Council has full confidence in the proposed new governance arrangements, a detailed explanation of those arrangements will be brought back to Council in the autumn.
- 7.10 All of the above is, of course, conditional on funding being available. A detailed explanation of the position regarding revised funding will, therefore, also be brought back to Council in the autumn.

8 Recommendations

8.1 That Council:

- a) Agree that of the options available, and subject to funding, Option (iii) (Airport to St. Andrew Square/York Place) should be pursued to provide a revenue generating service and realisation of the investment to date;
- b) Authorise the Chief Executive to enter into the Settlement Agreement which is conditional on funding, substantively on the terms set out in the Settlement summary contain in the confidential appendix, with such amendments as may be considered appropriate;
- c) Authorise tie Ltd to progress on the priority works, in accordance with MoV4, and incur expenditure within the limits of the project budget of £545m, until the end of August 2011;
- d) Instruct the Director of City Development to report back to Council in the autumn with a detailed explanation of:
 - i. the revised governance arrangements; and,
 - ii. the funding, once this has been finalised.
- e) As shareholder, ask Lothian Buses to assist in preparing for operations, by accepting transfer of ETL, subject to staff consultation, as soon as possible.

Dave Anderson
Director of City Development

Appendices	<ol style="list-style-type: none">1. Tram Route 1a Diagram2. Revised Governance Model3. Atkins Independent Review of the Business Case (Summary)
Contact/tel/Email	Dave Anderson, Director of City Development dave.anderson@edinburgh.gov.uk Tel 0131 529 3524
Wards affected	All

Single Outcome Agreement

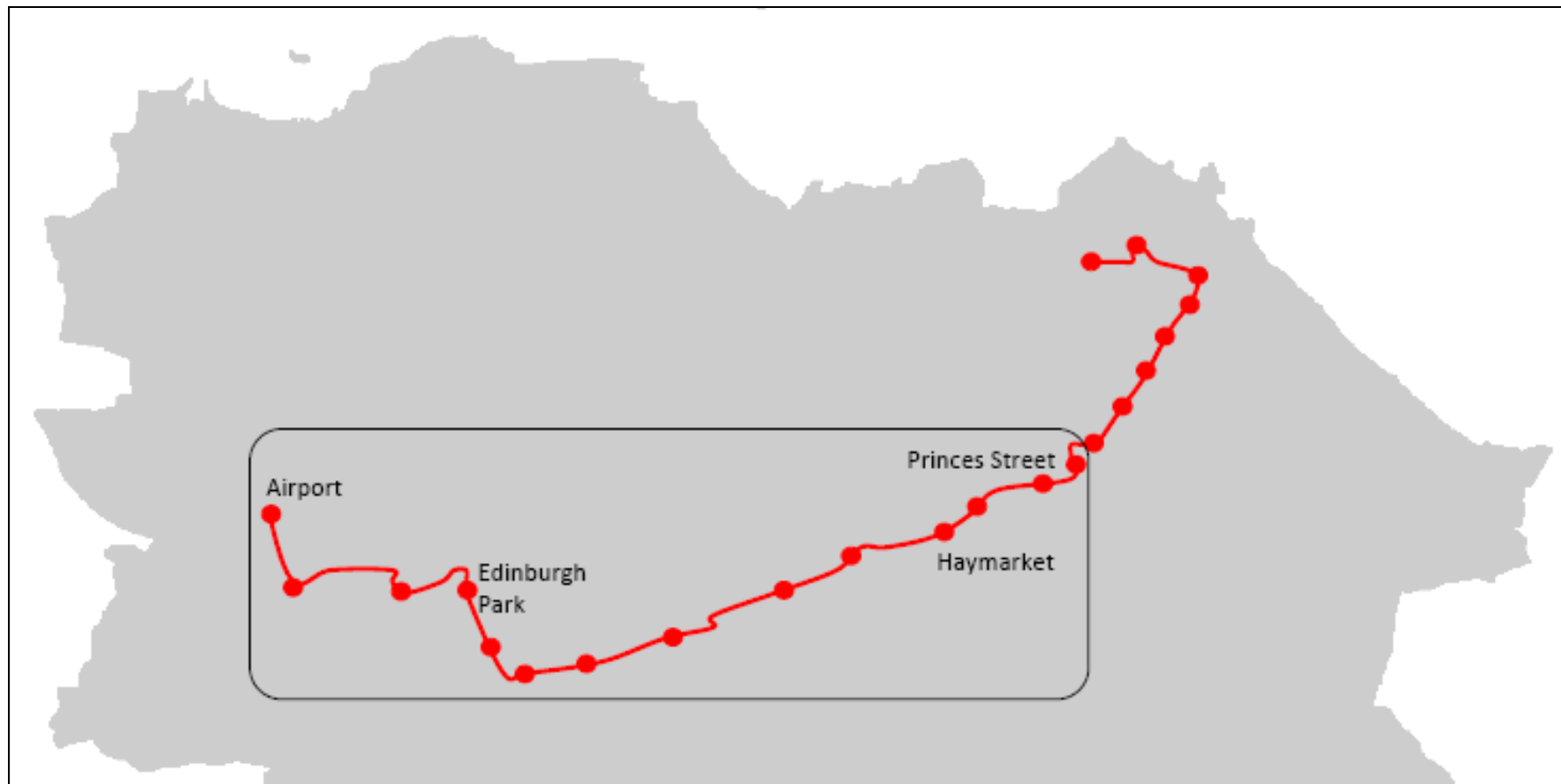
[National Outcomes:](#)

- National Outcome 1 - We live in a Scotland that is the most attractive place for doing business in Europe
- National Outcome 10 - We live in well-designed, sustainable places where we are able to access the amenities and services we need
- National Outcome 12 - We value and enjoy our built and natural environment and protect it and enhance it for future generations
- National Outcome 14 - We reduce the local and global impact of our consumption and production.

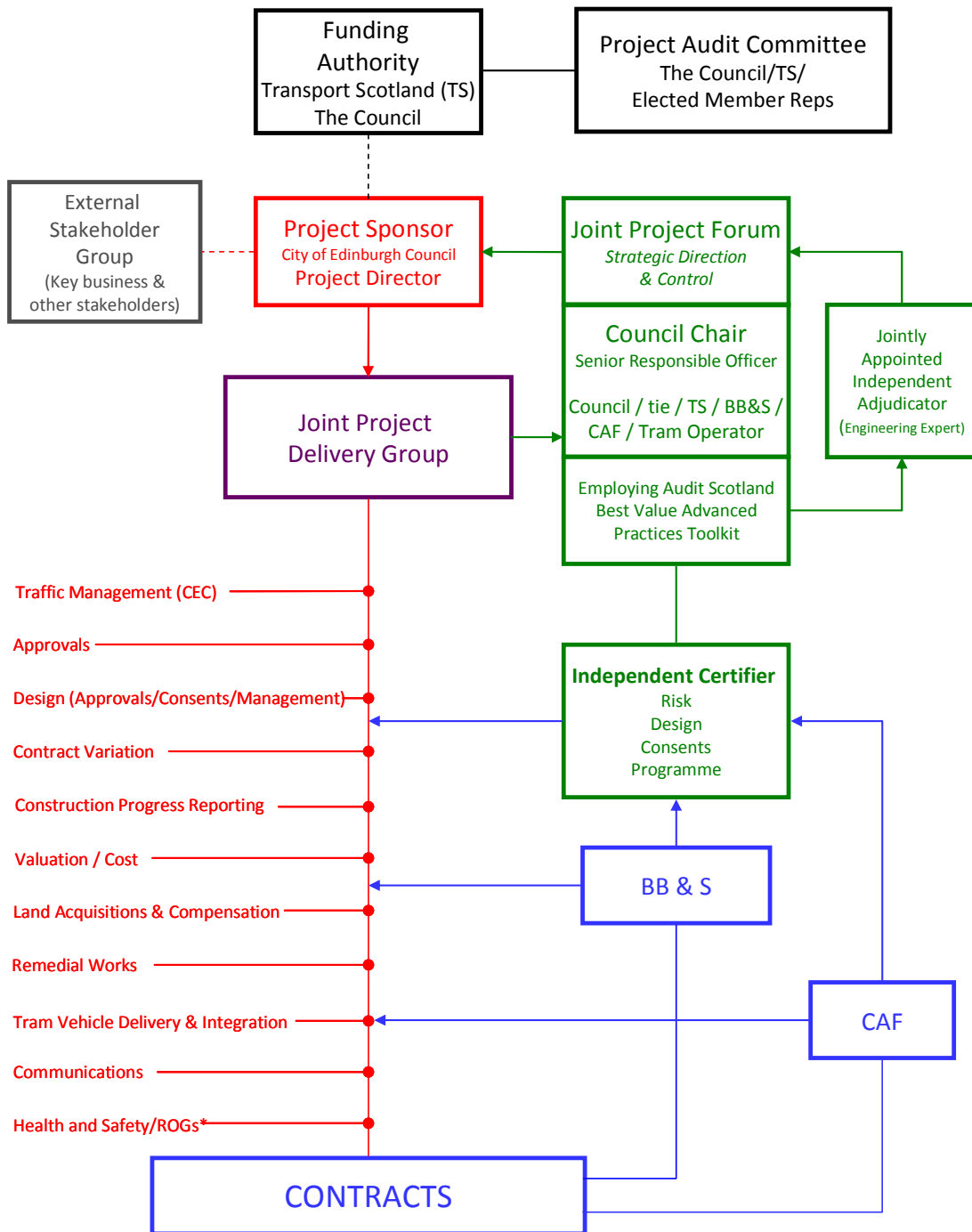
Background Papers

- The City of Edinburgh Council Meeting, 16 May 2010, Item 2.1: [Edinburgh Tram Update](#)
- The City of Edinburgh Council Meeting, 16 December 2010, Item 8.2: [Edinburgh Tram Project](#)
- The City of Edinburgh Council Meeting, 14 October 2010, Item 8.1: [Edinburgh Tram Update Report](#)
- The City of Edinburgh Council Meeting, 24 June 2010 Report, Item 8.2: [Edinburgh Tram Project - Update Report](#)

Tram Line 1a

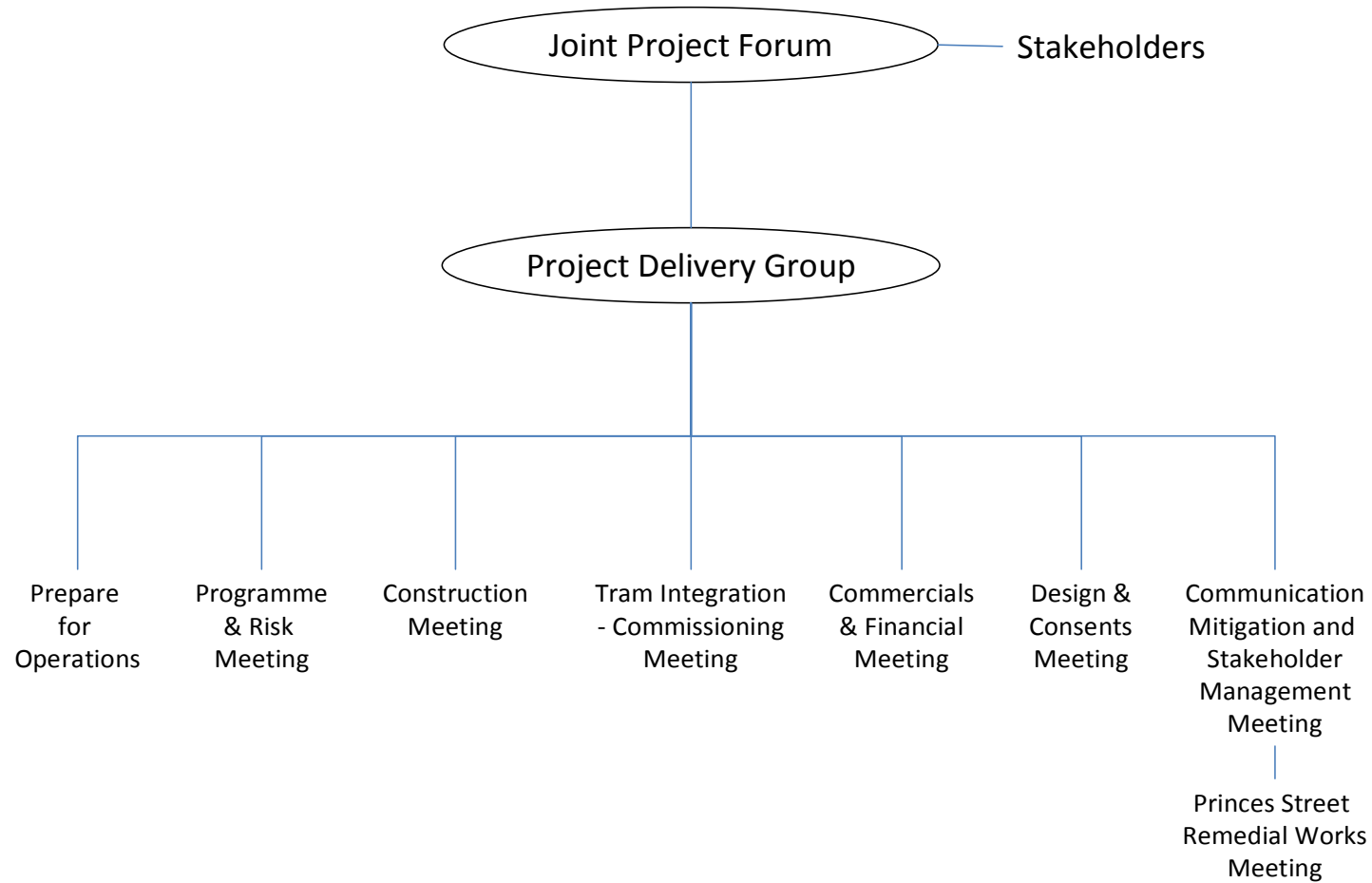


Revised Project Governance Structure



* RoGs are [The Railways and Other Guided Transport Systems \(Safety\) Regulations](#)

Revised Project Meeting Hierarchy



Atkins Independent Review of the Business Case (Summary)

Atkins

Edinburgh Tram Business Case Audit

June 2011

ATKINS

Plan Design Enable

Edinburgh Tram – Business Case Audit

June 2011

Executive Summary

Notice

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Contents

Section	Page
Executive Summary	1
Edinburgh Tram Business Case Audit	1
Options Tested	1
Business Case Components	1
Our Approach	2
The Tools Used – Are They Fit for Purpose?	2
The Assumptions Used – Are They Reasonable?	3
The Outputs – Do They Look Credible?	3
Risks & Uncertainty	5
Conclusions	6

Executive Summary

Edinburgh Tram Business Case Audit

Atkins is the UK's largest engineering and design consultancy and has extensive experience in the planning, design, and delivering of mass rapid transit projects in the UK and overseas.

We were commissioned by the City of Edinburgh Council (CEC) in April 2011 to undertake an independent review of the Edinburgh Tram Business Case. The audit's principal focus has been reviewing the work which the Joint Revenue Commission (JRC) has been undertaking in assessing the benefits that could be gained from the introduction of the proposed tram system in Edinburgh.

Key inputs to the audit have included: Edinburgh Tram Network Final Business Case Version 2 (2007), Edinburgh Tram – Business Case Update (2010), recent analysis on three route options undertaken by JRC in parallel to the audit, historic revenue and risk reports, and the current financial models for the tram.

Options Tested

The JRC was commissioned by the City of Edinburgh Council in April 2011 to provide updated TEE analysis¹ for the following three tram routes options:

- The full Phase 1a, Edinburgh Airport to Newhaven;
- Truncated Phase 1a, Edinburgh Airport to St Andrews Square; and
- Truncated Phase 1a, Edinburgh Airport to Foot of the Walk.

Business Case Components

Our business case audit has focussed on the updated TEE analysis that has been provided by the JRC during June 2011. In addition to quantifying the benefits and costs to Government via the TEE analysis STAG² requires that other relative benefits from a transport scheme are presented within the context of the following parameters:

- Environment;
- Safety and Security;
- Accessibility and Social Inclusion;
- Transport and Land Use Integration;
- Economic Regeneration; and
- Economic Activity and Locational Impacts (EALI).

The Edinburgh Tram Network Final Business Case Version 2 (2007), and Edinburgh Tram – Business Case Update (2010) provide evidence of the relative benefits within each of these parameters; while these elements have not been updated by the JRC team, or reviewed in detail as part of this audit, we have drawn our overall conclusions acknowledging this wider context for the scheme.

The scheme's capital and revenue costs are a key input to the TEE analysis. The updated capital costs used by the JRC are presented in the table on the next page. These have been an important input to our

¹ Transport Economic Efficiency

² Scottish Transport Appraisal Guidance, Scottish Government, 2011

work, but we have not undertaken any auditing work specific to costs. Tram operating costs and savings associated with reducing bus provision have been provided to the JRC from TEL.

Updated Capital Costs³

Outturn Costs £m	Phase 1a	St Andrews Square	Foot of the Walk
Infrastructure costs already spent (sunk costs)	469	469	469
Vehicle costs	62	42	50
Remaining infrastructure costs	286	198	256
Total capital costs	817	709	775

Our Approach

The approach Atkins has adopted to undertake the business case audit has been developed around answering three questions:

- The **tools** used – are they fit for purpose?
- The **assumptions** used – are they reasonable?
- The **outputs** – do they look credible?

The Tools Used – Are They Fit for Purpose?

Our assessment of the appropriateness of the tools used has focussed on the modelling suite and the appraisal methodology.

The modelling suite comprises a number of elements, including the High level Model (HLM), which is a strategic multi-modal demand, network assignment and distribution/mode choice model developed using VISSUM software. The HLM is the main source of data for the assessment of demand, revenue, and user and non-user impacts which drives the benefits side of the TEE/BCR calculations, and, as such, has been the focus of our review of the tools used.

The model was subject to a detailed audit in 2008, and enhancements were implemented on the basis of recommendations made at that time. We have not replicated the technical depth and of that audit, but have reviewed aspects of the HLM to which the outputs (the benefits in the TEE/BCR calculations) are most sensitive. This has included the quality of the representation of highway and public transport network performance, and the behavioural parameters which drive mode choice.

Our overall assessment of the HLM is that it is an appropriate tool for the purposes of informing the TEE/BCR assessment. We have however identified some areas of relative weakness (not unusual in a model of this size and complexity), which we have used to interpret output and influence the focus of sensitivity testing requested. These are documented further in the main body of our report.

We have found the scheme **appraisal methodology** to be in line with standard good practice, and with the requirements of STAG. However, we do recognise that since the STAG appraisal was undertaken that there has been a number of changes in the context within which the appraisal was undertaken; most notably within the policy context, and in particular the prominence of climate change policies that have emerged as a result of the Climate Change (Scotland) Act 2009. It is therefore recommended that consideration is given to refreshing the wider appraisal to ensure that the full benefits of the tram scheme are captured within a contemporary context.

³ Provided by CEC

In summary, therefore, our review of the tools which were used within the Business Case has found them to be broadly fit for purpose, with any relative weaknesses examined through sensitivity testing and interpretation.

The Assumptions Used – Are They Reasonable?

A number of assumptions have been made by the JRC in the development of the business case. The key assumptions that we consider to have the most significant influence on the business case relate to the following areas.

The composition of the transport network – now and in the future

The modelling tools used by the JRC to generate outputs has been updated periodically to reflect changes in the existing transport network, and the nature of the network in the future. A number of assumptions have been made regarding the infrastructure and operational characteristics for both the highway and public transport components of the transport network. In order to inform and validate these assumptions the JRC has engaged with a number of key stakeholders who are best placed to provide a view on the scale and magnitude of the variables associated with the transport network. Representatives for the following organisation contributed - CEC, SDS⁴ tie, Lothian Buses, and Transport Scotland.

On the basis that they had been validated by local stakeholders, we were broadly satisfied with these assumptions, however, we have not undertaken our own detailed review of the model's public transport network representations. We also considered it prudent to recommend a sensitivity test that replicated potential competition for the tram from a bus operator between the city centre and the airport.

The demand for transport – now and in the future

The original development assumptions which were utilised within the 2006 model were updated in 2010 to inform the Business Case refresh and again in 2011 for the most recent TEE analysis. The existing assumptions reflect the current advice from CEC planners and reflect the need to take account of known changes in development figures and the current economic climates and its impact on development in Edinburgh. An adjustment has also been made to the predicted future patronage forecasts to reflect recession impacts on bus patronage in Edinburgh, this has been derived base on adjustments proposed by TEL that reflect Lothian Buses recent experience of the bus market in Edinburgh.

Clearly, future development will provide much of the future demand for the tram and we recommended that a sensitivity test should be undertaken to represent a worst case scenario where no future development occurred.

Traveller responses to the tram

Finally, the JRC has made a number of assumptions relating to a number of parameters that will influence a traveller's propensity to use the tram – these include factors such as travellers' value of time, the relative attractiveness of the tram as a mode of travel, and the impact of having to interchange.

We have benchmarked the assumptions used by the JRC and are content that they are appropriate for use in the development of the business case. The parameters used to assess the scope for transfer to tram from other modes are cautious compared to similar schemes elsewhere, and we note that there may be some scope for greater shift to tram than has been forecast. However, in the interest of prudence we have also recommended that a sensitivity test was undertaken to assess the impact of lowering the relative attractiveness of the tram as a mode of transport.

The Outputs – Do They Look Credible?

The outputs which the 2011 analysis has supplied can be broken into the following main categories:

- Tram demand/revenue;

⁴ The Edinburgh Tram system designer

- Impacts on public transport users;
- Impacts on road users; and
- Value for money (TEE tables and BCR).

The outputs for each of these categories are shown in the tables below for all three options tested. While we have not undertaken a detailed review of tie's 2010 Financial Model, we have sought to reassure ourselves that the demand and revenue figures emerging from the current JRC work can be reconciled with corresponding numbers informing the 2010 financial assessment. This is because the level and profile of demand is critical to the financial performance of the scheme. It is important to ensure that changes and enhancements to the model for the purpose of the current tests have not given rise to a significantly lower set of demand forecasts, potentially contradicting earlier conclusions from the Financial Model in relation to the financial viability of the scheme.

For the two options where a direct comparison can be made, Phase 1a and St Andrews Square, the new demand forecasts are broadly in line with (or – in later years – exceed) the demand levels in the Financial Model, and are therefore consistent with the demand inputs to the Business Case Review of 2010.

In terms of overall public transport demand levels at 2011 we are also satisfied that these appear plausible relative to the observed figures that we understand to have been verified by Lothian Buses during a similar check undertaken at 2010.

In addition to the overall demand levels, we have also examined supporting material relating to the scale, distribution and source of demand. We found these outputs broadly plausible, but noted:

- The unusually high proportion of those forecast to use tram whose previous mode was car (for the St. Andrews Square option (of the order of 40%). This is only likely to be deliverable with the level of quality of service (both for those switching directly to tram, or those using P&R) envisaged within the model, in terms of comfort, journey time and reliability; and
- The prominence of 'counter-peak' movement with the St Andrew's Square option, with a significant element of demand travelling outbound from the city centre in the morning peak to access areas such as Edinburgh Park.

We have reviewed the emerging TEE tables (as set on the next page) and a number of supporting outputs relating to the level and distribution of impacts upon both users and non-users of the scheme. We have found these broadly plausible, but would make the following observations:

- The distribution of non-user impacts (impacts upon car users) appears broadly in line with expectations. However, in our experience the overall level is difficult to quantify, and we would view this as particularly the case with the tools used for this assessment, given some of the weaknesses in the highway element of the model. For this reason we would express caution in comparing the relative merits of options where non-user benefits form a key component. The JRC team has stated that no future junction optimisation has taken place to address specific points of congestion due to traffic re-assignment, and we accept that this may over-state disbenefits (particularly on the Phase 1a assessment).
- We believe the level and distribution of user benefits look broadly plausible. These benefits will however be driven directly by the level of demand for, and transfer to tram, and are therefore sensitive to issues such as future development and propensity to switch. This has been explored through sensitivity testing.

Treatment of costs

A benefit to cost ratio of less than one suggests that the economic return would be less than the investment, even when appraised over 60 years. The BCR of the options taking into account the full costs and benefits have been found in the current analysis to be less than 1. In other words completing the project will incur more expenditure with an overall return of less than one.

However, to abandon a scheme where such a large proportion of the costs have been sunk would represent a zero-return on a large investment. In this case when the analysis is being carried out after

sunk costs have occurred it is conventional and reasonable (as set out in STAG and WebTAG appraisal guidance)⁵ to account for sunk costs in the scheme appraisal for a fair comparison between investment opportunities.

The analysis if JRC’s updated business case also appraises the full benefits against only the costs of completion and operation then the BCRs for the three options are:

- The full Phase1a, Edinburgh Airport to Newhaven, **BCR = 1.33**
- Truncated Phase 1a, Edinburgh Airport to St Andrews Square, **BCR = 2.20**
- Truncated Phase 1a, Edinburgh Airport to Foot of the Walk, **BCR = 1.23**

We would however express caution in using the relative BCRs for the three options tested to inform decision-making on the relative merits of the alternative options, particularly in light of the significant differential performance in terms of non-user impacts , and the degree of confidence which can be attached to this element of the appraisal.

Updated TEE Outputs (Source – JRC, June 2011)

£m Present Value, 2002 prices	Revised Phase 1		St Andrews Square		Foot of the Walk	
	Full Costs	Minus Sunk Costs	Full Costs	Minus Sunk Costs	Full Costs	Minus Sunk Costs
Public transport user benefits	541	541	340	340	493	493
Other road user benefits	-196	-196	74	74	-156	-156
Private sector provider effects	81	81	68	68	60	60
PV of Scheme Benefits	427	427	482	482	397	397
PV of Scheme Costs	760	321	658	219	762	323
Net PV	-334	106	-176	263	-365	74
Benefit Cost Ratio to Government	0.56	1.33	0.73	2.20*	0.52	1.23

*Please note that following an update on the treatment of sunk costs in relation to St Andrew Square, the BCR for St Andrews Square should now read 1.85.

Risks & Uncertainty

The audit has established a number of areas in the business case where there is a degree of risk and uncertainty as with any modelling work. Below we set out our areas of concern and the outputs from the sensitivity testing that was undertaken to help quantify the impact of these risks on the business case.

Much of the future demand/benefit relates to **new committed development**, this is an area of inevitable uncertainty which could have a possible impact on revenue and the economic case for the tram scheme.

⁵ http://www.transportscotland.gov.uk/stag/td/Part2/Cost_to_Government/12.2
<http://www.dft.gov.uk/webtag/documents/expert/pdf/unit3.5.9.pdf>

A ‘worst case’ zero growth sensitivity has demonstrated that the tram demand would reduce by around one-third in 2031.

There is a risk that a bus operator could establish a service to run in competition with the tram between the city centre and the airport, and a sensitivity test has been undertaken to replicate this by using the Service 100 as a proxy for competition. The outputs suggest that tram revenue would decrease by around 6%.

Much will depend on the relative ‘levels of service’ the tram provides the travelling public. A sensitivity test has been undertaken to replicate a less favourable differential for the tram when compared with the bus, this shows that the tram demand and revenue could reduce by around 12%.

The relative impacts of these sensitivity tests on the BCR are presented below for St Andrew’s Square.

Sensitivity Test Results (Source – JRC, June 2011)

£m Present Value, 2002 prices	St Andrews Square			
	Minus Sunk Costs	Mode Constant Increased	Competition	Zero Growth
Public transport user benefits	340	289	362	227
Other road user benefits	74	47	74	49
Private sector provider effects	68	64	76	45
PV of Scheme Benefits	482	400	511	321
PV of Scheme Costs	219	246	322	254
Net PV	263	154	190	67
Benefit Cost Ratio to Government	2.20**	1.63	1.59	1.26

**Please note that following an update on the treatment of sunk costs in relation to St Andrew Square, the BCR for St Andrews Square should now read 1.85.

Conclusions

Our overall conclusions from our review are:

- The tools and assumptions adopted and the outputs from the analysis are broadly fit for purpose, in line with our expectations, and comparable to experience on other schemes.
- We have identified a number of areas of risk and uncertainty. Sensitivity testing has been used to quantify the impact of these areas of risk and uncertainty on the business case for the St Andrew’s Square option. Even allowing for these downbeat assumptions, once sunk costs are taken account of, there remains an economic case for the St Andrew Square option, on the basis that each of these pessimistic tests still delivers a BCR of greater than 1.