Table 10: Assessment against planning objectives

Planning Objective	Assessment	Comment
Supporting the Spatial Strategy	√√√	The project has the strong potential to support the delivery of identified housing and employment opportunities.
Sustainable Economic Development	√√√	The spatial strategy is developed to support the overall growth of Edinburgh in a sustainable manner.

3.53 The project offers the potential to:

- Increase the attractiveness of major development sites, enhancing their overall viability and potentially bringing them forward at a faster rate than would otherwise be the case.
- Support the nature and scale of development, by supporting higher density development with a lesser requirement for parking than would be the case without the tram.

3.54 The project also supports the spatial development strategy and the wider economic objective of supporting the planned population and jobs growth within Edinburgh in a sustainable manner.

Environment

3.55 A detailed environmental impact statement was prepared for the securing of powers for the project. The EIS sets out the results of an appraisal of the environmental impacts and identifies appropriate mitigation measures that are included in the design and development.

3.56 The granting of powers implicitly suggests that there were no unacceptable environmental impacts for the tram to Newhaven.

Accidents and security

3.57 The Edinburgh Tram York Place to Newhaven project has the potential to reduce accidents through the transfer of car trips to tram. However, the Leith corridor already has a high public transport mode share so the absolute change in vehicle kilometres will be modest.

3.58 The tram offers a high level of security, in particular through the presence of Ticket Sales Assistants and on board and on street CCTV and passenger help points.

Transport economic efficiency

3.59 The assessment of transport economic efficiency is the economic appraisal presented above.

Economic activity and locational impact

Local economic impacts

3.60 Local economic impacts are concerned with which geographic locations and which sectors are likely to gain or lose as a result of the project. In geographic terms, the project will support existing businesses and expansion of activity in key employment locations, in particular the city centre and Edinburgh Park.

3.61 The growth in these locations will be driven by the expansion of higher-value service sector jobs which would probably only locate in the city centre or high-grade premises such as those in Edinburgh Park. It is therefore unlikely that other locations within Edinburgh would be material losers as a result of the project.

3.62 The Edinburgh Tram York Place to Newhaven project aims to support the delivery of planned jobs and housing growth. Without tram this growth would either be at a lesser scale, take longer to come forward or need to be accommodated in a less sustainable manner (i.e. growth would have to be supported by greater levels of in-commuting).

National Economic Impacts

3.63 Net impacts at the national level are unlikely to be significant. However, key sectors such as business and financial services and bio-science / technology are mobile and internationalised, and enhancing the attractiveness of Edinburgh as a location to locate (through good transport, access to a large labour pool, and direct access to the Airport) will help maintain and enhance Edinburgh's competitive position as a place that high-value internationally mobile businesses want to locate and expand in.

Distributional impacts

3.64 The project serves a corridor of comparatively high unemployment and deprivation, as shown in Figure 5. The tram will provide improved accessibility to residents along the corridor to the range of job opportunities in the city centre and along the existing tram corridor (e.g. Edinburgh Park).

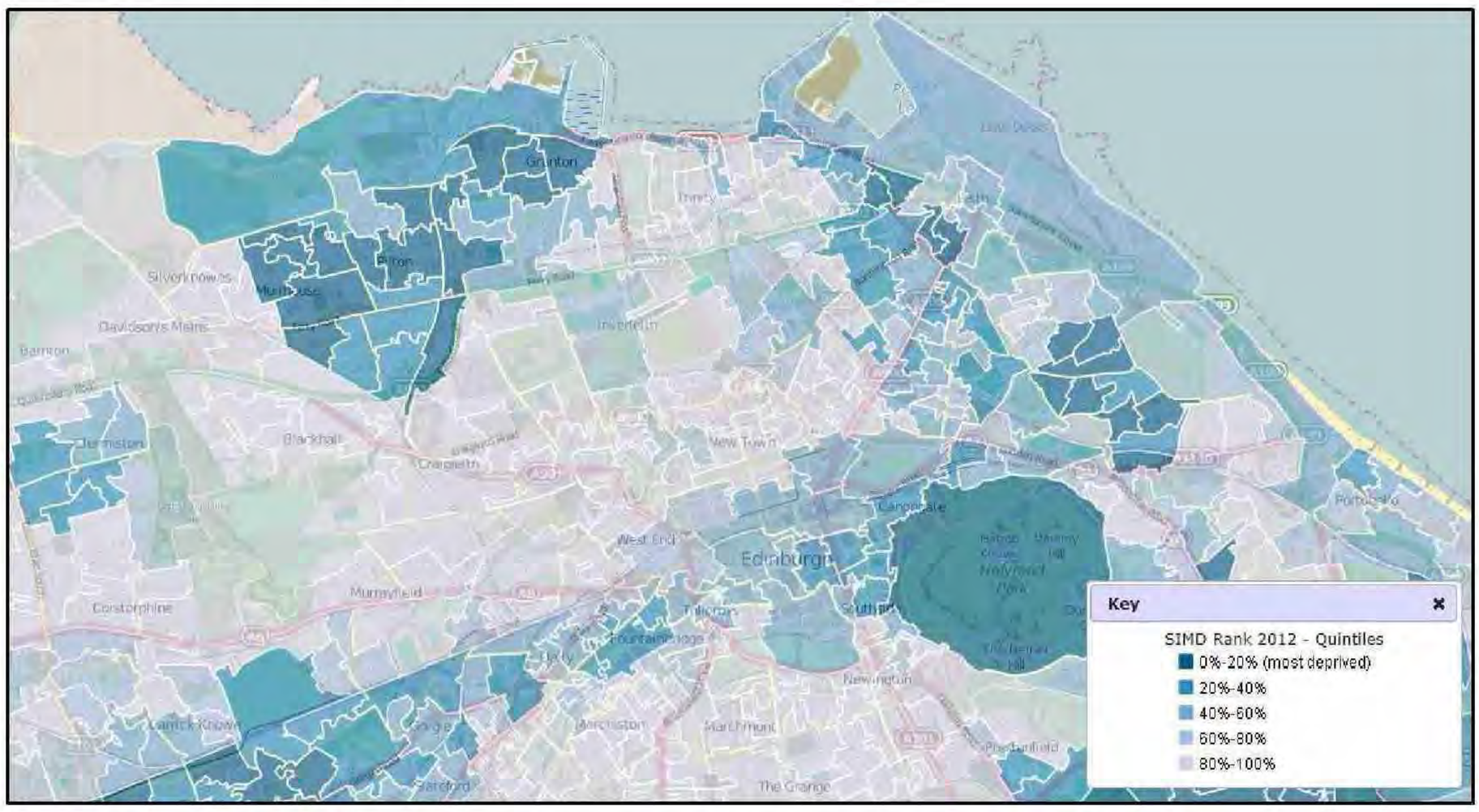

Figure 5: Index of Deprivation (from Scottish Index of Multiple Deprivation Interactive Map)

3.65 SDG's assessment of the Economic Activity Location Impact (EALI) s is presented in Table 11.

CEC02086792_0046

Table 11: EALI assessment

Criteria	Assessment
Local Economic Impacts	√√
National Economic Impacts	√
Distributional Impacts	√√

Integration

3.66 The Edinburgh Tram York Place to Newhaven project provides more direct journey opportunities avoiding interchange, as well as interchange opportunities at a range of destinations including the city centre (rail at Waverley and Haymarket, bus), Edinburgh Gateway and at Ingliston Park and Ride.

3.67 The project supports the city's spatial strategy and hence wider economic policy objectives. All options fully support the city's transport policy objectives.

3.68 JRC's assessment of integration is presented in Table 12.

Table 12: Assessment of Integration Impacts

Criteria	Assessment
Transport Interchange	√√√
Land Use Transport Integration	√√√
Policy Integration	√√√

Accessibility and social inclusion

3.69 The Edinburgh Tram York Place to Newhaven project enhances accessibility and social inclusion.

3.70 In terms of community accessibility, the public transport network coverage and access to local facilities is reasonably good throughout the corridor, reflecting the good existing bus network coverage. Tram will improve this accessibility but will not transform any specific movement from being 'inaccessible' to 'accessible'.

3.71 The tram improves the comparative accessibility by public transport for a range of movements, in particular those from the northern end of the route, and from the whole route to a range of employment and other opportunities on the existing tram corridor.

3.72 JRC's assessment of accessibility and social inclusion is presented in Table 13.

Table 13: Accessibility and social inclusion assessment

Criteria	Assessment
Community Accessibility	√
Comparative Accessibility	√√√

CEC02086792_0047

Measuring the Economic Benefits

3.73 A post-project review will be carried out to demonstrate the achievement of the economic benefits of the project. This review will include a full post-facto cost benefit analysis.

3.74 As the patronage on the route is expected to build up over time, it is recommended that this review is carried out at least 24 months after the opening of the new route, and may be done in conjunction with the review of strategic benefits.

Conclusions

3.75 The economic appraisal shows that the central case delivers a benefit to cost ration of 1.64 to 1, and that the BCR would remain positive under a range of sensitivity tests undertaken.

3.76 The outline STAG assessment demonstrates how the project contributes to a range of wider policy objectives and outcomes, in particular supporting the spatial planning and development strategies for the city, and improving transport accessibility in areas of comparative high deprivation.

CEC02086792_0048

4 The Financial Case

Chapter summary

- The detailed financial model produced for the 2015 OBC has been revised and updated to assess the financial benefits of a tram extension to Newhaven and whether it is affordable to the City of Edinburgh
- In the short to medium-term, an estimated additional funding gap of £1m exists after utilising £20m of assumed extraordinary dividend from Lothian Buses, compared to the gap if no extension were to be built
- Options for reducing the funding gap have been identified
- In the longer term, tram revenues can fund the extension and provide additional income to the Council
- Sensitivity testing has been undertaken on the key assumptions showing the financial impact of changes.

Introduction

4.1 In order to assess whether the Edinburgh Tram York Place to Newhaven project is affordable to the City of Edinburgh, costs and income have been assessed in terms of:

- financial impact of the project on both the bus and tram businesses; and
- affordability to CEC in the short, medium and long term

4.2 The detailed financial model produced for the 2015 OBC has been revised and updated to incorporate actual costs and revenue data provided by Edinburgh Trams based on performance in 2016, updated capital cost estimates detailed elsewhere in this chapter, and patronage assumptions per the transport modelling detailed in Chapter 3.

4.3 The model utilises the 2016 base actual costs and revenue data and projects these forward to 2053, taking account of the impact of constructing and operating the line to Newhaven, inflation forecasts from the Office of Budget Responsibility and current short term tax rates as provided by the appointed tax adviser, Grant Thornton. The model provides detailed annual cashflow forecasts for Edinburgh Trams and the City of Edinburgh Council to assess the affordability of the investment in, and operation of, an extended tram line to Newhaven.

Capital cost

Introduction

4.4 The capital cost estimate has been updated by Turner & Townsend for this business case to take into account changes arising from further design development, the latest programme, and a comprehensive quantitative risk assessment.

Assumptions

4.5 Based on the experience of the original tram project, and the work done by Atkins, a number of assumptions have been made and agreed with the project board. Key assumptions include:

- The construction delivery strategy will be as set out in Chapter 6, including traffic management arrangements which allow the opening up of large areas of the site to

CEC02086792_0049

facilitate a one-dig approach and flexibility to deal with unforeseen underground obstructions
- The procurement strategy will be broadly as set out in Chapter 5
- No bridge replacements will be required
- Road reconstruction and public realm improvements will be limited to those necessitated by the tram project and no allowance is made for additional general improvements
- No land costs will be incurred

Design basis

4.6 The cost plan is based upon the detailed design for the York Place to Newhaven corridor produced for the original tram project, supplemented by design work and alignment plans completed by Atkins during Stage 1.

4.7 The works and equipment, such as the trackform, ducting, drainage and OLE, are similar to that implemented on the original tram project.

4.8 The scope of utility diversions is based on the utility conflict schedule developed in 2015. This schedule was developed as a desktop study and since 2015 has been augmented by a series of advanced intrusive and non-intrusive site investigation works.

4.9 Several design and scope changes have been made since the cost estimate for the 2015 business case was prepared. These changes have been agreed with the project board. The most significant changes are:

- A reduction in the scope of utility diversions and public realm works in the Picardy Place area due to works being carried out by the Edinburgh St. James developer
- Addition of a bus interchange at Picardy Place
- An increase in scope of public realm works in Elm Row
- Introduction of segregated cycleway on Leith Walk
- More conservative assumptions in relation to requirement for road reconstruction
- Reassessment of value of materials available from original tram project
- Removal of third platform at Ocean Terminal and associated provision of replacement tram stabling at Newhaven
- Provision of tram driver facilities at Newhaven.

Programme

4.10 The capital cost estimate is based on the current programme, which includes the key dates shown in Table 14.

Table 14: Programme milestones

Milestone	Date
Council approval to commence Stage 2 (procurement)	September 2017
Issue OJEU notice for main construction works	October 2017
Complete evaluation of tenders for main construction works	October 2018
Council approval to commence Stage 3 (construction)	Q4 2018
Commence construction	Q2 2019
Services commencement	Q2 2022

4.11 The programme duration from contract award to the line opening for revenue service is 40 months.

Risk Management, Evaluation and Quantification

4.12 The updated risk allowance includes assessments of the main sources of uncertainty to the project, including:

- Discrete cost risks
- Estimate uncertainty
- Cost of schedule delay
- Unknowns

4.13 The discrete cost risk estimate is based on a quantitative cost risk assessment of the project risk registers. Each risk in the risk register is assigned a probability of occurring and a range of estimated costs impacts, which are then modelled using a stochastic risk model to generate an estimate of the likely cost of risk at varying degrees of confidence. It is generally accepted best practice to adopt the P80 risk estimate, i.e. the risk cost which the model predicts will not be exceeded 80% of the time.

4.14 Every cost plan is developed based on the best information available at the time and therefore there is always an element of uncertainty. An allowance of 3% of the construction costs which were not market tested (64% of the capital cost) has been made for estimate uncertainty.

4.15 The cost of schedule delay is based on a quantitative schedule risk assessment (QSRA) of the programme risk register to estimate the delay cost of discrete risk events, and duration uncertainty. The QSRA provided a range of confidence levels for milestone completion dates. The P80 outputs were used to estimate the cost of delay for each stage of the project.

4.16 Despite undertaking a robust approach to developing and assessing the risk register, cost plan and programme it is possible that a currently unforeseen event could occur. An allowance has been made for such unknowns by incorporating the standard deviation of the QCRA from the tram construction risk register.

4.17 The above approach to assessment of the risk estimate, including utilising the P80 estimate for the risk contingency to be included in the project budget, was presented to and adopted by the project board.

Inflation

4.18 The most recently published data available from the Building Cost Information Services All in Tender indices rate was used to calculate the inflation uplift for the period between 2015 (previous cost plan) and 2017 (current cost plan). This inflation uplift was applied to construction costs which were not subject to market testing in 2017.

4.19 The uplift based on BCIS indices is circa 3% per annum during the construction period. However, as a result of the UK withdrawing from the single Market and Customs Union, there is an increased likelihood of restrictions on the movement of labour and pressures on sterling that has the effect of increasing the rate of inflation in the latter years of the BCIS all in tender price five year forecast. Therefore a conservative approach has been adopted and 4% inflation has been included in the cost plan.

Results

4.20 The results of the updated capital cost estimate are summarised in Table 15.

Table 15: Capital cost estimate

Element	Cost
Construction costs	£114.1m
Risk	£32.8m
Inflation	£18.3m
Projected out-turn capital cost estimate	**£165.2m**

4.21 The above capital cost estimate has been audited and verified by Faithful & Gould.

Lifecycle costs

4.22 The following general assumptions have been made in the development of the life cycle cost model:

- The life cycle cost period is 60 years[3]
- Costs are based upon 2017 price levels
- No discount factors have been applied to later years
- There is no requirement to return infrastructure to a "Day 1" condition at the end of the 60 year lifecycle

4.23 The lifecycle renewal assumptions are:

- Replacement periods are generally assumed to match the design lives in the employer's requirements. In some cases, such as structures, costs have been added for partial renewals within the design lives
- Base unit costs from the current capital cost estimate have been used with normal allowances for contractor's preliminaries and client on-costs for design and project management.
- Allowances are made for tram refurbishment within the lifecycle cost estimate. This does not allow for a major overhaul potentially required at the half-life stage of the tram or the complete renewal required at 30 years as these costs will be incurred with or without the project being constructed.

4.24 The lifecycle costs amount to £118.5m over 60 years.

Revenue and Cost Assumptions

4.25 The updated tram financial model is based on a large number of detailed assumptions. The most significant ones are detailed below. Key assumptions have been signed off by appropriate officers in the Council and Edinburgh Trams to ensure the robustness of the financial projections.

---

[3] Life cycle costs have been calculated over 60 years to match the economic appraisal period

CEC02086792_0052

Revenues

4.26 The most significant revenue stream is from tram fares. This income stream is based on projected passenger numbers derived from the JRC transport modelling work described in Chapter 3. This modelling shows significant growth in tram patronage due to forecast passenger increases at Edinburgh Airport and planned housing growth in the city.

4.27 Edinburgh Trams have provided data on current ticket yields and the proportion of passengers using different ticket types (cash single, airport cash single, Ridacard, concession travel cards, etc). This information is used alongside the passenger projections to calculate estimated fare revenue, which has been increased by RPI + 1% on a 3 year step basis to take account of future fare increases.

4.28 Currently the Scottish Government contributes to free bus travel for the over 60s and the Council pays for concessionary travel on trams. The model assumes that these arrangements will continue, with concessionary revenue being calculated as a percentage of overall patronage and adjusted for the increase in the rate of inflation.

4.29 In addition to fare income, the projections include developers' contributions of £7.8m towards the construction of the extended tram line. This is based on contributions received or agreed to date as well as an estimate of future contributions based on assumed development along the tram corridor.

4.30 The financial model for the 2015 OBC assumed annual net tram advertising income of approximately £1m. In this update, based on current proposed arrangements for the advertising contract, this is reduced to £0.06m.

Operating and Maintenance Costs

4.31 Edinburgh Trams have provided details of all their current operating costs. Tram maintenance costs have been taken from existing Council contracts. These costs have been uplifted by appropriate inflation indices.

4.32 In the 2015 OBC, tram costs had been increased proportionately to the additional track length for each of the options being considered. For this update, this methodology has been reconsidered and, in consultation with officers within Edinburgh Trams, refined to be based on a combination of what are considered more appropriate cost drivers including track length, annual tram kilometrage, peak vehicle requirement and one-off increases.

4.33 The impact of refining the cost drivers used to estimate future operating and maintenance costs, coupled with the proposed increased service frequency, is that in overall terms, operating and maintenance costs are increased when compared to the 2015 OBC.

Capital replacement costs

4.34 In addition to annual operating and maintenance costs, the model allows for capital replacement of tram assets. Replacement costs for the existing tram line are taken from the business case approved by Council in August 2013 and the costs for the proposed line from York Place to Newhaven have been calculated by Turner and Townsend.

CEC02086792_0053

Taxation

4.35 Taxation has been modelled using existing tax rates, capital allowances and company structures. Grant Thornton, appointed as specialist tax adviser, made recommendations around refining the tax calculations within the model, particularly around timing and settlement of corporation tax liabilities. These recommendations have been included in the model.

4.36 Grant Thornton have also recommended further work and analysis around the tax efficiency of the current company structure and tram infrastructure payment mechanism. Progressing this will be considered as part of any wider decision to review the current company and contractual structure of Transport for Edinburgh and the Council.

Dividend policy and transfer payments

4.37 Monies are transferred between Transport for Edinburgh and the Council by way of dividend payments and a number of access fees detailed in the tram operating agreement, for the use of tram assets. This enables the Council to fund tram maintenance and life-cycle replacement as well as the capital financing costs for the project.

4.38 Dividend policy does not affect the financial benefits of the overall project, as it is simply a transfer of cash to the Council from its subsidiary. However, it is important when assessing the project's affordability, as the Council requires cash to be transferred in order to service any borrowing.

Lothian Buses Dividends

4.39 The Council's draft budget framework for the period 2016-2021 assumes a continuing additional annual dividend of £6m. This comprises the existing £3m, which helps fund the existing line, and an additional £3m dividend payment as approved by Council in October 2015. For the purposes of this business case update, it is assumed that this money is not available for the York Place to Newhaven project. However, it is assumed that the dividend will increase in line with inflation, and these increases are assumed to be available for the extension along with an assumed one-off extraordinary dividend of £20m from Lothian Buses, receivable between 2017 and 2021.

Capital costs and financing

Capital advance

4.40 In order to extend the tram line to Newhaven, the Council needs to fund capital costs of up to £165.2m as described in more detail in the 'Capital Cost' section of this chapter. Within the trams financial model, the capital advances associated with the spend profile, net of developer contributions, have been charged as interest only during the construction phase, followed by a 30 year repayment profile using an income-based repayment approach. The interest associated with repaying the capital advances has been charged at an indicative marginal cost of borrowing rate of 4.1%. The repayment profile modelled, based on an income approach rather than the default Equal Instalment Payment complies with current regulations guiding local authority borrowing, lending and loans fund administration.

CEC02086792_0054

4.41 The capital costs, net of projected developer contribution, together with an averaged annual 30 year borrowing requirement based on the indicative borrowing rate of 4.1% are stated in Table 16.

Table 16: Net capital cost and borrowing requirement

Description	Cost
Net capital cost estimate	£156.6m
Averaged annual borrowing cost	£9.5m

Borrowing

4.42 The Council's treasury management strategy focuses on borrowing to fund its overall capital financing requirement rather than specific project financing. Through this approach, the Council can achieve economies of scale and efficiency ensuring that borrowing required is secured at advantageous rates of interest. Prudential borrowing using the Public Works Loan Board is how the majority of Council capital expenditure is funded and its interest rates are currently viewed as being competitive.

4.43 Discussions are currently underway with commercial lenders to understand other types of competitive borrowing packages the Council could get access to. This will continue in tandem with a wider exercise to understand what the Council's capital financing requirement will be over the next five year timeframe. The latter exercise requires understanding the capital advance profile of the Council's approved five-year capital programme and other potential major projects that may be approved in the short to medium term, including the proposed tram project.

4.44 Once more certainty is reached on both these exercises, a treasury management strategy will be formulated to consider the overall Council borrowing plan to be pursued. So, should the tram project proceed to the next stage and on to financial close, the output of this overall Council borrowing strategy will be used to inform the actual rate of interest to be applied to the tram project, which will then replace the indicative 4.1% rate used in the current financial model.

4.45 Although the aim is that this indicative rate is maintained or reduced once a Council borrowing strategy has been agreed, there is a risk that uncontrollable economic and market factors adversely affect the type, structure and overall cost of borrowing the Council is able to gain access to. Two significant events that are likely to be factor in this are the impact of Brexit and the announcement and timing of any potential second Scottish Independence Referendum. The Council's Treasury section will manage this risk as far as possible through a combination of monitoring market trends and consideration of the timing of any borrowing strategy.

Modelling results

Affordability and funding

4.46 In order to assess whether the Council can afford the tram project, the Council cash flows during the construction period and over the subsequent borrowing repayment period have been modelled separately. Figure 6 details the cumulative cash flows to the Council to 2036 comparing both the York Place to Newhaven project against the operation of the existing Airport to York Place line (the do nothing option).

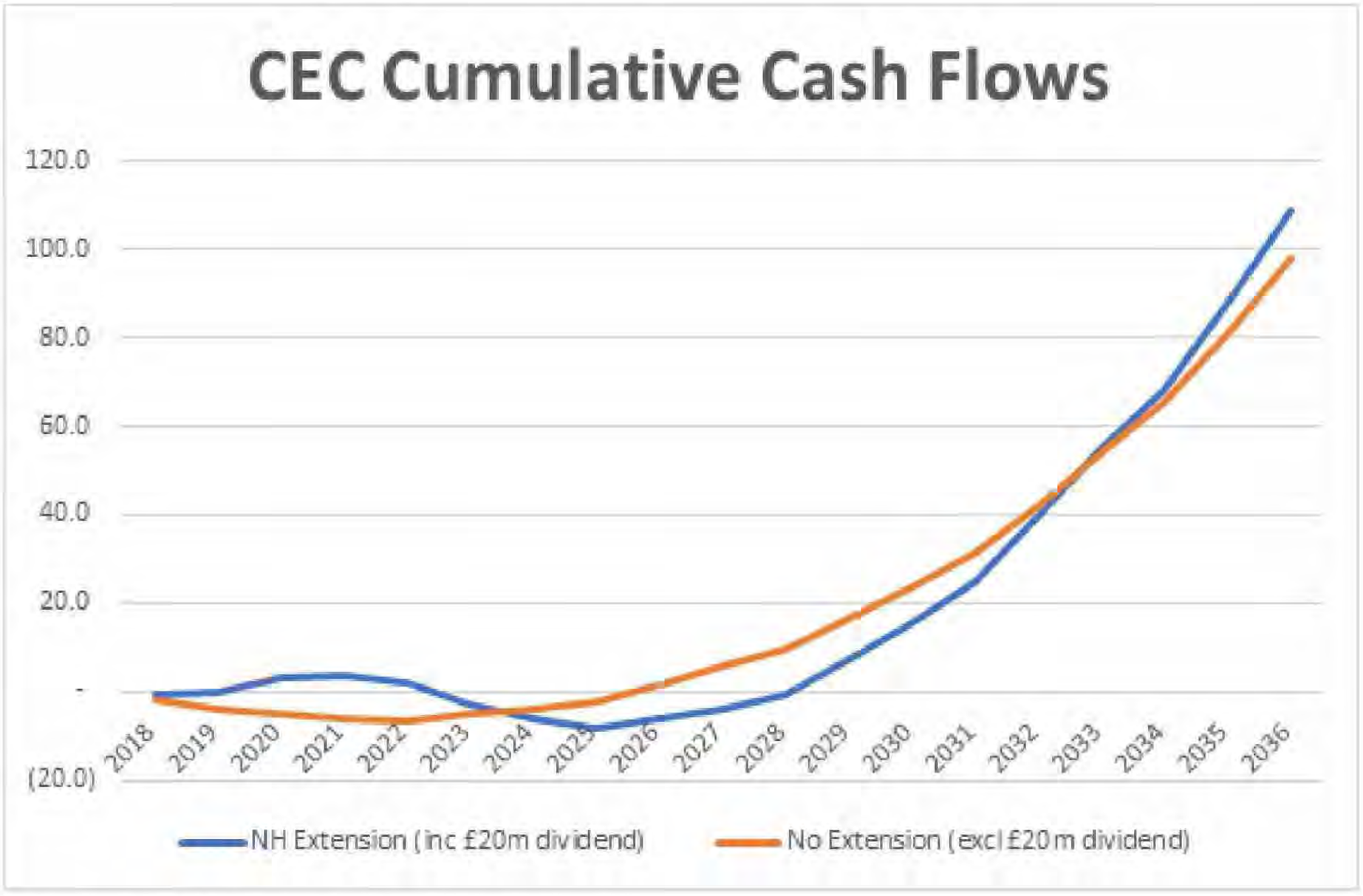

Figure 6: CEC Cumulative Cash Flows

4.47 Under the income-based repayment profile, capital financing costs are repaid as interest only in the construction period, with principal and interest repayments for the 30 years following commencement of operations. However, the increased revenue generated from extending the tram line grows over a longer period presenting a challenge in terms of short to medium term affordability.

4.48 The model suggests a likely total funding gap of £8m in the short to medium term, after utilising £20m of assumed extraordinary dividend from Lothian Buses. The Council will need to finance this from its revenue budget. The break-even point occurs in 2029.

4.49 However, it is important to note that the majority of this funding gap (£7m) is associated with the operation of the existing Airport to York Place line, and, if all things remain equal in terms of current operation of the tram network, is projected to arise in any event. The York Place to Newhaven project thus would have only a marginal impact on the anticipated short to medium term funding gap. The timing of the initial funding gap differs between the extension and do nothing options as the latter does not include the one-off £20m extraordinary dividend or debt servicing, which are assumptions relevant to the extension option only.

Lothian Buses Viability

4.50 It is recognised that the York Place to Newhaven tram line will have an impact on the Lothian buses business as a significant proportion of bus passengers on the proposed route could be expected to transfer to the tram. In addition, based on real experience from the construction of the previous on-road sections of the tram line, the company is also highly likely to lose revenue and incur additional operational costs during the construction phase with corresponding impacts on financial out-turn.

4.51 The counter balance is the positive impact of the development of an integrated public transport system aimed at continuing the growth of the public transport market to the benefit of the city.

4.52 The Council has discussed its proposals with Lothian Buses and both parties recognise the points above. The company continues to operate in a challenging commercial environment and the tram works will add to these challenges significantly. The company is confident that with the full support of the Council it can continue to operate its business successfully as well as develop it for the future.

4.53 Furthermore, the Council will continue to work with Lothian Buses closely in the development of traffic management arrangements including the development of bus priority measures to speed up journey times and will also seek to minimise the impact on Lothian Buses and its passengers by keeping the city moving and the provision of public transport high on the agenda.

Risks and sensitivity

Risks and opportunities

4.54 The detailed trams financial model is based on a large number of assumptions. There are risks in relying on any financial model, particularly one covering such a long time period and with multimillion pound costs and income streams.

4.55 There is a risk that logical errors in the modelling result in misleading projections. To mitigate this risk, PWC have performed a high level review of the model and its outputs. The review highlighted a small number of minor formula inconsistencies and errors that were rectified prior to running the model for this business case update.

4.56 As noted above, there is a risk that the tram works will impact on the ability of Lothian Buses to pay the modelled level of dividend due to the challenging commercial environment in which it operates as well as the disruption caused by the construction works. In order to mitigate this risk, the Council continues to work closely with Lothian Buses to minimise any negative impact on its operations.

4.57 There is also a risk that key assumptions regarding costs and income prove to be inaccurate. Assumptions which could significantly change the financial impact of the project, either negatively or positively, include:

- The capital cost of the project
- Passenger number estimates (the model assumes significant increases in tram use over the next 30 years)
- Tram premium fares as a percentage of total tram cash fares
- The effects of inflation on both costs and income.

4.58 In order to reduce this risk, all model inputs have been signed off by appropriate officers within the Council and Edinburgh Trams.

4.59 In addition, sensitivity analysis has been carried out to determine the financial impacts to the Council should costs and incomes change.

Sensitivity analysis

4.60 To improve confidence in modelling outputs, the following sensitivities have been tested:

- Changes in tram passenger forecasts on the total extended line of plus/minus 15%
- Changes in future tram airport passenger forecasts of plus and minus 15%
- Changes in capital costs of plus and minus 15%, based on existing profile of spend
- Reduction in inflation by 1%

4.61 These sensitivities were used to test the affordability of the project to the Council. This analysis shows that if the estimates of the number of passengers prove to be overly optimistic or if capital costs increase, then the Council will have to find additional resources to fund the project.

4.62 Figure 7 illustrates the impact of the sensitivities for affordability on the maximum funding gap.

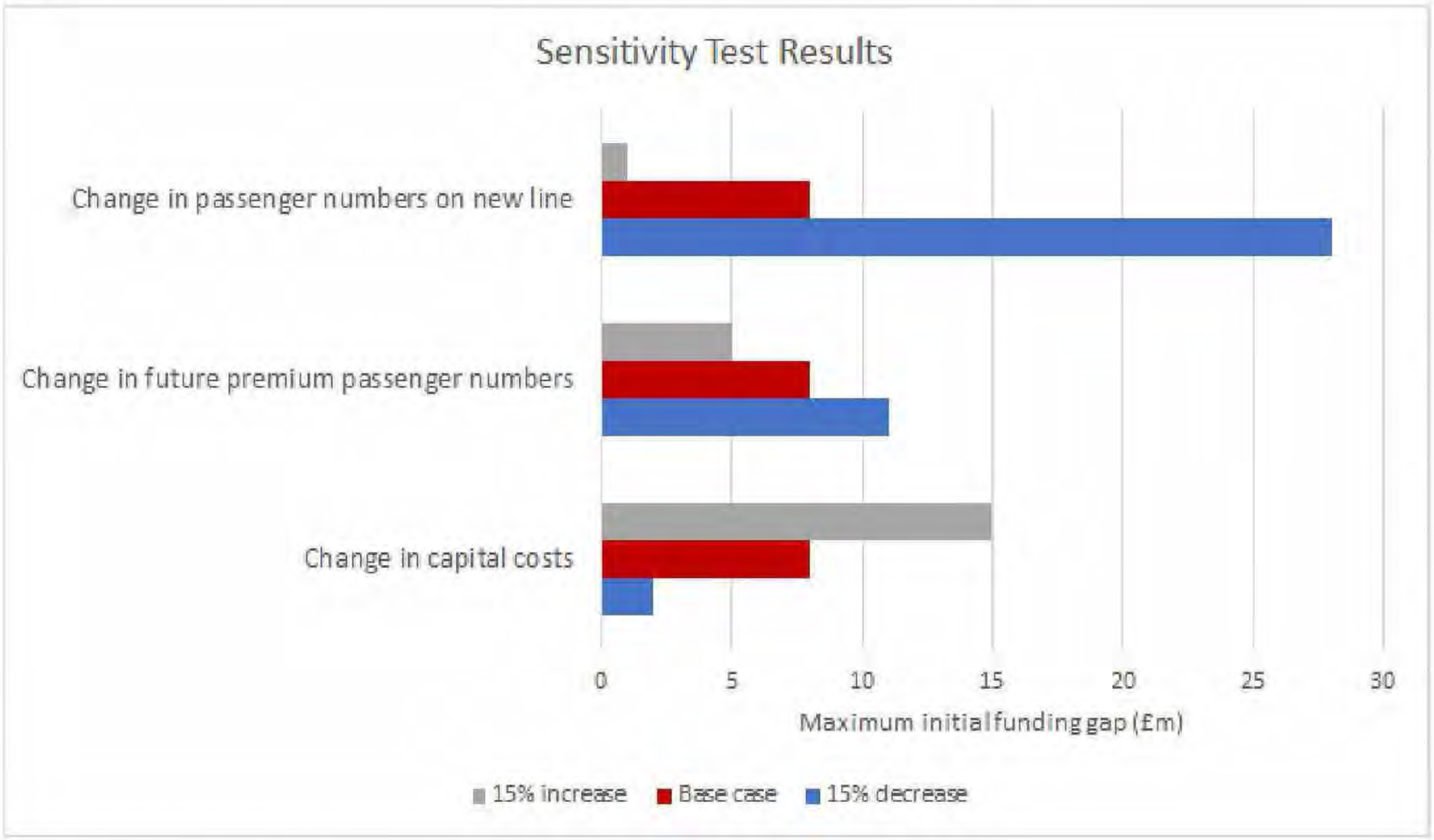

Figure 7: Results of sensitivity tests

4.63 Table 17 quantifies the revised funding gap which would arise for each of the sensitivities when compared to the base case of £8m.

Table 17: Sensitivity test results

Sensitivities	Revised funding gap	Break Even Point (Year)
Base case	£8m	2029
Capital cost +15%	£15m	2030
Capital cost -15%	£2m	2026
Tram patronage on Airport to Newhaven route +15%	£1m	2024
Tram patronage on Airport to Newhaven route -15%	£28m	2035
Future premium passenger numbers +15%	£5m	2027
Future premium passenger numbers -15%	£11m	2028
Reduction in inflation of 1%	£9m	2030

CEC02086792_0058

4.64 The sensitivities demonstrate that additional capital costs or reduced patronage would create a financial challenge to the Council in funding the York Place to Newhaven project. Options for addressing this possible financial challenge have been identified.

4.65 The model is also sensitive to inflation, as funding costs would remain constant. In order to manage this risk, Edinburgh Trams will have to carefully monitor its fare policy to ensure that the business continues to be profitable over the 30 year period of the financial model.

Potential funding options

4.66 In the event that one or more of the sensitivity scenarios arose, the Council could consider a number of options to reduce the funding gap. These options may include:

- Reducing tram service frequency to reflect any reductions in patronage
- Reviewing and re-tendering maintenance contracts to achieve more competitive prices
- Generating additional revenues either within Edinburgh Trams or within the wider Council.

4.67 More detailed analysis is required to assess both the financial impact of these options and also their impact on wider Council policies. This analysis can be undertaken during the next phase of the project.

Conclusions

4.68 The financial analysis supports the following conclusions:

- In the short to medium-term, an additional funding gap of £1m exists after utilising £20m of assumed extraordinary dividend from Lothian Buses, compared to the gap if no extension were to be built
- Sensitivity testing has shown that should capital costs be higher than anticipated or patronage less than forecast, the affordability gap would be considerably greater
- Options for improving the financial position have been identified, but will require further detailed analysis
- In the longer term, Tram revenues can fund the extension and provide additional income to the Council.

CEC02086792_0059

5 The Commercial Case

Chapter summary

- The procurement strategy has been developed based on key procurement objectives and a consideration of the lessons learned on the first phase of tram and from other tram projects in the UK and internationally
- It is recommended that the project is delivered under a design and build contract, incorporating tram infrastructure and tram control and communications systems
- Utility diversions should be carried out in conjunction with the main infrastructure works, either by the main contractor or under a separate contract
- The maintenance of the York Place to Newhaven line should be procured separately
- The suitability of the project for a private finance initiative was examined. There is likely to be little or no market appetite for taking full construction risk which would negate a PFI approach
- Consideration has been given to the appropriate form of contract and it is recommended that the NEC3 Option C target price contract is adopted
- A comprehensive risk identification and assessment has been carried out, and recommendations are made on an appropriate allocation of risks.

Introduction

5.1 The commercial case identifies the procurement and contracting strategy for the project, and outlines the proposed approaches to incentivising contractor performance, and to risk allocation.

5.2 Determining the appropriate procurement strategy involves an understanding of the procurement objectives; a consideration of the lessons learned on the first phase of tram and from other tram projects in the UK and internationally; and an appraisal of options available against the objectives and the lessons learned.

Procurement objectives

5.3 All projects classically have three objectives against which the success of the project is measured: cost, time and quality. These are shown in Table 18 along with a brief explanation of each one.

Table 18: Project objectives

Objective	Description
Cost	There are two aspects to the cost objective: • Value for money - which will be driven by market appetite, competitive tension, contractor innovation and a balanced approach to risk • Cost certainty – which will be driven by the form of contract, and the apportionment of risk
Time	The strategy should allow the project to be delivered within efficient but realistic timescales. Consideration is given to both preconstruction and construction timescales.

CEC02086792_0060

Quality	There is a need to ensure that the Council receives a quality finished product for such a significant intervention in the city. Quality encompasses a range of factors, including: • system performance and reliability, which underpin the economic case • construction quality • safety and compliance with statutory obligations, including the environmental obligations set out in the Tram Act. The procurement strategy needs to balance control with risk apportionment and elements of self-certification.

Lessons learned

5.4 In establishing the project team for the tram to Newhaven the Council has retained a number of individuals who successfully delivered the Airport to York Place project following mediation in 2011. In retaining this knowledge, the project is drawing on a number of lessons learned and these have been incorporated into the planning for the extension. These lessons include:

- The use of industry standard contracts to govern the project
- Rigorous project governance with highly qualified key personnel with experience of delivering light rail projects in the UK and abroad
- Setting up cross industry networks with other cities including Manchester, Birmingham and Dublin to ensure best practice is being adopted at each stage of project development
- Adopting traffic management plans that provide the contractor with expanded sites to ensure that works can continue in the event that problems are encountered during construction as well as adopting a strategy of only opening up roads once and completing all works prior to reinstatement - no double-dig
- Carrying out robust quantitative risk analysis and ensuring the contingencies set aside for unforeseen events
- Ensuring robust measures are incorporated into the construction contracts to ensure build quality, and a strong client team is present on site to monitor build quality
- Carrying out comprehensive formal consultation with the market to road test the overall delivery strategy for the project and encourage strong competition

5.5 The project team is also recommending that a gateway approval process is put in place to ensure all recommendations from the Edinburgh Tram Inquiry will be incorporated into the project plans and governance arrangements before contracts for the main construction works are signed . The approval being sought at present is to run a tender process for the project and then seek further approval from Council prior to the award of contract.

Procurement strategy

5.6 The procurement strategy considers how the project should be divided into different contracts. Figure 8 shows the various works involved in constructing a tram system, broadly following the sequence of construction.

CEC02086792_0061

Figure 8: Project work breakdown

5.7 In developing the procurement strategy for the project, the following specific questions were addressed:

- Who should be responsible for design: Council or the contractor?
- Should enabling works packages be carried out prior to the main track, civil works and tram systems works commencing?
- Should utility diversions be carried out as a separate contract or included with the main works?
- How should the proprietary tram control and communication systems be extended and integrated?
- Who should be responsible for maintenance of the extension?

Design responsibility

5.8 In broad terms two procurement models have been considered in developing the procurement strategy for the extension:

- Client design
- Design and build

5.9 Both models were evaluated against the objectives and lessons learned. The results of the evaluation are set out in Table 19, using a green, amber, red colour coding system to show how well the options perform against each objective.

Table 19: Design responsibility – evaluation of options

Objective	Client Design	Design and Build
Cost	• There are significant design interfaces to be managed, between the various work elements. The Council retains these risks under the Client Design approach • Requires strong technical expertise not available within Council to deliver value for money	• More likely to deliver value for money • Complex design interface risks lie with Contractor, who is best able to manage them. • Greater scope for private sector innovation
Time	• Council has more control over the Contractor's work sequences and traffic management • Council more exposed to delay risks associated with unforeseen site conditions • Council exposed to delay risks associated with design interfaces	• Provision can be made in the Contract for rigorous Council approvals and for the Contractor to work with the Council in finalising and implementing its traffic management and project phasing proposals. • Contractor can respond more efficiently to delay risks associated with unforeseen site conditions, and will carry most of this risk

CEC02086792_0062

Quality	• Council have complete control over all design decisions • Requires strong technical expertise not available within Council to supervise works to ensure quality	• Contractor is responsible for quality in accordance with the specified requirements. • Quality is monitored through ISO9000 and 9001 and the Council has right to intervene if the quality falls below that specified. • Contractor is incentivised to provide a quality product as completion of the works and final sign off by the Council will depend on it. This model for ensuring quality is used successfully throughout the UK and overseas on a range of infrastructure projects, including tram projects
Lessons Learned	• The design from the first phase of tram is approximately 85% complete and the Council has retained the right to use the design for the extension to Newhaven. • However, that there is very limited resource in the Council to manage a detailed tram design. By its nature tram design is complex and requires coordination across a range of disciplines including civil design, mechanical and electrical, systems and design integration with trams and the existing system. • While the actual design would be outsourced to a technical partner there is a significant risk that the Council would, in effect, be a poorly informed client without the necessary expertise to deal with complex design issues as they arose. It is also worth noting that other tram systems in the UK and Ireland have adopted a Design and Build approach to mitigate against this risk, even when there is a level of expertise embedded within the client organisation.	• Adopting a Design and Build approach puts the responsibility for design, including integration, with the Contractor and it would be the responsibility of the Council to define its requirements through a series of outputs in a Performance Specification. • The 85% design from the first phase would not be wasted as this would be provided to all bidders in the form of an unwarranted reference design. It would then be the responsibility of the Contractor to either carry out the necessary due diligence on the existing design or to discard it and develop a design from scratch. • Based on experience from other schemes, it is likely the Contractor would utilise parts of the design and re-design other elements. Either way the Council would not be responsible if the design failed to meet the output requirements set out in the Performance Specification.

5.10 The Design and Build approach performs similarly to or better than the Client Design approach under all criteria.

5.11 In relation to the primary procurement objectives, the Design and Build model will provide the Council with more opportunity to drive value for money and more opportunity to transfer delay risk and interface risks to the contractor. The models perform similarly in terms of delivering quality.

5.12 In order to achieve the most benefit from the design done during phase 1, it is recommended that this is issued as an unwarranted client's 'reference design' to all bidders.

5.13 The Client Design model carries significant risks in relation to the Council's in-house technical capability and while both models are similar in respect of managing wider in-house support and third party interfaces the Client Design model would import an almost unmanageable risk to the Council in relation to technical compatibility and systems integration.

5.14 Based on the above the Design and Build model is recommended.

Enabling Works

5.15 Options to carry out advanced enabling works at Bernard Street and Constitution Street have been explored and market tested during Stage 1 although a decision has been taken not to pursue these further.

5.16 A detailed programming exercise has been carried out and has concluded that the Bernard Street and Constitution Street works can be included in the main contract without adversely affecting the programme, so long as the detailed design for the wall is carried out during Stage 2. This approach is also consistent with the principle of "one dig" which has been developed in more detail during Stage 1, particularly in relation to the temporary traffic management arrangements.

5.17 Some minor enabling works have been carried out during Stage 1 and these are summarised in Table 20.

Table 20: Enabling works packages

Package	Description
Traffic management modelling	Following discussions with the Transport Working Group and agreement with the Project Board around the traffic management approach, plans have been developed and a level of traffic modelling has been carried out on the traffic management approach to ensure a workable solution is available.
Advanced Utility Site Investigation	A series of advanced site investigation works have been carried out in key areas identified by the utility conflict schedule.
Lindsay Road Sewer	An advanced site investigation has been carried out to inform the tender documentation, level of risk transfer and inform the accuracy of the as built information currently available
Advanced Archaeological Site Investigation	Discussions have been held with the City Archaeologist to understand the likely finding of archaeological arising's of interest during the project. A series of advanced site investigation works have been carried out in key areas identified through these discussions including the 1817 Dock structure at Ocean Terminal and Queen Charlotte Street to Baltic Street.
Edinburgh St James interface	Agreement has been reached with Edinburgh St James on programme and scope and this is reflected in the GAM agreement.

Utility diversions

5.18 Two options have been considered for the utility diversions:

- Award a separate utility diversions contract in advance of the main design and build contract
- Include utility diversions in the scope of the main design and build contract

5.19 Utility diversion works suffer a high risk of delay due to the poor quality of records available on utility locations. Even with advance site investigations, there will inevitably be a significant volume of unknown services found. Separate advance utility diversion contracts are commonly awarded on tram projects, so as to reduce the delay risk to the main works due to unforeseen utilities.

5.20 However, there is a significant design tie-in between the utility diversions and the main works, as the designs of the track alignment, track structure and drainage, overhead line pole foundations and tram system ducts all significantly affect where utilities can be diverted. This can result in the main contractor re-diverting utilities moved under advance contracts, to accommodate their design.

5.21 There is a key objective, arising from the lessons learned, wherever possible to only excavate once in any area (no "double dig").

5.22 Given the number of utilities in the Leith Walk and Forth Ports areas already diverted under the original MUDFA contracts, and given the level of information available in relation to utilities not already diverted, there may be an opportunity to transfer some risk to the main contractor, this was discussed with potential bidders as part of the formal market consultation earlier this year and the reaction was mixed.

5.23 The Council would provide the contractor with the utilities data collated during the first phase of tram and subsequently during the development of this business case. This would be supported with additional ground investigation information and the contractor would be required to manage the risk and tie the programme of utility diversions in with its permanent works design and construction.

5.24 However, it is clear from the market consultation that the main contractor would not be willing to take the risk of unknown utilities given the history of the project, and the Council would therefore need to provide some relief under the contract to deal with any such eventualities.

5.25 Another option under consideration is for the Council to engage a specialist subcontractor to work ahead of the main contractor to identify and resolve unknown utilities. This was the model successfully adopted on the first phase of tram, post mediation.

5.26 It is recommended that the utility diversions be carried out immediately prior to main infrastructure works to avoid any double dig. This could be achieved by including the diversions in the main design and build contract, or appointing a specialist subcontractor to work in advance of the main contractor.

Tram control and communication systems

[redacted]

[redacted]

CEC02086792_0066

[redacted]

Form of Contract

5.39 A construction contract will need to be entered into between CEC and the preferred bidder chosen after a competitive procurement procedure. The provisions of the construction contract will need to be drafted and reviewed to ensure they reflect an appropriate risk allocation (see later in this chapter for a review of the risk allocation), and that the balance of risk and reward for the contractor drives a value for money and affordable solution.

5.40 The first phase of the Edinburgh Tram project used a bespoke form of contract, which was complex and burdensome to manage. It is not recommended that this form is

adopted for the York Place to Newhaven project. A revised bespoke form of contract may be considered, but this would be expensive to produce and administer and will be unpopular with the bidding community.

5.41 There are a number of 'standard form' construction contracts which provide a more appropriate alternative for a design and build contract of this nature. These fall into two basic types:

- Recourse or adversarial style contracts such as the FIDIC contract
- Collaborative style contracts such as NEC 3

5.42 The advantages and disadvantages of each type are summarised in Table 21.

Table 21: Comparison of collaborative and recourse style contracts

Collaborative (NEC3)	Recourse (FIDIC)
Advantages: Familiar to bidders Focused on collaboration and early warning/resolution of issues Has been used extensively by government on infrastructure schemes, e.g. Crossrail "Risk share" as opposed to "risk transfer" approach	**Advantages:** Familiar to bidders Relatively clear allocation of risks and liabilities Used extensively and well tested (leading to fewer issues as to interpretation) Less amendment required to produce balanced contract
Disadvantages: Will require a proactive (and intensive) approach to managing the contract Sometimes considered to be more contractor-friendly than FIDIC Attempted to be written in "plain English"; accordingly can potentially lead to some ambiguity unless amended appropriately	**Disadvantages:** Less focus on collaboration and the proactive resolution of issues More likely to lead to protracted contractual disputes, particularly on complex projects

5.43 There are significant heavy rail procurements currently in the market which are being procured under the NEC3 standard form contracts, including Crossrail and High Speed 2. In 2009 the Office of Government Commerce announced that the NEC3 is the only form of contract it endorses.

5.44 Informal contact by CEC with other public sector light rail operators such as Docklands Light Railway Limited, Transport for London and Transport for Greater Manchester have demonstrated that there is strong support for the use of NEC3 in the light rail sector.

5.45 From the market consultation, there was broad support from the contracting community for the use of NEC3, though some of the European based contractors were less familiar with it.

5.46 There are two NEC3 forms which are possibly suitable, depending on the risk allocation adopted:

- Option A is a lump sum priced contract with activity schedule, where the contractor provides the works described in the contract for a sum of money. The contractor prepares an activity schedule where each activity is priced as a lump sum that the contractor is paid once it has completed that particular activity. The contractor takes

the assessing and pricing risk under option A, although the lump sum will be adjusted if certain compensation events occur.

- Option C is a target cost contract with activity schedule. The contractor uses an activity schedule to tender a target price, which is the sum of the price for each activity and a fee. Payment is made on the basis of actual costs incurred, meaning that activities not initially included in the activity schedule will increase the target cost. Since the risk of savings and over-runs is shared between the parties in option C, the contractor takes less risk than under option A.

5.47 The unknown nature of the ground conditions risk and third party risks, and the significant potential for additional works being required would make it very difficult for bidders to quote a fixed lump sum.

5.48 A target cost contract is thus more appropriate, but even this will be difficult to cost accurately given the limited design work the market will be able to undertake during the tender period. To mitigate this, consideration is being given to a two-stage procurement process whereby a preferred bidder is selected based on the published award criteria, including target price, and is given a preliminary contract to work up a detailed design and refine the target price prior to the full construction contract being signed. This approach has the added benefit of ensuring the detailed system interfaces are fully designed for the final target price.

5.49 Given the UK Government support for NEC3, the experience of its use on other rail projects, and the support from the market, and the level of unquantifiable risk, it is recommended that the NEC3 Option C form of contract is used, subject to CEC being comfortable on the risk share approach and the need for proactive management of the contract. A number of amendments will be made to the contract to ensure that the risk allocation reflects the recommendations set out later in this chapter.

Private Finance Suitability

5.50 A Private Finance Initiative (PFI) or Public Private Partnership (PPP) can offer significant advantages over a traditional approach to project delivery, through design and construction innovation, incentivised performance, long term asset management and deferred funding. In developing the procurement strategy, an assessment was made of the suitability of the project for a PFI/PPP approach.

5.51 The primary concern when assessing private finance suitability is to ensure a PFI approach is only adopted if it offers the potential to deliver better value for money than a conventional procurement approach. This involves ascertaining that the project has the right scale and operational performance requirements, certainty of future demand and has scope for significant risk transfer.

5.52 The Edinburgh Tram York Place to Newhaven project has a number of the necessary characteristics to make it suitable for a PPP/PFI approach. It is of suitable scale to justify the additional procurement costs, demand is likely to continue to grow over time, the long term maintenance availability could be included in the scope and performance can be specified and measured in output terms.

5.53 However, the scope for significant construction risk transfer is likely to be compromised by a number of factors:

- The time and cost overruns experienced on the original Edinburgh tram project

CEC02086792_0069

- The inclusion of residual utility diversions within the scope of the contract, and the volume of known remaining conflicts with utilities and other below ground assets
- The significant construction and programme interfaces with other developments, including Edinburgh St. James and the Leith Programme.

5.54 There is likely to be little or no market appetite for the risks imposed by these factors. An inability to transfer construction risks would prove fatal to a PFI/PPP approach.

5.55 In addition, the existence of a detailed design, and the fact that much of the equipment for the extension has already been acquired, severely limits the scope for value for money through private sector innovation.

5.56 A conventional procurement process is thus recommended. The appropriate form of contract is discussed elsewhere, however, the recommended Design and Build approach will allow the contractor the scope for some innovation in construction and delivery methods.

Risk apportionment

5.57 A comprehensive assessment of risks has been carried out, following the risk management process described in Chapter 6.

5.58 The main risks associated with the delivery of the project are summarised in Table 22, along with recommendations on how each risk should be apportioned between the Council (CEC) and the Main Contractor (MC). The table also notes actions being taken to mitigate the risks.

Table 22: Recommended risk allocation

Risk	CEC	MC	Actions
Site access and possession			
Site possession	✓		Access Protocol to be prepared setting requirements in relation to sufficient design completion prior to MC being granted access to site.
Off-site access and possession rights		✓	
Exercise of third party access rights to Site.		✓	Review of third party agreements.
Protester action		✓	
Road closure and traffic management approvals		✓	TRO approval to be sought prior to tendering main contract. Time only relief where CEC cause delay.
Access to existing Tram System	✓		Existing System Access Protocol
Usability of existing free issue equipment		✓	Bidders to be given access to materials during tender
Site conditions			

CEC02086792_0070

Completion of enabling works to specified standard	✓		
Condition of existing structures	✓	✓	Consideration being given to sharing this risk to avoid bidders pricing for unnecessary works in their tenders
Archaeology	✓	✓	Consideration being given to appropriate risk sharing approach.
Contaminated ground		✓	Appropriate site investigation.
Diversion of known utilities	✓	✓	Consideration being given to appropriate risk sharing approach, including appointment of a specialist contractor to carry out advanced works.
Diversion of unknown utilities	✓	✓	Consideration being given to appropriate risk sharing approach, including appointment of a specialist contractor to carry out advanced works.
Necessary Consents			
Adequacy of Powers	✓		Legal review of Tram Act carried out
Obtaining of all necessary consents		✓	CEC resources to ensure timely response to Prior Approval requests
Building fixing consents		✓	
Design			
Ability of CEC Specification to meet CEC business objectives	✓		Peer reviews of specifications
Inconsistency / ambiguity within CEC Specification		✓	Obligation on bidders to review specifications at tender stage
Accuracy of "Relied Upon Information" relating to the Existing System	✓		Verification of information by survey or with relevant authority (e.g. Edinburgh Trams)
Development of design		✓	Previous design being made available on an unwarranted basis
Construction			
Build quality		✓	Include appropriate measures in contract and ensure strong client team on site.
Site security		✓	
Traffic management		✓	Advance TRO approval being sought.
Adverse weather conditions		✓	
Force majeure events	✓	✓	Define FM on a "closed list" basis

Late completion of the Works		✓	
Public liaison		✓	Collaborative approach recommended
Damage to existing system		✓	Close collaboration between contractor and operator
Disruption to operations		✓	Close collaboration between contractor and operator
Third party claims		✓	
Testing, commissioning and bringing into service			
Provision of trams and staff	✓		Close collaboration between contractor and operator
System integration		✓	Availability of existing systems supplier to contractor
System performance		✓	
Safety Case	✓		Edinburgh Trams

Conclusions

5.59 It is recommended that the project is delivered under a design and build contract, incorporating tram infrastructure and tram control and communications systems.

5.60 Utility diversions should be carried out in conjunction with the main infrastructure works, either by the main contractor or by a specialist contractor working in advance of the main contract.

5.61 The maintenance of the York Place to Newhaven line should be procured separately

5.62 It is recommended that the NEC3 Option C target price contract is to be adopted subject to CEC being comfortable on the risk share approach and the need for proactive management of the contract

5.63 It is recommended that risks are allocated as set out in Table 22.

CEC02086792_0072

6 The Management Case

Chapter summary

- Traffic management will be deployed which facilitates opening large sections of the work site at any one time. A detailed logistics and access plan will be developed, in consultation with key stakeholders, prior to any works going to tender.
- A continuous approach to construction will be deployed wherever possible avoiding the need to excavate twice.
- A desktop exercise has identified in excess of 1200 conflicts with utilities and other below ground assets. Additional site investigations have now been completed and the results have fed in to the costs and risk assessments and have also informed the construction strategy
- There are a number of heritage items that are impacted by the works, including archaeological areas of interest, listed buildings and monuments. The strategy for dealing with these heritage items and archaeological remains has been agreed with the City Archaeologist.
- During the construction, testing and commissioning of the project there will be a requirement to terminate services at West End Princes Street tram stop to carry out activities to tie-in the new route with the existing line. This curtailment of passenger service however can be kept to a minimum
- A programme has been developed based on the recommended construction delivery strategy and procurement strategy. This concludes that the overall design, construct, test and commission duration for the project will be in the region of 40 months.
- The 40 month programme duration is based on the traffic management assumptions set out herein. If these cannot be delivered it is highly likely that the overall project duration will increase.
- Strong project governance and project management arrangements are in place
- A stakeholder management and communication plan has been developed

Introduction

6.1 The management case sets out how the Council plan to deliver the project to ensure that the objectives in terms of cost, time and quality are achieved. The following topics are covered:

- Construction delivery strategy
- Programme
- Project management
- Risk and opportunity management
- Stakeholder management
- Post-project review

Construction delivery strategy

Introduction

6.2 In developing the Outline Business Case in 2015 a review of the existing design was carried out which determined that it was sufficiently detailed to generally be adopted for the business case. The review noted areas of the design which required further development, including:

- the tram alignment from York Place to Picardy Place, including the upgrade of the Picardy Place junction and the interface with the Edinburgh St James development
- the reconfiguration of the London Road – Leith Walk junction
- the track slab design over the following structures:
    - Scottish Power tunnel on Leith Walk
    - Network Rail overbridge on Leith Walk
    - Tower Place bridge
    - Victoria dock bridge
- design of Ocean Terminal tramstop
- review of building fixing locations

6.3 Further design work has now been done on each of these areas and this has fed in to the costs and risk assessments in this update of the outline business case and has also informed the following construction strategy.

6.4 The construction delivery strategy also includes general principles which should be adopted and recommendations on several key issues:

- Traffic management
- Utilities and other below ground assets
- Advanced site investigation
- City heritage
- Third party interfaces
- Tie in to the existing tramway

6.5 The recommendations of the strategy are summarised in the following sections.

Core principles

6.6 Based on lessons learned from the construction of the first phase of tram the strategy is underpinned by the following core principles:

- Traffic management will be deployed which facilitates opening large sections of the work site at any one time. This will require significant traffic management planning over a large geographic area to accommodate diversion routes and changes to junction operations
- A continuous approach to construction will be deployed wherever possible whereby the diversion of utilities and the installation of the tramway are combined avoiding the need to excavate twice thus minimising disruption, minimising cost and speeding up the construction process. This is consistent with the recommended procurement strategy set out in Chapter 5
- Recognising the impact this approach is likely to have on local businesses and residents impacted by the works, a detailed logistics and access plan will be developed, in consultation with key stakeholders. A compensation scheme for business affected by the works will also be put in place.

Traffic Management

6.7 The principle of adopting a traffic management plan which facilitates opening large sections of the work site at any one time was driven primarily by lessons learned from the construction of the existing route and experience in other cities both in the UK and

CEC02086792_0074

Europe. The factors considered by the working group in arriving at this decision are summarised in Table 23.

Table 23: Advantages and disadvantages of proposed traffic management approach

Advantages	Disadvantages
• Overall programme saving • Economies of scale through completing utility diversions in single phase • Savings on traffic management costs • Fewer traffic management changes allowing all road users adapt to revised arrangements • Flexibility to solve site issues as they arise • More efficient track construction • More efficient testing of built infrastructure • Continuity of access and dedicated logistics support for business deliveries and collections • Better quality road surfacing with fewer transverse joints	• Disruption over a wider area at any point in time • Impact of traffic diversions on a wider area • Additional road modifications to support diversion routes • Some reduction in public transport accessibility due to bus route diversions

6.8 To facilitate the works there is a need to provide significant traffic management. The current proposals are to deliver the project in substantial sections with wider city traffic management required to facilitate the required closures. These will be supplemented by provision for parking and loading, pedestrian crossings and logistics support for local businesses.

6.9 From a traffic management perspective, the route has been split into four sections, with a different approach being adopted in each section, as set out in Table 24.

Table 24: Traffic management proposals by route section

Route section	Proposals
York Place to London Road	Carry out works in sub-phases to maintain traffic in both directions at all times: • Picardy Place to Union Street • Union Street to London Road • York Place tie-in
London Road to Foot of the Walk	Close 3 lanes of Leith Walk for approximately 18 months Introduce a temporary gyratory system with single direction running on Leith Walk and traffic in opposite direction diverted to Easter Road and Bonnington Road. This will be supported with the provision of loading areas, logistics support and pedestrian crossings to minimise disruption.
Constitution Street to Tower Street	Given the constraints in relation to road width, and the availability of diversionary routes, the strategy is to close the full width of the road in sections to allow the works to take place. Access to all business and residential premises will be maintained at all times.
Forth Port to Newhaven	Carry out works in phases to maintain traffic in both directions at all times: • Newhaven to Ocean Terminal West Side • Ocean Terminal West to Ocean Terminal East • Ocean Terminal East to Rennie's Isle • Rennie's Isle to Tower Place • Tower Place to Constitution Place

CEC02086792_0075

6.10 This approach has been tested using the Council's traffic model. The final traffic management proposals will be developed in detail by the Contractor and will be subject to scrutiny by a Traffic Management Review Panel chaired by Council officials and including representatives of the emergency services and public transport operators. Members will be consulted as detailed proposals are developed. Further modelling work will also be carried out during Stage 2 to assess the impact of this approach.

6.11 The 40 month programme duration used to develop this OBC is based on the traffic management assumptions set out herein. If these cannot be delivered it is highly likely that the overall project duration will increase.

Utilities and other below ground assets

6.12 A major part of the works involved in building a tram system is the clearing of obstructions from the tram construction path including all required utility diversions. It is understood that a significant number of utility diversions have been carried out by previous contractors however it is known residual issues remain to be resolved.

6.13 A desktop utility assessment has been carried out to identify utilities, basements, archaeological works, monuments, obstructions and other underground assets that may impact the tram works. A schedule has been prepared detailing the likely conflicts and the action required to mitigate them.

6.14 The desktop exercise has identified in excess of 1200 potential conflicts with utilities and other below ground assets along the route. An impact assessment of the conflicts was also carried out with over 75% being considered medium to high impact. As well as those conflicts identified there are likely to be further conflicts that are currently unknown and will only become apparent when the excavation works occur. The site investigation information provided by the Leith Programme team was used to verify the desktop exercise in areas where trenches had been excavated.

6.15 The conflict schedule has informed the procurement strategy set out in Chapter 5, which recommends that the utility diversions should be carried out in conjunction with the main infrastructure works, either by the main contractor or by a specialist contractor working in advance of the main contract.

Advanced site investigations

6.16 To support the desktop assessment the technical working group reviewed site investigation information provided by the Leith Programme team. This information was gathered during the construction works on Leith Walk and identified utility apparatus as well as its location. This information was used to verify the desktop exercise.

6.17 Given the conclusions set out in the procurement section of this business case and the need to provide good quality, comprehensive ground investigation information to bidders, an assessment based on the outputs of the desktop exercise, was carried out and identified additional areas that should be investigated further through site investigation in the pre-contract stage of the project.

6.18 These additional site investigations have now been completed and the results have fed in to the costs and risk assessments in this update of the outline business case and have also informed the construction strategy.

CEC02086792_0076

City heritage

6.19 There are a number of heritage items that need to be considered when developing the construction delivery strategy, including archaeological areas of interest, listed buildings and monuments.

6.20 The strategy for dealing with archaeological remains has been agreed with the City Archaeologist and is set out in Table 25.

Table 25: Strategy for dealing with city heritage items

Archaeology		
Area	**Description**	**Strategy**
York Place to Foot of the Walk	Some archaeological remains	Maintain an archaeological watching brief during the works and record features of interest
Foot of the Walk to Constitution Place	Significant level of archaeological interest, including graveyard	Include an allowance in the programme for resolution of archaeology. Carry out heritage works at the Constitution Street church, including wall stabilisation and exhumation and reinterment of bodies currently lying under roadway.
Constitution Place to Newhaven	Varying sections of archaeological interest including 1817 dock structure at Ocean Terminal and archaeological findings between Queen Charlotte Street and Baltic Street	Maintain an archaeological watching brief during the works and record features of interest. Carry out heritage works at the 1817 dock structure and between Queen Charlotte Street and Baltic Street.

6.21 There are a number of listed buildings and structures that will be encountered during the works. These have been categorised as buildings or structures needing improvement works; protection works or no work. All costs associated with the improvement or protection works are included in the capital cost estimate.

6.22 There are four monuments within public realm spaces which conflict with the tram construction path. These are:

- Paolozzi sculptures at Picardy Place;
- Sherlock Holmes statue at Picardy Place
- Queen Victoria statue at the Foot of the Walk; and
- Robert Burns statue at Bernard Street

Each of these monuments has been assessed in relation to its current location, condition and revised road alignments to determine how it will be dealt with. With the exception of the Queen Victoria statue which can be protected during construction, the monuments will need to be permanently relocated. The new locations will be as close as possible to the existing, and will be agreed with the Council. The Paolozzi sculptures and the Sherlock Holmes statue will be relocated as part of the Edinburgh St. James project.

Tie-in to the existing tramway

6.23 The project includes the demolition of the existing temporary tramstop at York Place. The platform of this stop sits on the line of the future inbound track of the extended line. This stop will thus have to be shut for a period of time to construct the tie-in of the existing track to the new line.

6.24 To mitigate the impact on passenger services, it is proposed to bring the new stop at Picardy Place into service prior to decommissioning the York Place stop, with single line running from York Place to Picardy Place while the temporary stop platform is being demolished and the second track constructed.

6.25 Current analysis shows that the existing line can be kept open, but that there will be some service disruption, including a requirement for trams to turn back at West End Princes Street stop for a period of up to two weeks.

6.26 This sequencing is being reviewed with Edinburgh Trams to see if services could continue to operate in this period to St. Andrew's Square by using a temporary crossover.

Programme

6.27 An outline programme has been developed based on the general principle of continuous working and adopting a traffic management plan which facilitates opening up large sections of the work site at any one time. The programme has been informed by actual observed timescales on the first phase of tram post mediation, feedback from market consultation, and the additional design work carried out.

6.28 The outline programme concludes that the overall design, construction, testing and commissioning of the York Place to Newhaven project will take approximately 40 months from award of contract. This duration is within industry norms for a tram project of this scale and complexity and is consistent with the views expressed during the market consultation.

6.29 The pre-contract award phase is estimated to be 13 months, as shown in Table 26.

Table 26: Pre-contract award programme

Milestone	Date
Issue OJEU notice for main construction works	October 2017
Complete evaluation of tenders for main construction works	September 2018
Council approval to commence Stage 3	November 2018
Award main construction contract	November 2018

Project governance

6.30 A key lesson learned from the first phase of tram delivery related to the project governance and contract management structures. Following mediation, revised governance structures were put in place that served the project well through to passenger service. It is essential that similar arrangements are put in place from the outset for any future projects. The key principles underpinning the project governance structure are:

CEC02086792_0078

- Strong leadership from the top of the client body, key stakeholders and the contractors selected to carry out the works;
- Strong political support and regular reporting by officers on risks, issues and costs;
- Clearly defined roles and responsibilities within the client organisation with clear reporting lines;
- Clear management information used to report through all project levels; and
- Professional project management support within the client organisation.

6.31 Following the decision to proceed with Stage 1 activities in December 2015 a governance structure, based on lessons learned from the first phase of tram, post mediation, was established.

6.32 The day to day responsibility for the project resides with the Project Director with core decisions being taken within the project, by the Project Board or by the Council's Corporate Leadership Team, as appropriate. Political oversight resides with the Transport Projects Working Group. Updates to the Governance, Risk and Best Value Committee will be provided as required. It is recommended that similar governance arrangements continue into Stage 2.

6.33 The current meeting schedule, attendees and agendas are given in Table 27.

Table 27: Project meeting schedule

Meeting	Frequency	Attendees	Agenda
CLT Briefing	As Required	CEO (chair) CLT Members Project Director	To provide oversight of all areas of the project and to highlight and resolve key issues that remain unresolved at CEC Tram Board
Project Board	Monthly	Director of Place (chair) Project Director Head of Finance External independent technical advisor Head of Place (Planning) Head of Procurement Head of Legal Senior Communications Officer Transport for Edinburgh CEO Edinburgh Tram Managing Director	To provide clear oversight of all areas of the Project as client, to provide challenge to issues and change requests and to be the client sign off point for change requests.
Working Group	Fortnightly	Project Director (chair) Finance Transport & Planning Communications Property Procurement	Day to day management of the project and to agree on matters to be escalated to Project Board

CEC02086792_0079

		Legal External Advisors	
Transport Projects Working Group	Monthly	Leader of the Council Deputy Leader of the Council Convener and Vice-Convener of the Transport and Environment Committee (or equivalent) Opposition Group Leaders Opposition Transport Spokespersons Senior Council Officers Project Director	Updates on project progress and current issues

Project management

6.34 A comprehensive Project Execution Plan (PEP) has been prepared for the Edinburgh Tram York Place to Newhaven project. This is a living document which continues to be updated as the project progresses from one stage to the next. The PEP defines the project objectives and the strategy for the management of the project and the procedures for its successful implementation and completion in line with those objectives.

6.35 An audit of the PEP and wider project governance is currently being carried by the Strategy and Insight team.

6.36 The PEP sets out the processes to be followed for a range of project disciplines, including:

- Overall project governance and organisation
- Project communications management
- Cost management
- Programme management
- Risk management
- Quality management
- Change management
- Design management
- Health and safety management
- Environmental management
- Stakeholder management
- Document control

6.37 The change management, risk management and stakeholder management approaches are elaborated on in the following sections.

Change management

6.38 A robust change management process will be implemented which recognises that good change control relies upon accurate identification and assessment of proposed changes

at the earliest possible stage. The implications of changes must be considered relative to the project objectives.

6.39 Sometimes decisions will have to be made quickly and it is recommended that a mechanism should be put in place to allow this to be done. Delegated authority will be put in place for approval of changes, with delegated limits approved by the Project Board.

6.40 A Change Register will be maintained and used for Board approval in advance of agreeing Compensation Events with the contractor.

6.41 The change management process will include for an element of project contingency reserved to the Board.

Risk and opportunity management

Risk management overview

6.42 This section sets out the risk management process being implemented on the project. It details the structure, management responsibilities, risk activities and reporting activities needed to successfully and proactively manage risk on the project. Risk is considered in terms of both threats and opportunities.

6.43 The risk management process represents common best practice for identifying and understanding the range of risks faced by the project and setting out actions to manage them. It consists of the following iterative steps:

- **Identification** – new risks are identified and incorporated into a risk register
- **Analysis & evaluation** – each risk is assessed in terms of likelihood and impact
- **Treatment** – actions identified and implemented to actively manage risk
- **Review** – on-going monitoring progression of risks over the life of the project

6.44 This is supplemented by the ongoing monitoring, review, management, reporting, communication and improvement of the risk process and its deliverables against the project objectives throughout the life of the project. This assists with establishing and maintaining the process, creating a risk management culture, assigning accountability, allocation of risk and allows for risk activity and reporting arrangements to adapt to emerging changes in the project.

6.45 Comprehensive risk registers have been developed for each of the work packages identified in the procurement strategy, as well as an overarching programme risk register. A process is in place for escalating risks to the programme risk register when appropriate. The risk registers provide full details in relation to the description, classification, assessment, and mitigation of all risks to the project. The registers remain as live documents, subject to regular amendment as new risks are documented and current risks are managed out. Individual risks will be regularly reviewed with the risk owners and the project team and updated as required. This process will provide an ongoing assessment of the risks in the light of project development and the impact of control actions taken.

6.46 In order to maintain continuous review and communication, the project is subject to a schedule of risk activities and reporting as shown in Table 28

CEC02086792_0081

Table 28: Risk reporting

Activity	Report Frequency
Risk Register Reviews	Monthly
Risk Register QCRA's	Following risk register Issue As required for Business Case updates
Risk Dashboard report	Monthly
QSRA	Quarterly or following significant change
Risk Forum	As required

6.47 The results of the monthly risk review, QCRA update and any other risk activity in the month are summarised in a monthly risk dashboard report. This summarises details of the top risks to the project and provides an overview of the current estimated risk exposure.

6.48 A risk forum will be established to meet as appropriate to discuss and obtain quick resolution to key risks to the project or table key risk findings.

Stakeholder management

6.49 A draft Stakeholder and Communications Management Plan[4] has been prepared for the project which describes the processes for ensuring an effective strategy for the management of stakeholders on the Edinburgh Tram York Place to Newhaven project. It details how the project team will identify and manage all stakeholders impacted by the works, engage with them and optimise their experience of the project.

6.50 The activities within the stakeholder management process include:

- **Identification** of stakeholder organisations and key decision makers
- **Analysis** of the stakeholders to understand their needs and position in relation to the project
- **Strategy & planning** to identify the most effective means of communicating with different stakeholders in order to minimise risk and maximise opportunity
- **Implementation, engagement and review** including the establishment of different engagement channels, production of stakeholder specific communications materials, and the implementation of reporting and reviewing procedures.
- **Evaluation** following review in order to identify positive engagement, minimise disputes where necessary and amend methods of communication.
- **Recording and monitoring** stakeholder requirements throughout the lifecycle, assigning tangible actions and deadlines for completion with the aim of maximising overall stakeholder satisfaction.

6.51 The stakeholder identification process takes into account the stakeholder analysis done for the original tram project; the Third Party Agreements between the Council and various stakeholders to resolve issues raised during the Tram Act process; and a wider

---

[4] Edinburgh Tram Extension and Leith Programme Stakeholder Management & Communications Plan, *City of Edinburgh Council,* October 2016.

CEC02086792_0082

exercise undertaken to identify stakeholders impacted by the Tram project using a combination of local business directories and site reconnaissance work.

6.52 The tram project communications team works closely with the Leith Programme and Edinburgh St. James projects to ensure a coherent and consistent message is being communicated to all stakeholders.

6.53 The objectives of the communications strategy are:

- to provide residents and businesses with relevant, timely and up to date information about the project
- to provide residents and businesses with accessible communications channels to ensure their concerns are given appropriate consideration in developing the timing and phasing of the project
- to highlight the benefits of the tram project to the local communities its serves and to the city as a whole
- to ensure, where possible, any conflict is avoided through open and transparent communication.

Lessons learned

6.54 As outlined in section 5.4, the project is drawing on a number of lessons learned and these have been incorporated into the planning for the extension. These lessons include:

- The use of industry standard contracts to govern the project
- Rigorous project governance with highly qualified key personnel with experience of delivering light rail projects in the UK and abroad
- Setting up cross industry networks with other cities including Manchester, Birmingham and Dublin to ensure best practice is being adopted at each stage of project development
- Adopting traffic management plans that provide the contractor with expanded sites to ensure that works can continue in the event that problems are encountered during construction as well as adopting a strategy of only opening up roads once and completing all works prior to reinstatement - no double-dig
- Carrying out robust quantitative risk analysis and ensuring the contingencies set aside for unforeseen events
- Ensuring robust measures are incorporated into the construction contracts to ensure build quality, and a strong client team is present on site to monitor build quality
- Carrying out comprehensive formal consultation with the market to road test the overall delivery strategy for the project and encourage strong competition

Conclusions

6.55 Traffic management should be deployed which facilitates opening large sections of the work site at any one time. A detailed logistics and access plan will be developed, in consultation with key stakeholders, prior to any works going to tender.

6.56 A continuous approach to construction will be deployed wherever possible avoiding the need to excavate twice.

6.57 The strategy for dealing with heritage items and archaeological remains has been agreed with the City Archaeologist.

6.58 During the construction, testing and commissioning of the project there will be a requirement to terminate services at West End Princes Street tram stop to carry out activities to tie-in the new route with the existing line. This curtailment of passenger service however can be kept to a minimum.

6.59 The overall design, construct, test and commission duration for the project will be in the region of 40 months. This is based on the traffic management assumptions set out herein. If these cannot be delivered it is highly likely that the overall project duration will increase.

6.60 Strong project governance and project management arrangements are in place.

6.61 A draft stakeholder management and communication plan has been developed and work will continue to update this plan in conjunction with Council Officers and Elected Members.

6.62 Processes have been put in place to ensure lessons learned on phase 1 of the tram project have been incorporated into the planning for the York Place to Newhaven line.

CEC02086792_0084

7 Way Forward

Chapter summary

- The 2015 Outline Business Case recommended a staged delivery approach to the project.
- The Stage 1 activities agreed by Council in December 2015 have been completed within budget
- It is recommended that the project proceeds to Stage 2
- This will keep the project on programme while allowing for a further affordability test based on actual tender prices to be carried out prior to awarding the main contract
- This approach will also allow the project take cognisance of any recommendations arising from the Edinburgh Tram Inquiry currently underway.

Introduction

7.1 The 2015 Outline Business Case recommended a staged delivery approach to the project. This updated Outline Business Case represents the completion of Stage 1, which also included a significant body of work, as described below.

Review of Stage 1 activities

7.2 Table 29 sets out the Stage 1 activities agreed by Council in December 2015 along with their status. The budget for Stage 1 was £3.25m and the tasks have been completed within budget.

Table 29: Review of Stage 1 activities

Stage 1 Activity	Status	Complete
Establish Project Governance & set up project team	Activity complete and project team established	✓
Develop Financing Solution	Financing options appraisal set out in Chapter 4	✓
Risk Analysis & Apportionment	Full quantitative risk analysis undertaken to inform OBC	✓
Stakeholder Engagement & Review of 3rd Party Agreements	Review of all 3rd party agreements complete and stakeholder engagement has commenced	✓
Review Phase 1 Contract Documentation including technical & prior approvals	Review complete to inform contract documentation for next phase	✓
Site Investigation	Additional site investigation work complete	✓
Commence Leith Walk Roadway and Footway Enabling Works – Phase 4	Works have commenced and are scheduled to be delivered in summer 2017	✓
Preliminary Draft ITT including works information	Draft documentation complete	✓

CEC02086792_0085

Partial completion of PQQ for Main Works and Residual Enabling Works	PQQ documentation for main works complete and PQQs finalised for all enabling works	✓
Complete designs and specifications for Leith Walk Footway Enabling Works – Phase 5	Complete	✓

Stage 2

7.3 Stage 2, which is scheduled to take approximately 12 months, is the procurement phase.

7.4 During this phase a formal OJEU prequalification for the main works will be conducted and a tender shortlist drawn up. This will be followed by a formal tender process; the evaluation of tenders; and the finalisation of financing arrangements.

7.5 Table 30 sets out the recommended Stage 2 activities and the expected outcomes at the end of the stage.

Table 30: Stage 2 activities

Activity	Outcome
Final review of tender documentation	Upon completion of the technical and legal documentation a thorough "claims" review will be carried out wherein the documentation will be reviewed for potential contractual claims. This can only be done once all documentation is complete and will be done by a body/person independent of the team that drafted the documentation.
Procurement of main contractor	The project will run a prequalification process in accordance with OJEU rules and shortlist a number of contractors for tender. Tender documents will be issued to the shortlisted contractors. Tenders will be received and evaluated and a preferred tenderer selected.
Finalise funding arrangements	Work will conclude with prospective lenders during this stage with facilities being put in place at contract award stage.
Public consultation	Public consultation processes and arrangements will be established and implemented and recommendations for business support measures will be developed.
Continue stakeholder consultation process	The stakeholder consultation process will run continuously throughout the life of the project.
Modelling impact of revised service pattern	The revised service pattern proposed by Edinburgh Trams in response to the funding gap will be modelled to determine its impact on costs and revenues, and hence the funding gap
Affordability test	This Outline Business Case will be reviewed using the actual tender prices received for the main works, and the results of the modelling of the revised service pattern, to confirm that the project can be delivered within the Council's affordability envelope.

Estimated costs

7.6 Turner & Townsend have estimated the costs for Stage 2 of the project up to the award of the main contract. This estimate is summarised in Table 31 and is broken down into

two elements: resource costs (internal staff and consultancy); and the costs for design of Constitution Street wall.

Table 31: Stage 2 budget

Element	Budget (£m)
Resources (including external advisors & CEC)	£1.90
Constitution Street Wall Detailed Design	£0.10
Total	**£2.00**

7.7 The above costs can be accommodated within the allowances for these elements in the estimates set out in Chapter 4.

Recommendation

7.8 It is recommended that the project proceeds to Stage 2 as described above.

7.9 This will keep the project on programme while facilitating the affordability test by:

- Providing accurate construction costs through a competitive tender process
- Allowing time for the impact of the revised timetable, which is being tested this summer by Edinburgh Trams, to be assessed
- Providing a further 12 months of evidence of tram patronage build-up
- Development of TROs to reduce design risk and allow more economical tenders
- Development of an advertising strategy that may generate revenues to contribute to the project costs
- Examination, in conjunction with Edinburgh Trams, of options for reducing maintenance costs

7.10 This approach will also allow the project take cognisance of any recommendations arising from the Edinburgh Tram Inquiry currently underway.

CEC02086792_0087