Report
August 2025

Trams to Granton, BioQuarter and Beyond: Options Assessment

City of Edinburgh Council
Our ref: 23673608
Client ref: n/a

Jacobs steer anturas

Report
August 2025

Trams to Granton, BioQuarter and Beyond: Options Assessment

Prepared by:	Prepared for:
Steer 14-21 Rushworth Street London SE1 0RB	City of Edinburgh Council 4 East Market Street Edinburgh EH8 8BG
+44 20 7910 5000	Client ref: n/a
www.steergroup.com	Our ref: 23673608

Jacobs steer anturas

Contents

Figures

Tables

1 Introduction

Trams to Granton, BioQuarter and Beyond Proposals

1.1 There is a strong strategic imperative to improve transport connectivity and capacity in the Edinburgh City Region. Key transport planning objectives which transport needs to meet in the region have been identified which support national, regional and local priorities.

1.2 Development of the existing Edinburgh Tram network, creating high capacity, fast, reliable transit routes to connect population and employment growth areas in the north and south of the city region, have been shown to have a strong strategic fit with these priorities.

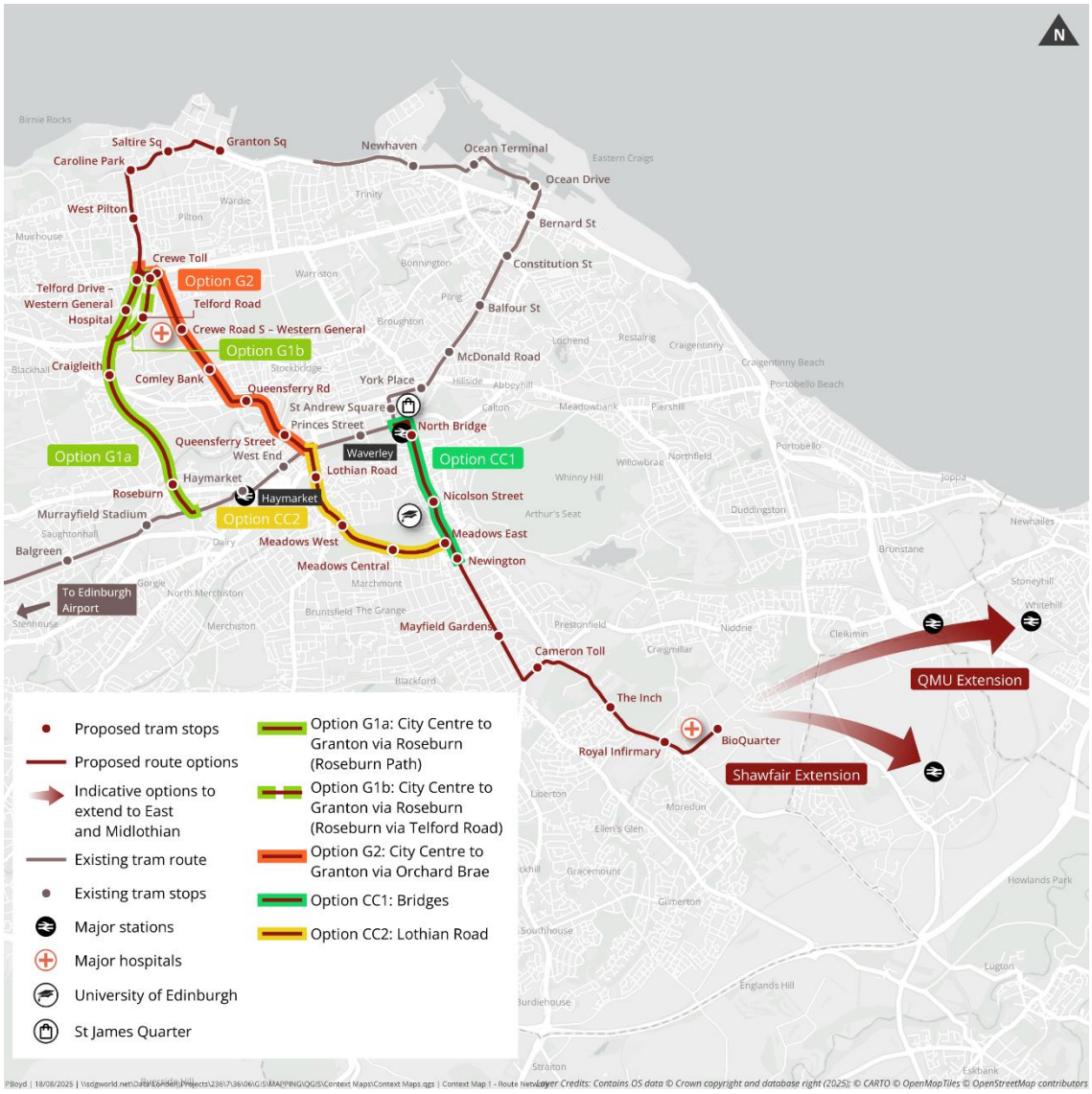
1.3 This Options Assessment Report (OAR) compares the options for the potential next phase of tram network extension, through the Trams to Granton, BioQuarter and Beyond (TGBB) programme, to determine which options best meet the strategic priorities as well as highlight any trade-offs between options.

Route Options Overview

1.4 This OAR focusses on two key parts of the proposed TGBB network as follows and presented in Figure 1-1 below:

- **City Centre – Granton**. Where there are three route options:
  - Option G1a: City Centre to Granton via Roseburn (Roseburn Path)
  - Option G1b: City Centre to Granton via Roseburn (Roseburn via Telford Road)
  - Option G2: City Centre to Granton via Orchard Brae
- **City Centre**. Where there are two options through the City Centre:
  - Option CC1: The Bridges Corridor
  - Option CC2: Lothian Road

Figure 1-1 Trams to Granton, BioQuarter and Beyond – Route Options Overview



1.5 These options together, provide the potential for a consistent tram link from the anchor points of Granton in the north to Edinburgh BioQuarter in the south.

1.6 Expansion of Mass Transit routes (potentially through Tram) into East Lothian and/or Midlothian could further support the regional transport and growth needs of South East Scotland. At this time, these options are in early stages of development and stakeholder discussion and are thus not considered in this OAR.

1.7 It should be noted that beyond Edinburgh BioQuarter, a connection to Shawfair railway station has been assumed in all transport modelling / passenger forecasting as indicated in the Strategic Modelling Report (2025).

1.8 While the OAR focuses assessment on options between Granton-City Centre and within the City Centre, appraisal of the full route has been undertaken and details of this are contained within the report (e.g. sections around Cameron Toll to Edinburgh BioQuarter and Dalkeith Road etc.)

Other route options not progressed at this stage

1.9 While the OAR focuses assessment on options between Granton-City Centre and within the City Centre, appraisal of the full route has been undertaken. A number of route options were considered during the Edinburgh Strategic Sustainable Transport Study (Phases 1 and 2, conducted between 2019 and 2021 and which underpin the City Mobility Plan (CMP) and City Plan 2030) for the route sections north of Crewe Toll to Granton Square, between the city centre and Cameron Toll and beyond Edinburgh BioQuarter to Sheriffhall P&R. These have not been progressed at this stage with rationale detailed as follows:

- **Crewe Toll to Granton:**
  - **Via Pennywell Road:** this option resulted in a longer route resulting in additional costs and longer end to end journey times. Significant utilities would also need to be accommodated on Pennywell Road.
  - **Via Crewe Road North:** this option was dismissed as significant engineering work would be required to allow transit to connect to options G1a, b and G2. The route is also narrow, presents challenges with local residential access which would reduce reliability. In addition, West Granton Access was built with passive provision for tram.
- **City Centre to Cameron Toll:**
  - **Via Dalkeith Road:** this route was assessed as likely to preclude tram due to gradient constraints at the Pleasance thus not taken forward further.
- **Cameron Toll to Royal Edinburgh Infirmary:**
  - **Via Gilmerton Road/Moredunvale Road:** this alternative tram alignment was considered but was longer and slower than the preferred alignment, making it less attractive with regards to improving regional connectivity.
- **Edinburgh Royal Infirmary to Sheriffhall P&R**

  Via A7: this option would not provide connectivity to Borders Rail, and poorer connectivity to key development sites at Edinburgh BioQuarter and Shawfair. The route would also present challenges in terms of maintaining tram speed in an on-street environment. Further extension over City of Edinburgh bypass at Sheriffhall Roundabout would present an additional challenge.

Route Option Assessment

Purpose of Route Options Assessment

1.10 The purpose of the route option assessment has been to identify the advantages and disadvantages of alternative route options between Granton and the Edinburgh BioQuarter. This options assessment, alongside Public Consultation and further engagement will inform the identification of a preferred option to be developed for the Strategic Business Case (SBC): the document which will set out the Case for Investment (CiF) and the evidence-base to inform decision-makers on whether and how the scheme should proceed.

Purpose of Mult-Criteria Assessment Framework

1.11 The purpose of the Multi-Criteria Assessment Framework (MCAF) is to provide evidence on performance of route options against a range of criteria and, through this, identify where key trade-offs between options may exist. This is used to inform stakeholder

engagement, briefing of City of Edinburgh Council (CEC) and provide information to support public consultation. It forms part of the overall set of considerations that decision makers will consider in deciding whether, and in what form, TGBB should be taken forward.

Supporting Workstreams / Evidence

1.12 Analysis has been undertaken to ensure that options are deliverable and that key technical issues and environmental impacts are understood. Supporting workstreams have included:

- Structures[1], geotechnical[2] and environmental assessments[3] supporting the identification of a Preferred Option
- Strategic modelling[4] to inform patronage forecasts
- Microsimulation modelling[5] to identify traffic impacts and tram journey times
- Client and stakeholder engagement

Structure of Report

1.13 This report is structured as follows:

- **Strategic Policy Context:** this section sets out:
  - the national, regional and local policy framework;
  - the clear alignment between this and the Transport Planning Objectives (TPOs), consistent with Scottish Transport Appraisal Guidance (STAG);
  - the MCAF which the options are assessed against;
- **City Centre to Granton Options Assessment:** this section provides:
  - an overview of the options;
  - key option attributes;
  - impacts in relation to journey time and reliability for tram, road and bus users;
  - catchment analysis;
  - demand and benefits estimation;
  - estimated tram demand;
  - tram and public transport benefits;
  - impact on heritage;
  - an overview of the assessment against the TPOs; and
  - an assessment of comparative economic performance.
- **City Centre Options Assessment:** structured as per the City Centre to Granton Options assessment.

[1] See Report 4 – Bridges and Structures

[2] See Technical Note 5 – Geotechnical Desktop Study

[3] See Report 5 – Landscape and Ecology

[4] See Report 3 – Strategic Modelling

[5] See Report 2 – Microsimulation Modelling

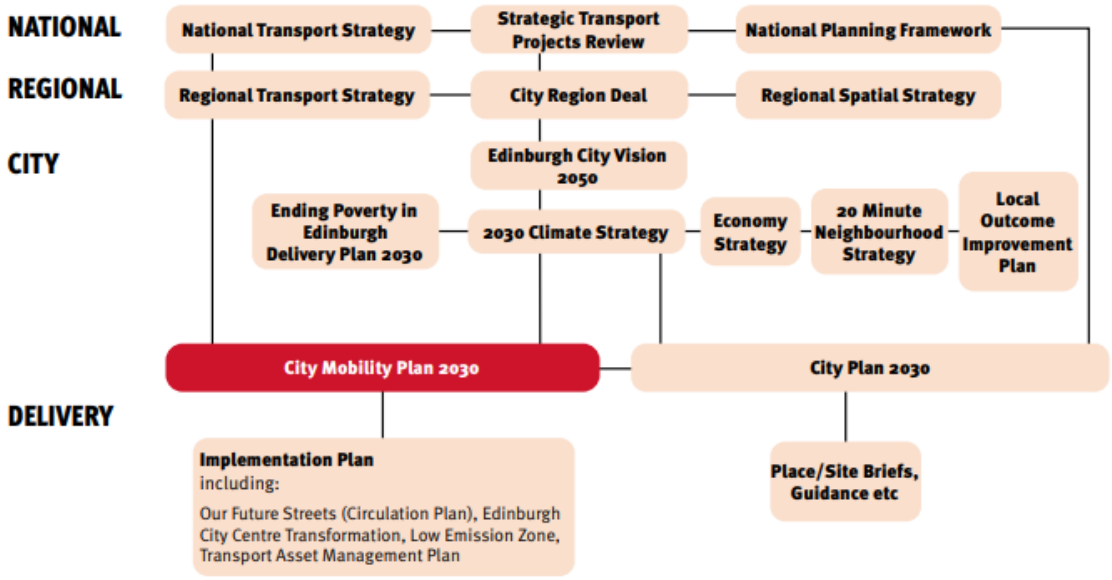
2 Strategic Policy Context

2.1 This chapter sets out the policy context and framework within which the proposed TGBB proposals have been developed. This policy framework supports the development of scheme specific TPOs which provide the bases for assessing how, whether and the extent to which tram supports wider policy priorities and outcomes.

National, Regional and Local Policy Framework

2.2 Expansion of the tram network has a strong policy fit at national, regional and local strategic levels. The following section explores the national, regional and local policy which is summarised in Figure 2-1 below.

Figure 2-1 National, regional and local policy context overview



Source: City Mobility Plan, City of Edinburgh Council, 2024 update

National context

National Transport Strategy 2

2.3 National Transport Strategy 2 (NTS2) was published in 2020. It sets out the vision for Scotland's transport system for the next 20 years, underpinned by four priorities.

2.4 The NTS2 vision is:

> "We will have a sustainable, inclusive, safe and accessible transport system, helping deliver a healthier, fairer and more prosperous Scotland for communities, businesses and visitors."

2.5 The overall vision of the NTS2 is underpinned by four priorities and each priority is expressed through a set of three outcomes which helps to explain the effect the policy is seeking to achieve, as shown in Figure 2-2.

Figure 2-2 National Transport Strategy 2 Objectives

Source: NTS2, Transport Scotland, 2020

Strategic Transport Projects Review 2 (STPR2)

2.6 In 2019 Transport Scotland commenced the second Strategic Transport Projects Review (STPR2) to help inform transport investment in Scotland for the next 20 years. The STPR2 Final Technical Report and its recommendations were published in 2022.

2.7 The STPR process:

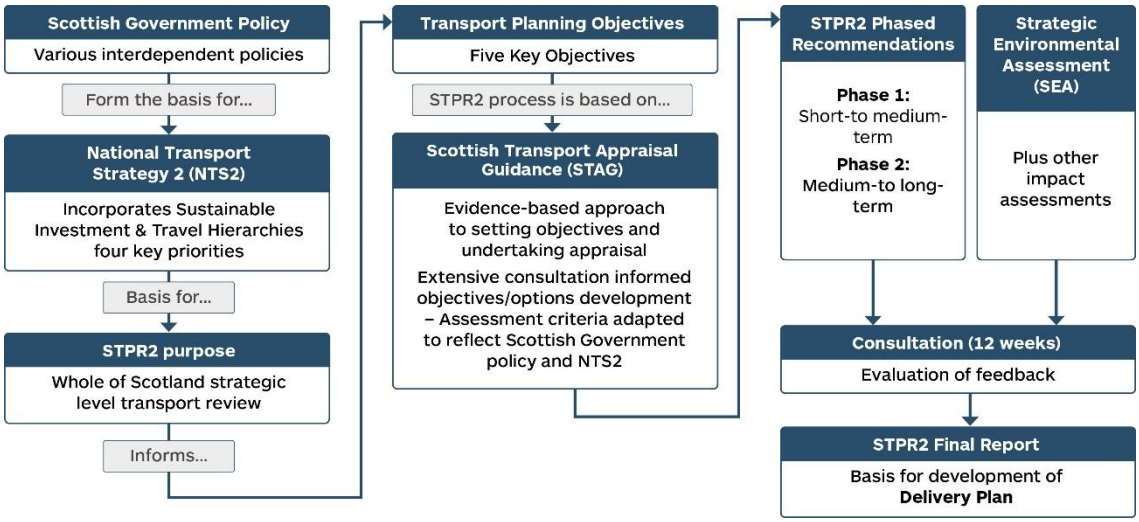
- was guided by National Transport Strategy (NTS2) and aligned with other national plans such as the Climate Change Plan Update, the National Strategy for Economic

Transformation (NSET) and the Revised Draft Fourth National Planning Framework (NPF4);

- involved the development of TPOs in line with STAG guidance which, in turn, informed the appraisal of transport projects undertaken as part of STPR2. These objectives reflect those of the NTS but introduced 'Increase Safey and Resilience' (to ensure consistency with STAG appraisal guidance); and
- developed final recommendations including Recommendation 12 to develop "Edinburgh and South East Scotland Mass Transit" including tram (described further in para 2.10 and Figure 2-5).

2.8 The STPR2 process is summarised in Figure 2-3.

Figure 2-3 STPR Development Process Summary



Source: STPR2 Final Technical Report, Transport Scotland,2022

STPR Transport Planning Objectives

2.9 The TPOs developed for STPR2 are set out in Table 2-1 below and their alignment with the NTS2 and its TPOs in Figure 2-4.

Table 2-1 STPR2 Transport Planning Objectives

NTS Objective	STPR Transport Planning Objective	Sub-Objective
Takes Climate Action	A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target	• reduce the consumption of fossil fuels through a shift to more sustainable modes of transport; • increase the mode share of active travel for shorter everyday journeys; • increase the mode share of public transport by providing viable alternatives to single occupancy private car use; • reduce emissions generated by the strategic transport system.
Reduces Inequalities	An inclusive strategic transport system that improves the affordability and	• increase public transport mode share by connecting sustainable modes of transport to facilitate integrated journeys;

NTS Objective	STPR Transport Planning Objective	Sub-Objective
	accessibility of public transport	• improve mobility and inclusion, recognising the specific needs of disadvantaged and vulnerable users; • reduce transport poverty by increasing travel choice; • reduce the reliance on private car for access to key centres for healthcare, employment and education
Improves our health and wellbeing	A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing	• reduce demand for unsustainable travel by embedding the place principle in the changes to the strategic transport system; • increase the mode share of active travel for shorter everyday journeys; • reduce demand for unsustainable travel arising from nationally significant growth areas, taking cognisance of the emerging NPF4.
Helps deliver inclusive economic growth	An integrated strategic transport system that contributes towards sustainable inclusive growth in Scotland	• increase sustainable access to labour markets and key centres for employment, education and training; • increase competitiveness of key domestic and international markets, by reducing costs and improving journey time reliability for commercial transport; • increase resilience of accesses to key domestic and international markets to encourage people to live, study, visit and invest in Scotland; • increase the mode share of freight by sustainable modes; • unlock housing development sites through provision of sustainable transport links to employment, education, health and leisure opportunities.
Increases Safety and Resilience	A reliable and resilient strategic transport system that is safe and secure for users	• improve resilience from disruption through adaption of Scotland's trunk road, rail and strategic ferry infrastructure; • reduce transport related casualties in line with reduction targets; • improve resilience through climate change adaptation within the management and maintenance of trunk road, rail and ferry infrastructure; • improve perceived and actual security of the strategic transport system.

Figure 2-4 STPR2 Transport Planning Objectives (from STPR2)

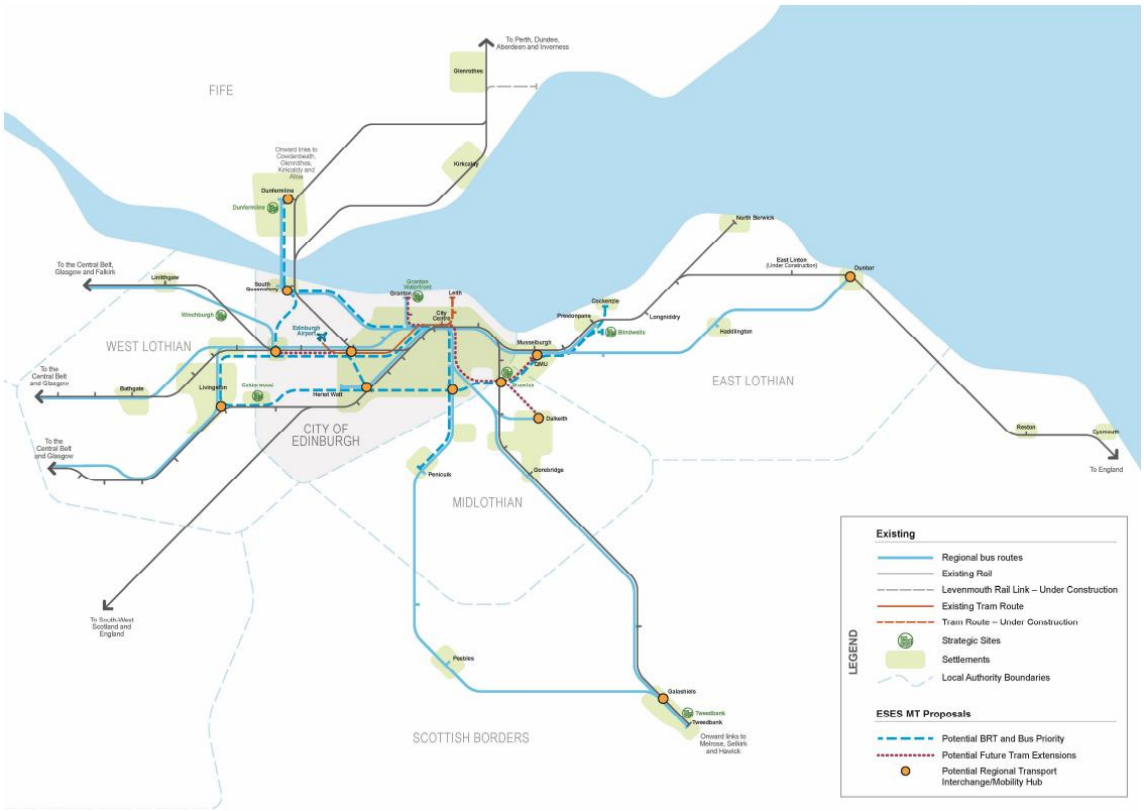
Key objectives ▼	STPR2 aligns with and supports Scottish Government policies	STPR2 meets the second National Transport Strategy (NTS2) priorities	STPR2 reflects NTS2's Sustainable Investment and Travel Hierarchies	STPR2 meets Transport Planning Objectives to deliver:	STPR2 recommendations meet its stated purpose to:
Takes climate action	**Climate Change Plan Update (2020) & Route Map** target net zero Carbon by 2045 and a world leading 20% reduction in car km by 2030	Takes climate action	Reducing the need to travel unsustainably	A sustainable transport system that contributes to net zero emissions target	Create better connectivity with sustainable, smart, cleaner transport options
Addresses inequalities & accessibility	Delivering a **Just Transition** to net zero in a way that delivers fairness and tackles inequality **Addressing Child Poverty**	Reduces inequalities	Enhances choice and access to active travel and public transport	An inclusive transport system that improves affordability/ accessibility of public transport	Improve accessibility for residents, visitors and business
Improves health & wellbeing	**Cleaner Air For Scotland 2 (2021) & Delivery Plan** – STPR2 recommendations will deliver further air quality improvements	Improves our health & wellbeing	Priority given to walking and wheeling, then cycling	A cohesive transport system that enhances communities as places – supporting health/ wellbeing	Create better connectivity with sustainable, smart, cleaner transport options
Supports sustainable economic growth	The draft **Fourth National Planning Framework (NPF4)** – presents the opportunity to embed the importance of "place" across land-use planning and transport. **Scotland's National Strategy for Economic Transformation** sets out the priorities for Scotland's economy and recognises the role of transport investment in enabling and sustaining Scotland's economic growth.	Helps deliver inclusive economic growth	Making better use of existing capacity	An integrated transport system that contributes to sustainable inclusive growth	Enable and sustain economic growth Improve accessibility for residents, visitors and business
Increases safety & resilience	**National Transport Strategy 2** and **Scotland's Road Safety Framework to 2030**	Increases the safety of the transport system and meets casualty reduction targets	Maintain and safely operate existing assets	A reliable and resilient transport system – safe and secure for users	Improve accessibility for residents, visitors and business

Source: STPR2 Final Technical Report, Transport Scotland,2022

Edinburgh and South East Scotland Mass Transit in STPR2

2.10 Recommendation 12 in STPR2 relates to Edinburgh & South East Scotland Mass Transit. The review recommended that Transport Scotland works with regional partners to develop and enhance the cross-boundary public transport system for the Edinburgh and South East Scotland region, potentially comprising tram and bus-based transit modes including bus rapid transit (BRT) and bus priority measures. This would complement and integrate with the region's current bus, tram and heavy rail networks, to provide improved connectivity between Edinburgh and the surrounding communities in the region, as well as more direct connections between communities outside Edinburgh.

Figure 2-5 Indicative extent of Edinburgh and South East Scotland Mass Transit



Sources: STPR2 Final Technical Report, Transport Scotland,2022

Regional context

Regional Transport Strategy

2.11 This Regional Transport Strategy (RTS) for the South-East of Scotland was prepared by the South-East of Scotland Regional Transport Partnership (SEStran). It covers SEStran's eight constituent local authorities provide a strategic framework for transport management and investment for the Partnership area.

2.12 The RTS was developed within the policy framework provided by NTS2 and its four strategic priorities as well as defining a Sustainable Travel Hierarchy. The four priorities and hierarchy were used to guide the development of the RTS.

2.13 The RTS has the following vision:

> A South-East of Scotland fully integrated transport system that will be efficient, connected and safe; create inclusive, prosperous, and sustainable places to live, work and visit; be affordable and accessible to all, enabling people to be healthier; and delivering the region's contribution to net zero emissions targets.

2.14 The vision is supported by four objectives and associated desirable societal outcomes as summarised in Figure 2-6 below.

Figure 2-6 SEStran RTS objectives

Source: SEStran 2035 Regional Transport Strategy, SEStran, 2022

The RTS includes twelve mobility themes mapped to the four strategic objectives with each theme having a range of associated policies and actions. In terms of tram this is considered within the mobility theme of "Enhancing and extending rail services". This theme includes a policy:

"Implementation of an Edinburgh & South East Scotland Mass Transit system is supported in principle and should explore further opportunities to expand the regional light rail and tram network."

And an associated action of:

"Undertake appraisal and business case development for an Edinburgh & South East Scotland Mass Transit system including new light rail and tram links within the region, based on a 'settlement connectivity' review."

Regional Spatial Strategy

2.15 The Planning (Scotland) Act 2019 introduced a new duty requiring local authorities to prepare a Regional Spatial Strategy (RSS). The RSS is a long-term spatial strategy for the strategic development of Edinburgh and South East Scotland City Region. Key themes include:

- Regional recovery and renewal including tacking inequality, environmental improvement and economic renewal;
- Adaptable, a more resilient region, including tackling climate change, building design and conservation.
- Accessible region including connectivity, infrastructure delivery and sustainable housing sites.

The RSS includes reference to mass rapid transit by tram or guided bus through north/south Edinburgh with cross boundary regional links to east, south and west, which would connect key development sites within the city, such as the Waterfront (both at Granton and Seafield) and the Edinburgh Bio Quarter / regional hospitals and for West

Edinburgh, providing connectivity within the city and the city region to harness their full potential to provide necessary homes and nationally significant employment opportunities.

City Region Deal

2.16 The Edinburgh and South-East Scotland City Region (the city region) comprises of the local authorities of City of Edinburgh, East Lothian, Fife, Midlothian, Scottish Borders, West Lothian. In 2022, the region had a population of 1.4m, just under 700,000 jobs and GVA of £44.87 billion. With population and jobs represent 26% and 27% of the Scottish total respectively, whereas GVA represents 30% of the Scottish total, providing evidence of the significance of the role of the regional economy.

2.17 Supporting growth in Edinburgh and the South East Scotland region is therefore critical to the success of the overall economy. This means a need to attracting inward investment, support housing growth and Strategic Employment Sites.

2.18 Despite the region's success economically, there remain significant challenges in terms of economic and health inequality, the climate challenge and wider environmental considerations.

2.19 The City Region Deal aims to accelerate growth, create new economic opportunities and new jobs that will help to reduce inequalities. The City Deal has five themes:

- Theme 1: Accelerating inclusive growth
- Theme 2: Removing physical barriers to growth
- Theme 3: A significant programme of construction
- Theme 4: Targeted employability and skills interventions
- Theme 5: Social benefit through innovation.

2.20 Theme 2 emphasises the unlocking physical barriers to growth including housing and transport connectivity, as a key component of the City Region Deal.

City of Edinburgh context

City Plan 2030

2.21 CEC prepared Edinburgh's new local development plan (LDP) - City Plan 2030 - which sets out the strategy for development, proposals and policies to shape, development and inform planning decisions in the city over the next 10 years and beyond. It was adopted in 2024.

City Mobility Plan

2.22 The CMP, approved in 2021 and updated in 2024, is fully consistent with National and Regional policies as depicted in Figure 2-1. The CMP sets out the Council's strategic approach to the sustainable, safe and effective movement of people and goods around Edinburgh up to 2030. It has the following vision:

> "Edinburgh will be connected by a safer and more inclusive net zero city transport system delivering a healthier, thriving, fairer and compact capital city and a higher quality of life for all residents."

2.23 This vision is supported by three high level aims and nine supporting objectives as set out in Table 2-2.

Table 2-2 City Mobility Plan Objectives

CMP aim	CMP Objective
People: To improve health, wellbeing, equality and inclusion	• Encourage behaviour change to support the use of sustainable travel modes. • Ensure that transport options in the city are inclusive and affordable.
Movement: To support inclusive and sustainable economic growth and respond to climate change:	• Increase the proportion of trips people make by active and sustainable travel modes. • Improve sustainable travel choices for all travelling into, out of and across the city. • Reduce harmful emissions from road transport. • Improve the safety for all travelling within our city. • Maximise the efficiency of our streets to better move people and goods
Place: To protect and enhance our environment	• Reduce the need to travel and distances travelled. • Reduce vehicular dominance and improve the quality of our streets

Development of STAG Transport Planning Objectives

2.24 Scottish Transport Appraisal Guidance (STAG) requires the setting of specific, measurable, achievable, realistic and timebound (SMART) Transport Planning Objectives (TPOs) which must capture the essence of the evidence-based problem to be addressed or opportunity being undertaken.

2.25 The STAG Transport Planning Objectives for TGBB reflect:

1. The policy outcomes based on national, city and regional objectives. These are represented through the 'high-level policy objectives' which are relate direct to policies as national, regional and local level. These are shown in the final column of Table 2-3 along with the adopted policies within which these 'nest'.
2. The specific TPOs for Tram are articulated through development of sub-objectives that reflect specific ways in which tram could support / impact on specific objectives. These are shown in Table 2-4.

2.26 The STAG TPOs for have been developed to ensure they capture both the positive contribution that tram can make to achieving desired outcomes, and also areas where there likely to be key policy related trade-offs, and choices between:

- The development of a tram route which delivers against the critical success factors (CSFs) which would underpin the delivery of successful outcomes. These include achieving fast and reliable journey times to deliver strong operational and financial performance, and the wider connectivity that would drive tram demand, mode shift and positive economic, social and environmental outcomes.
- Trade-offs between tram and other modes/ road-users on on-street sections of route.

- Trade-off between tram and other priorities on route sections identified as supporting biodiversity, of ecological importance, part of the Green-Blue Network, open space or of heritage value.

Table 2-3 Study Objectives: High-Level Objectives

NTS2	STPR2 TPOs	City Plan 2030	City Mobility Plan	High-Level Policy Objectives for Tram
Helps our economy prosper • Will get us where we need to get to • Will be reliable, efficient and high quality • Will use beneficial innovation	An integrated strategic transport system that contributes towards sustainable inclusive growth in Scotland	• A city where everyone shares in its economic success	**Movement:** To support inclusive and sustainable economic growth and respond to climate change	To support inclusive and sustainable economic growth
Takes climate action • Will adapt to the effects of climate change • Will help deliver our net-zero target • Will promote greener, cleaner choices	A sustainable strategic transport system that contributes significantly to the Scottish Government's net zero emissions target			To respond to climate change towards delivering net-zero
Promotes equality • Will be affordable for all • Will be easy to use for all • Will provide fair access to the services we need	An inclusive strategic transport system that improves the affordability and accessibility of public transport	• A city in which everyone lives in a home which they can afford • A city where you don't need to own a car to move around	**People:** To improve health, wellbeing, equality and inclusion	To promote equality and inclusion and help tackle the city's housing emergency
Improves our Health and wellbeing • Will be safe and secure for all • Will enable us to make healthy travel choices • Will help make our communities great places to live	A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing	• A sustainable city which supports everyone's physical and mental wellbeing	**Place:** To protect and enhance our environment	To improve health, wellbeing & safety To protect and enhance our environment
Increases Safety and Resilience	A reliable and resilient strategic transport system that is safe and secure for users			

Table 2-4 High-Level Objectives and STAG Transport Planning Objectives

High-Level Policy Objectives	STAG Transport Planning Objectives (TPOs)	Alignment with STAG Appraisal Criteria
To support inclusive and sustainable economic growth	**Objectives** • To support economic growth at the city, region and national level • To support the development and success of Strategic Development Areas • To ensure growth is inclusive and sustainable	**Economy** • **Transport Economic Efficiency (TEE)** covers the benefits captured by standard cost-benefit analysis • **Wider Economic Impacts (WEIs)** refer to any economic impacts which are additional to transport user benefits. These reflect where tram can help attract new jobs, help existing businesses, open appropriate land for development
To respond to climate change towards delivering net-zero	**Objectives** • Encourage mode shift to more sustainable modes of transport • Improve the attractiveness of public transport through increased efficiency, journey time reliability and service quality • Support sustainable land-use development, aligned with spatial planning and development policies **Key Impacts (Trade-Offs)** • Ecology, biodiversity and network resilience	**Climate Change** • Greenhouse Gas Emissions • Vulnerability to the Effects of Climate Change • Potential to Adapt to the Effects of Climate Change
To promote equality and inclusion and help tackle the city's housing emergency	**Objectives** • Increase public transport accessibility to jobs, education, healthcare and leisure, especially for disadvantaged and vulnerable users • Improve mobility through improving the physical accessibility of transport **Key Impacts (Trade-Offs)** • Affordability of public transport	**Equality and Accessibility** • Public Transport Network Coverage • Active Travel Network Coverage • Comparative Access by People Group • Comparative Access by Geographic Location • Affordability

High-Level Policy Objectives	STAG Transport Planning Objectives (TPOs)	Alignment with STAG Appraisal Criteria
To improve health, wellbeing & safety	**Objectives** • Reduce collisions and casualties from road transport through modal-shift to safer public transport and active travel methods • Increase safety and security of the transport network • Increase the attractiveness of the active travel network and increase active travel use • Improve local air quality **Key Impacts (Trade-Offs)** • Impact on key designations including the Green-Blue Network and LNCS	**Health, Safety and Wellbeing** • Accidents • Security • Health Outcomes • Access to Health and Wellbeing Infrastructure • Visual Amenity
To protect and enhance our environment	**Objectives** • To protect and enhance the built and natural environment and support the enhancement of 'place' **Key Impacts (Trade-Offs)** • Biodiversity and habitats • Heritage	**Environment** • Biodiversity and Habitats • Geology and Soils • Land Use (including Agriculture and Forestry) • Water, Drainage and Flooding • Air Quality • Historic Environment • Landscape • Noise and Vibration

2.27 The Transport Planning Objectives form the basis of the Multi-Criteria Assessment Framework (MCAF) that support the options assessment presented in this report.

2.28 The TPOs developed align with the STAG appraisal criteria that will, as part of the development of a SBC following public consultation, be developed to support the assessment of a preferred option. The STAG appraisal criteria are also summarised in Table 2-4.

MCAF for Options Assessment

2.29 The TPOs have informed the development of the MCAF that has been used to assess route options in Chapter 3 (Granton to City Centre options) and Chapter 4 (City Centre route options).

2.30 The assessment framework has two elements:

- **Assessment of scheme performance against Transport Planning Objectives.** This provides an assessment of each route option against transport and wider policy objectives. This assessment corresponds with the Strategic Case for the scheme, for which the central question is to understand whether and how the proposal contributes to wider policy priorities and outcomes.
- **Assessment of comparative economic performance.** This assessment considers the key drives of the Economic Case for the scheme, in the form of costs, benefits and affordability.

3 City Centre to Granton Options Assessment

Options Overview

3.1 The City Centre to Granton corridor connects the existing tram network in city centre to Granton in the north of Edinburgh. It is characterised by established residential areas such as Pilton, Muirhouse and Ravelston. In addition, major residential development is underway at Granton Harbour and proposed on former industrial land around Granton Waterfront. The areas around Pilton and Muirhouse are some of the most deprived in Edinburgh. Conversely, further south, in the vicinity of Orchard Brae and Ravelston, communities are some of the most affluent in the city.

3.2 On the northern section of the corridor all options would route from Crewe Toll, from where the route follows West Granton Access and Waterfront Avenue to Granton Square. This alignment is the safeguarded route for tram within the existing LDP.

3.3 Three options have been considered between Crewe Toll and the city centre. These are:

- Option G1a: City Centre to Granton via Roseburn (Roseburn Path)
- Option G1b: City Centre to Granton via Roseburn (Roseburn via Telford Road)
- Option G2: City Centre to Granton via Orchard Brae

3.4 The options are as shown in Figure 3-1.

Figure 3-1: Granton to City Centre Route Options

Option G1a Description: City Centre to Granton via Roseburn (Roseburn Path)

3.5 The route of Option G1a follows the Roseburn Path from the existing tram alignment to Ferry Road, west of Crewe Toll. The alignment would be fully segregated, following an old railway track bed, and now an active travel corridor and part of NCN1. The alignment is the protected route for tram as detailed in the Edinburgh Tram (Line One) Act 2006.

3.6 The Roseburn Path is also designated as part of the secondary cycle network[6], Local Nature Conservation Site (LNCS) and Local Biodiversity Site[7], and provides a popular north south active travel route.

[6] as indicated in the City Mobility Plan Active Travel Implementation Plan

[7] City Plan 2030

3.7 The route development has therefore sought to balance the trade-offs between these policy designations as outlined below.

Scheme Design Overview / Properties

Tram alignment

3.8 Option G1a would make use of the former Roseburn railway corridor, currently designated as a key active travel route and forming part of National Cycle Network Route 1 (NCN1). The alignment diverges from the existing tram network near Russell Road and proceeds off-street via the Roseburn Path to Crewe Toll, continuing on to Granton via the West Granton Access and Waterfront Avenue.

3.9 The tram route would leave the existing tram infrastructure at Haymarket via a Delta Junction west of Haymarket at Balbirnie Place. A single-track alignment would be introduced between Roseburn and Craigleith to help reduce land take and environmental impact. It would then transition back to double track between Craigleith and Ferry Road.

Active Travel Provision

3.10 The Roseburn Path forms part of a well-used and much-valued linear park within the city, contributing to the character and environmental quality of the corridor. The tram route would follow the former railway path currently in use for walking and cycling, thus delivery of Option G1a would impact an established active travel corridor.

3.11 However, the corridor would provide an opportunity to accommodate tram and active travel users in a largely segregated environment and the design approach seeks to preserve the integrity of the green corridor.

3.12 Active travel provision along the route would comprise:

- A 3-metre-wide footway/cycleway which would be provided adjacent to the tram alignment along the corridor with the exception of a reduction in width where constrained by the bridge at Telford Road.
- Improved segregated cycling facilities would be provided on Queensferry Road, making permanent the existing Spaces for People scheme. Existing cycling infrastructure on Crewe Road South would also be retained. Permanent improvements would also be made through Murrayfield to provide improved cycle connectivity towards Roseburn.

3.13 Temporary diversions would be required during construction, but post-delivery access for non-motorised users would be fully reinstated. In order to maintain active travel connectivity during construction, it is proposed that additional provision would be made in advance, supporting wider Circulation Plan network proposals. Options to improve cycle safety across Dean Bridge would be explored, providing a connection into the City Centre West to East Link (CCWEL). Between Queensferry Road and Telford Road, temporary improvements to enhance cycle safety would include the removal of parking on South Groathill Avenue between Queensferry Road and Groathill Road South, with cyclists then following a route via Groathill Road South to Telford Road.

3.14 The character of the corridor would be changed which could affect the attractiveness / ambience for walkers and wheelers. However, enhancement works are proposed as part of the scheme which would aim to improve user experience for pedestrians and cyclists

and deliver a net benefit in terms of corridor usability, accessibility and perception of personal safety.

Ecology and Biodiversity

3.15 The Preliminary Ecological Appraisal (PEA) completed in April 2025 identifies the Roseburn Corridor as a sensitive ecological environment, forming part of Edinburgh's Green-Blue Network and designated as a LNCS. The corridor comprises mature woodland, scrub, and grassland, providing habitat for a range of species including bats, birds, amphibians, and small mammals. It also acts as a commuting and foraging route for protected species such as pipistrelle and Daubenton's bats.

3.16 The Roseburn route would result in the permanent loss of woodland and habitat, especially within the constrained section between Roseburn and Craigleith. In order to mitigate these impacts, a single-track section between Roseburn and Craigleith would be implemented. Other mitigation measures would be proposed, including habitat reinstatement.

Heritage

3.17 The route goes through areas with heritage value, particularly at the southern end where the tram rejoins the existing network near Haymarket. However, the Roseburn Path itself does not include designated heritage assets along its main alignment.

3.18 One key structure is the Roseburn Terrace Bridge, which was designed to carry a dual track railway line. Options to accommodate tram and walking/wheeling have been considered. These works would be delivered in line with conservation principles and structural safety standards. The absence of on-street running would also reduce the direct impact on heritage townscape, especially compared with the Orchard Brae alignment which passes directly over Dean Bridge, a Category A listed structure.

3.19 The design proposes that battery-powered trams would operate along this section to avoid the use of overhead line equipment (OLE), thereby preserving important views and reducing visual impact.

Option G1b Description: City Centre to Granton via Roseburn (Roseburn via Telford Road)

3.20 Option G1b is essentially a route variant of option G1a. The route would be similar to the above but the route would divert to follow Telford Road to Crewe Toll, re-joining the original alignment at West Granton Access.

3.21 The key potential advantage of this route is that it would reduce the distance between the proposed tram stops with the Western General Hospital, enhancing connectivity for staff, patients, students and visitors.

Scheme Design Overview / Properties

Tram alignment

3.22 This option retains many of the operational benefits of the Roseburn Path alignment while introducing greater interaction with general traffic on Telford Road. A tram stop adjacent to the Western General Hospital is proposed on this section, offering direct access to the hospital's west entrance. However, on-street running through this section introduces

potential impacts on engineering complexity (and associated costs), road space, tram journey times, traffic operations, and access particularly given the residential and institutional land uses nearby.

Active Travel Provision

3.23 Active travel access would be retained throughout the off-street sections, with diversions or enhancements planned where necessary to accommodate the tram corridor. The Telford Road variant introduces on-street running[8], which would require more complex integration with existing pedestrian and cycling facilities on the Roseburn path than option G1a.

3.24 Construction along Telford Road would be expected to necessitate localised traffic management and potentially affect side road access and movement for pedestrians and cyclists during works. A ramp-type structure for trams would be required between the Roseburn Path and Telford Road, restricting the use of the Roseburn Path during construction. With the ramp in place, the Roseburn Path itself would be 3 metres wide, although the ramp would create a relatively dark funnel effect, so would be less attractive than a route following the original LDP alignment.

3.25 Compared to Option G1a, this alignment reduces the extent of the Roseburn Path affected by tram development. This lessens the impact on the linear park character of the full corridor, although the introduction of on-street infrastructure along Telford Road introduces more urban elements into the route. The majority of the northern corridor remains within a green, segregated setting and retains the potential for enhancement works to support access and biodiversity.

Ecology and Biodiversity

3.26 By shortening the extent of tram infrastructure directly on the Roseburn Path, Option G1b potentially reduces disruption to habitats along that corridor. However, on-street running on Telford Road introduces potential impacts on existing street trees, landscaped frontages, and verge habitats. These impacts would require mitigation and could include replanting, verge reinstatement, or other ecological enhancements as part of the design development.

3.27 The remaining sections between Granton and Craigleith remain largely off-street and follow the same alignment as Option G1a, where ecological interventions would mirror those proposed under the full Roseburn Path option. Option G1b thus potentially reduces the ecological impact in relation to option G1a.

Heritage

3.28 While this alignment avoids the listed Dean Bridge and highly constrained heritage areas in the West End, it passes through established residential neighbourhoods along Telford Road. These areas, while not of designated heritage status, have a consistent streetscape character that would need to be considered during design and consultation.

[8] Though Option G1b includes on street running on Telford Road, this section has been classed as 'segregated' within analysis because tram and general traffic are in separate lanes.

3.29 Heritage impacts along the Roseburn section would be the same as those in Option G1a, including required structural works to the Roseburn Terrace Bridge and general considerations around maintaining the character of the green corridor.

Option G2: City Centre to Granton via Orchard Brae

3.30 Option G2 would be an on-street option utilising Queensferry Street, Dean Bridge, Orchard Brae and Crewe Road South towards Crewe Toll. This option would provide access to the Western General Hospital from the existing entrance on Crewe Road South and serve Comely Bank and the western end of Stockbridge.

Scheme Design Overview / Properties

Tram alignment

3.31 Option G2 would comprise an on-street tram alignment utilising Queensferry Street, Dean Bridge, Orchard Brae and Crewe Road South toward Crewe Toll, where it would rejoin the alignment to Granton.

3.32 The route would connect to the existing tram infrastructure at Princes Street / Queensferry Street via an east-facing junction only. As such, travel from Orchard Brae to the west, toward Haymarket, the airport, and beyond, would require interchange at Princes Street.

3.33 The alignment would be fully on-street and would share road space with general traffic and buses. The corridor forms part of a key strategic route from Fife into Edinburgh and currently experiences high traffic volumes. The introduction of tram infrastructure would significantly affect road capacity, limiting options for traffic diversion and presenting challenges to tram journey times and operational reliability. There would also be an impact on the road during construction with re-routing required for Dean Bridge via Stockbridge and road closures around Learmouth Terrace. Regional bus services also share this alignment, presenting challenges for journey times of these services.

3.34 Several complex junctions would need to be accommodated:

- **Princes Street / Queensferry Street**: This junction is already constrained by high tram and bus volumes, and any redesign to accommodate the Orchard Brae alignment would further impact capacity and reliability for all modes. It would also present challenges for pedestrian and cycle safety improvements.
- **Queensferry Street**: No satisfactory location has yet been identified for a tram stop at this critical node. Any solution would reduce existing and future bus stop capacity on a corridor already operating near saturation.

3.35 Further north, the route provides direct access to the main entrance of the Western General Hospital via a proposed stop on Crewe Road South. While this offers a closer connection to the hospital's primary access than the Roseburn options, it comes with associated land, cost and operational constraints (such as a need to consider interaction with emergency service vehicles).

Active Travel Provision

3.36 The Orchard Brae option would allow the Roseburn Path / NCN1 to be retained in its present form, as a quieter, dedicated, high-quality active travel corridor, preserving an important off-road route for walking and cycling.

3.37 However, on the Orchard Brae route itself, opportunities for segregated cycling are extremely limited. On Crewe Road South, space constraints and driveway access limit the feasibility of dedicated cycling facilities. On Queensferry Road, between Orchard Brae and Dean Bridge, existing cycle segregation would need to be removed. On Dean Bridge itself, a Category A listed structure, it would not be possible to provide segregated cycle lanes without the addition of a new structure across the Water of Leith, a significant intervention in heritage and landscape terms.

3.38 As a result, while the route avoids direct interference with the existing active travel corridor, it would do little to support wider cycling improvements within the Orchard Brae corridor itself.

3.39 The route would not pass through a green corridor in the same way as the Roseburn Path alignment. However, it would intersect with pockets of mature street trees and landscaped residential frontages, particularly along Crewe Road South. These linear greenspaces, while not part of a designated corridor, still contribute to local environmental character and amenity.

3.40 Where trees or planting are displaced by tram infrastructure, mitigation planting or localised enhancements may be required to offset the visual and amenity impacts of a more urbanised corridor.

Ecology and Biodiversity

3.41 The Orchard Brae alignment avoids the LNCS and would not intersect with a continuous green corridor. However, it passes through areas with mature trees, many of which are protected by Tree Preservation Orders, particularly along Crewe Road South. Tree pruning would be required to accommodate tram infrastructure.

3.42 While the ecological impact is lower than Roseburn in terms of biodiversity corridor disruption, the route offers limited scope for ecological enhancement due to space constraints and proximity to urban development. Street trees contribute to local environmental quality and ecosystem services such as shade and air quality, and their loss would have a minor to moderate impact. Opportunities for ecological mitigation within this corridor are relatively constrained.

Heritage

3.43 Heritage impacts are a key constraint for Option G2. The alignment crosses Dean Bridge, a Category A listed structure designed by Thomas Telford. Analysis has highlighted the almost unique nature of the structure, which presents significant challenge. Accommodating tram infrastructure here would require substantial structural works, including slab strengthening and potential future reinforcement for long-term resilience. Works on the bridge would need to be carried out with sensitivity to its heritage status and would likely involve significant planning, engineering and consultation requirements.

3.44 In addition, parts of Queensferry Street and Lynedoch Place are within Edinburgh's conservation areas, with building frontages and street layouts of high historic and aesthetic value. Delivering tram infrastructure along these streets could have a direct impact on their character, particularly given the need to reallocate road space and potentially remove established street trees or street furniture.

3.45 The proposed tram stop at Queensferry Street would require sensitive design and consultation to manage impacts on adjacent heritage assets, including retaining wall structures and mature trees.

3.46 The design proposes battery-powered trams along this section to avoid the use of OLE, thereby preserving important views and reducing visual impact.

Key Option Attributes (Transport outputs)

3.47 This section summarises the key attributes of each option in terms of what would be delivered 'on the ground'. These attributes help inform an understanding of how each option delivers against performance metrics described later in this section.

3.48 The key attributes are summarised in Table 3-1. The junction of Shandwick Place/Queensferry Street junction has been taken as the common point in all three options to aid direct comparability.

Table 3-1 Granton to City Centre Options: Key Attributes

Transport Outputs (between Shandwick Place/Queensferry Street and Granton)	Roseburn (via Roseburn Path)	Roseburn (via Telford Road	Orchard Brae
Tram			
Total route length	7,200m	7,400m	5,500m
Route length of new infrastructure[9]	5,700m	6,000m	5,500m
% of full route fully segregated from general traffic	94%	94%[10]	57%
Number of total stops	10 total (8 new)	10 total (8 new)	9 total (9 new)
Segregated cycle provision	• Shared use active travel path maintained at 3m throughout most of the Roseburn corridor. • Where it drops below 3m alternative routes for cycles are being explored, e.g. Balbirnie Pl to connect into the A8 cycle infrastructure already in place and farther north at South Groathill Avenue.		• Maintained on Roseburn as per current. • Tram alignment on OB would preclude Active Travel provision on OB.

[9] Additional to existing Airport to Newhaven route infrastructure.

[10] Telford Road variant classed as segregated because tram and general traffic would be in separate lanes.

Commentary: Roseburn vs Orchard Brae

Tram Attributes

3.49 The main option alternatives are those between Roseburn Path corridor and Orchard Brae. The key differences between the options are:

- The Roseburn route is longer in overall length between the city centre and Granton, at 7.2 km compared to 5.5 km for the Orchard Brae option.
- The two options are broadly comparable in terms of the length of new route infrastructure required, with Roseburn Path requiring approximately 5.7 km of new infrastructure (from its divergence near Haymarket), compared to 5.5 km for Orchard Brae.
- The Roseburn option is largely off-street, offering a high degree of route segregation. The route would be fully segregated between Haymarket and Crewe Toll. By contrast, the Orchard Brae alignment is fully on-street between its connection with the existing line at Shandwick Place and Crewe Toll, resulting in only 57% of this section of route being segregated from general traffic.
- The higher level of segregation on the Roseburn corridor is forecast to deliver significantly shorter journey times compared with Orchard Brae, particularly in the AM peak where the difference exceeds 7 minutes. Off peak journey times are approximately 2 minutes shorter for the Roseburn Path option.
- The Delta Junction at Roseburn offers direct operational connectivity with the depot and westward tram services, enabling future flexibility in operations and maintenance.

Active Travel

3.50 The Orchard Brae option would allow the Roseburn Path / NCN1 to remain entirely undisturbed, preserving a key dedicated off-road active travel corridor. However, due to space constraints it is not possible to provide adjacent cycling infrastructure between Crewe Toll and the city centre and there would be no potential for segregated cycling provision across Dean Bridge which creates a potential safety issue. Similarly, there is no opportunity for segregated cycling provision on Orchard Brae and only targeted provision on Crewe Road South.

3.51 By contrast, the Roseburn option would require temporary displacement of active travel users during construction but plans for reinstatement and enhancement of the route are included, ensuring long-term provision of a safe and attractive green corridor for walking and cycling.

Green Corridor

3.52 The Roseburn route follows a linear green corridor, contributing to the landscape quality and environmental character of the city. While tram development would change this landscape, mitigation and improvement works are included to enhance the corridor post-delivery.

3.53 To offset the loss of trees, new planting would be undertaken at a rate of at least two new trees for each tree removed. Planting would be undertaken adjacent to the corridor where possible and elsewhere in northwest Edinburgh as appropriate.

3.54 In addition, four areas of placemaking would be incorporated along the route to creating new desirable spaces to use and dwell. These are (south to north): the Old Murrayfield

Station goods yard, Craigleith tram stop adjacent to the shopping centre, Drylaw Park and the land between Drylaw Park and the Leonardo car park.

3.55 In contrast, Orchard Brae is a street-based corridor, offering little in terms of cohesive green space or potential for large-scale environmental integration.

Ecology and Biodiversity

3.56 The Roseburn option would affect a corridor of significantly higher ecological sensitivity. The route passes through a designated LNCS and Edinburgh's Green-Blue Network, affecting habitat continuity and protected species. The Landscape, Streetscape and Heritage Report (July 2025) cites that an estimated 1,000 trees out of a total of around 3,100 (approximately 33%) would need to be removed, meaning around two-thirds would be retained. The 2006 Landscape and Habitat Management Plan report identified that around 25% of trees are estimated to be dead, dying or diseased, so that some of the estimated 1,000 trees that would need to be removed (to accommodate tram) are likely to have to be removed in any event.

3.57 The Orchard Brae route, by contrast, does not traverse any designated ecological corridor and impacts are more localised to individual street trees. While those losses are not insignificant, they are easier to manage. Ecological enhancements would be more limited at Orchard Brae, but the biodiversity loss would be lower overall.

Heritage

3.58 Orchard Brae would introduce significant heritage constraints, most notably Dean Bridge, a Category A listed structure requiring major structural works. Additional impacts would occur along Queensferry Street and other sensitive streetscapes.

3.59 By contrast, the Roseburn Path corridor avoids direct interaction with listed structures, apart from upgrades to Roseburn Terrace Bridge.

3.60 In both cases potential visual impacts of OLE would be fully mitigated by the use of battery-powered trams.

Commentary: Roseburn via Roseburn Path vs. Roseburn via Telford Road

Tram Attributes

3.61 The Telford Road variant of the Roseburn alignment would involve on-street running between Ferry Road and Craigleith, with a tram stop adjacent to the western entrance of the Western General Hospital (WGH). The key differences between the Roseburn Path and Telford Road variant are:

- The Telford Road variant is slightly longer and would require additional infrastructure, including a transition from on-street to the off-street section and associated structural works.
- Journey times are longer than the full Roseburn Path option due to the number of tight turns and interaction with general traffic on Telford Road.
- The Telford Road alignment provides more direct access to the WGH, which could increase ridership associated with the hospital and reduce perceived walking distance for visitors and staff to a stop on the Roseburn Path to the north of Drylaw Park.

Active Travel

3.62 The Roseburn Path option would temporarily disrupt an existing active travel route during construction but includes plans to enhance and reinstate the corridor post-delivery.

3.63 On-street running along Telford Road may impact local pedestrian and cycling infrastructure and would not support segregated cycle lanes due to limited road width and competing transport demands.

Green Corridor

3.64 While the Telford Road variant avoids part of the Roseburn green corridor, it also reduces the opportunity to integrate tram within a naturalised landscape. The route introduces more hardscape and urban form, particularly along Telford Road. The Roseburn Path remains the more environmentally cohesive corridor, with greater potential for integrated planting and linear park design.

Ecology and Biodiversity

3.65 The Telford Road variant would reduce the tram's footprint within the LNCS by shifting part of the route onto Telford Road. This lessens direct ecological impact along the Roseburn Path but introduces localised impacts to street trees and verge habitats, with reduced habitat connectivity. Both options would require mitigation, but the full Roseburn Path alignment (Option G1a) involves a more concentrated ecological trade-off in a continuous green corridor, whereas the Telford Road variant disperses the impacts across a more urbanised setting. The Telford Road variant therefore may present a marginally lower ecological impact overall but still requires detailed mitigation planning and provides less opportunity for betterment.

Heritage

3.66 Both alignments would involve works to Roseburn Terrace Bridge and require general considerations around maintaining the character of the green corridor but avoid the Queensferry Street and Lynedoch Place within the Edinburgh World Heritage Site.

Impact on Tram Users: Journey Times and Journey Time Reliability

Tram Journey Times Estimates

3.68 Tram journey times have been estimated using a VISSIM micro-simulation model as detailed in the Microsimulation Modelling Report Trams to Granton: BioQuarter and Beyond report. The VISSIM model represents the existing network in terms of traffic, road lane configurations and junction layouts. The tram route options have been represented by representing proposed tram routes, stops and associated junction and lane configurations which would deliver sufficient general traffic capacity while providing stop-to-stop priority for tram.

3.69 The tram journey times estimated for each options are summarised in Table 3-2.

Table 3-2 Public Transport Journey Time & Journey Time Reliability (Average times for AM Peak and Inter-peak)

Criterion	Roseburn (via Roseburn Path)	Roseburn (via Telford Road)	Orchard Brae
Tram journey time: AM peak (inbound between Granton Sq. and Princes Street, mins)	26	29	34
Tram journey time: off peak (inbound between Granton Sq. and Princes Street, mins)	25	28.5	27
Peak inbound journey times (indexed: Roseburn Path = 100)	100	112	131
Inter-peak inbound journey times (indexed: Roseburn Path = 100)	100	114	108
Tram reliability	Roseburn provides greater journey time reliability, reflecting high-degree of route segregation.		Reliability is impacted by on-street Congestion at Crewe Toll, Comely Bank and Queensferry Street.
Bus journey times & reliability	As a new public transport corridor, options would provide additional network capacity for tram without constraining existing bus capacity. Mode shift to tram would also reduce road traffic, in turn resulting in faster journey times and better journey time reliability for bus		Tram would operate on bus corridor. Capacity constraints would result in slower journey times and worse journey time reliability for bus.

Assessment of Tram Journey Times and Journey Time Reliability Commentary

3.70 The tram journey time assessment shows that the Orchard Brae option would take around 30% longer in the AM peak and 8% in in inter-peak. The relative difference reflects the higher volumes of traffic and resultant conflict with tram in the peaks.

3.71 Moreover, the greater level of segregation for Roseburn would result in better journey time reliability than Orchard Brae. This provides for greater reliability for passengers and better operational performance and resilience.

3.72 The Roseburn via Telford Road option would be slower than via Roseburn Path due to its longer routing and lower overall level of route segregation. It is forecast to be significantly faster than Orchard Brae in the peak, bus slightly slower in the inter-peak. It would be more reliable than Orchard Brae in both the peak and inter-peak, owing to its greater level of segregation and resultant lower level of interaction with general traffic.

Impact on Road Users: Journey times & reliability

3.73 Tram can impact road journey times in two main ways. Firstly, where trams operate on-street the physical presence of tram infrastructure and journey time priority measures can impact general traffic, by reducing the effective capacity for general traffic. This has the effect of potentially increasing congestion, especially where traffic flows are close to capacity.

3.74 Secondly, tram has the potential to remove car trips from the road network as a result of modal shift. The effect of this, other things equal, would be to reduce congestion by reducing road traffic demand and therefore improving network conditions for those remaining on the road network.

Roseburn

3.75 The Roseburn options would operate on a segregated and off-street alignment for the majority of its route. As such, the option would have a minimal impact on road capacity and therefore would not result in any material impacts on congestion (compare to the Do Minimum).

3.76 In addition, the more attractive journey time and journey time reliability of this option means that tram would attract greater modal shift from car, reducing road traffic demand on the corridor.

3.77 The net effect of these impacts would be likely to be positive in terms of reducing the overall level of traffic congestion on the corridor. This would apply to both Roseburn options, through the option via Roseburn Path (by virtue of greater segregation and more attractive journey times) would be more positive overall.

Orchard Brae

3.78 The Orchard Brae option would operate on-street for large sections of the route, on Crewe Road South, Orchard Brae and Queensferry Road. Queensferry Road of the main strategic traffic route between Fife and Edinburgh via the Queensferry Crossing. It is also the main route for a number of regional bus services between Fife and Edinburgh.

3.79 The Orchard Brae route alignment would reduce effective road capacity on the corridor, with the impact of increasing traffic congestion and worsening journey times for general traffic and buses.

3.80 While the Orchard Brae option would also attract modal shift from car, this would be at a lower rate than Roseburn options, as Orchard Brae would have less competitive journey times. The likely net effect would be to increase road congestion and worsen road journey times on this corridor.

Impact on Bus Users: Journey Times and Journey Time Reliability

3.81 The impact on traffic congestion and road users would result in a similar impacts on bus journey times as follows:

Roseburn Options

3.82 The Roseburn options would be expected to support maintenance or potential improvement of bus journey time and reliability on the local road network. This would benefit key strategic bus routes between Fife and Edinburgh as well as local services.

Orchard Brae

3.83 In contrast, the introduction of tram on-street would impact on overall road capacity and would be likely to have an adverse effect on bus journey times of services operating on this corridor.

Impact on/Interaction with Cycling, Walking & Wheeling

3.84 There are two elements regarding the impact on / interaction with walking and cycling. First, the impact on journey accessibility and connectivity which reflects the availability and quality (e.g. degree of segregation from traffic) of routes that can be used for cycling and walking and, in the context or tram route options, the extent to which these are maintained and enhanced.

3.85 Second, the impact on journey ambience, which reflects the quality of the environment in which people can walk of cycle.

Roseburn Options

3.86 The Roseburn options would provide for enhanced overall cycle/ walking accessibility/connectivity through:

- Maintaining the ability for walking and cycling along the Roseburn Path through maintaining a 3-metre-wide footway/cycleway along the route (along the full route with the exception of Telford Road bridge where width constraints mean that 3 metres cannot be achieved).
- Providing additional capacity with an enhanced active travel route on Queensferry Road between Craigleith and Queensferry Street, together with additional improvements through Murrayfield towards Roseburn. These would be implemented prior to construction to provide an alternative route during the construction phase when Roseburn Path would not be accessible, and would be retained as a permanent

route following the completion of construction, offering an additional and complementary active travel route on the corridor.

3.87 There could, however, be an overall adverse impact on journey ambience as the route setting (the characteristics of the corridor) would be very different with tram compared to now. The route would be less 'natural' which may make walking and cycling less attractive for some (e.g. as leisure route), but for others features such as improved lighting and more activity (trams / people at stops) may encourage users for whom perceived safety/security deters their potential use of the corridor for walking and cycling. This may be a particular issue during the winter months with shorter periods of daylight and where commutes often happen in lower light conditions.

Orchard Brae

3.88 The Orchard Brae option would result in a reduction in overall cycle accessibility and infrastructure quality along the alignment. Due to space constraints and the on-street nature of the tram route, it would not be possible to provide segregated cycling facilities along Crewe Road South, Orchard Brae, or Dean Bridge. These sections are already heavily trafficked, and the introduction of tram infrastructure would further limit available road space for dedicated cycling infrastructure. While walking and wheeling would be maintained through standard footways, opportunities to enhance active travel provision are limited. No new strategic walking or cycling connections are proposed as part of this alignment as it is assumed Roseburn would provide this alternative.

3.89 In terms of journey ambience, there would be a potential deterioration in perceived walking and cycling quality, particularly due to the removal of existing street trees and increased vehicle activity within constrained urban sections. The loss of verge space and greenery, especially on Crewe Road South, could make the corridor feel less appealing for pedestrians. However, some users may benefit from the higher-quality footway surfacing, lighting, and more consistent urban design that would accompany tram installation.

Tram Accessibility (Catchment Analysis)

3.90 The accessibility analysis considers the 'in-scope' population and jobs that would be served by the respective route options.

3.91 The analysis considers the 800m catchment of stops along each route. The catchment is reported in terms of:

- The **total catchment** of each route between Crewe Toll and Princes Street[11]. The total catchment does not count any overlapping 800m catchments between stops and captures the population / employment within the areas shown in Figure 3-2.
- The **additional catchment** service by each route options, over and above that already served by the existing tram line (i.e. excluding any common catchment within 800m of the Haymarket, West End and Princes Street stops.

[11] Crewe Toll tram stop and Princes Street tram stop are common stops to both the Roseburn and Orchard Brae options, providing a consistent points upon which to compare population and employment catchments for each option.

Population Catchment

3.92 The population catchment area (based on 800m stop catchments), overlaid on a map showing population density, is shown in Figure 3-2 and the catchment results in Table 3-3.

Table 3-3 Population Catchment

	Roseburn (via Roseburn Path)	Roseburn via Telford Road	Orchard Brae
Total catchment of service	48,000	47,000	29,000
Indexed catchment (Roseburn Path = 100)	100	98	60
Additional catchment of new infrastructure only	17,000	17,000	22,000
Indexed catchment (Roseburn Path = 100)	100	100	129

Employment Catchment

3.93 The employment catchment area (based on 800m stop catchments), overlaid on a map showing jobs density, is shown in Figure 3-3 and the catchment results in Table 3-4.

Table 3-4 Employment Catchment

	Roseburn (via Roseburn Path)	Roseburn via Telford Road	Orchard Brae
Total catchment	125,000	125,000	78,000
Indexed catchment (Roseburn Path = 100)	100	100	62
Additional catchment of new infrastructure only	8,000	9,000	17,000
Indexed catchment (Roseburn Path = 100)	100	113	213

3.94 When **only** the incremental catchment (additional to the existing tram line) is considered, Orchard Brae has a higher population (22,000) and jobs (17,000) catchment compared to Roseburn's 17,000 population and 8,000 jobs. This reflects the fact that, along the respective Roseburn Path and Orchard Brae sections, the Orchard Brae corridor serves an area of higher population density along that section of the route served by the **new** stop infrastructure.

3.95 However, comparing the overall catchment of options between a common start and end point (Princes Street and Crewe Toll), the Roseburn options have a significantly larger overall population (48,000) and jobs catchments (125,000) compared to 29,000 population and 78,000 jobs for Orchard Brae. This reflects the fact that the section of 'common' route on the Roseburn options (which includes the existing tram stops at Haymarket and West End) is characterised by a high population and in particular employment density.

3.96 The Roseburn options would also result Haymarket and West End, and their associated areas of dense population and employment, having 20 trams per hour whereas with Orchard Brae, these stops would be served by 10 trams per hour.

Figure 3-2 Population Catchment - Crewe Toll to Princes Street

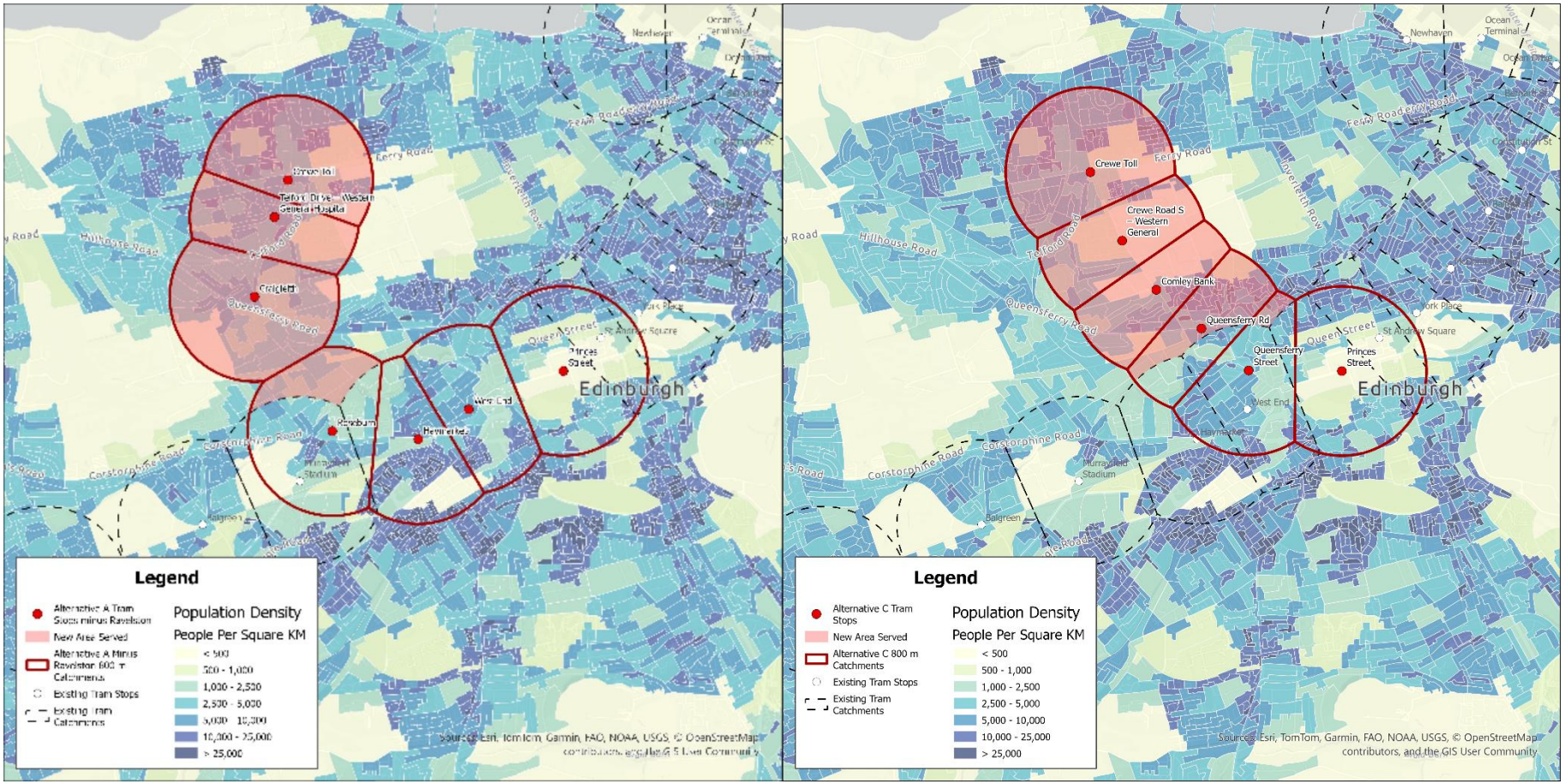
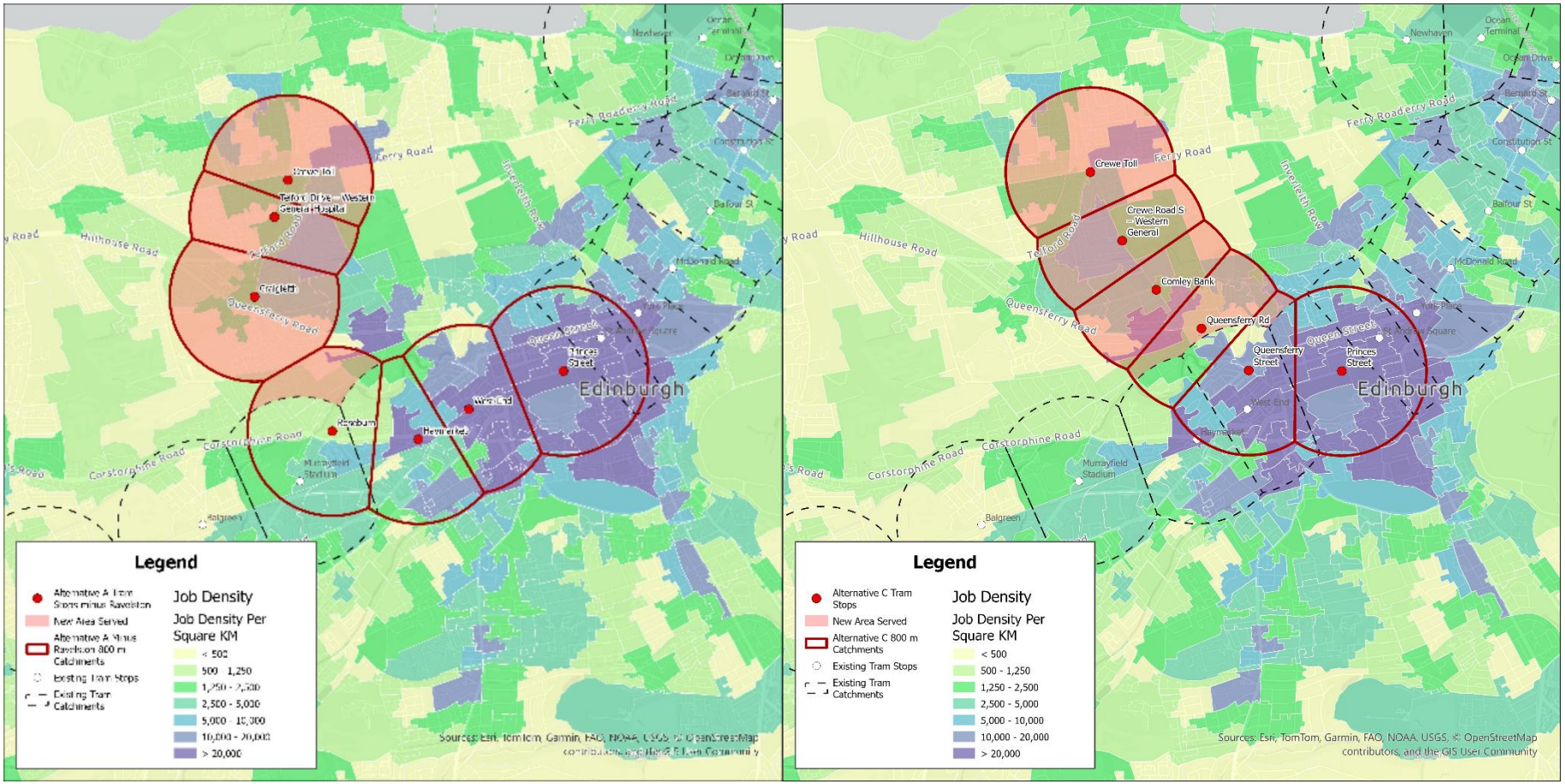


Figure 3-3 Employment Catchment - Crewe Toll to Princes Street



Implications for Option Performance: Population

3.97 The Orchard Brae option performs better in terms of providing increased accessibility to tram for a higher population catchment, whereby 22,000 of the total 29,000 Orchard Brae catchment is 'new' i.e. not served by existing tram. The 'new' catchment served by the Roseburn option is lower at 17,000, out of the total catchment of 49,000. The current 32,000 passengers (49,000 minus 17,000) are served by the existing tram route. However, those served by the current route would benefit from an additional tram connection to Granton and higher tram frequency (20 tph).

3.98 Whereas the Orchard Brae option serves a higher population catchment, this replicates the catchment currently served by bus services operating along this route. By contract, the Roseburn option (and the stops along Roseburn Path) would serve a local catchment that is additional to that currently served by bus. The Roseburn option would therefore offer better overall public transport accessibility, taking account of both tram and bus services.

Implications for Option Performance: Employment

3.99 The higher employment catchment served by the Roseburn option (125,000 compared to 78,000 for Orchard Brae) reflects the greater accessibility, via a direct tram service, that the Roseburn option provides to city centre employment.

3.100 This would make the Roseburn option more attractive to people living along the Granton corridor, but also from the South East corridor. It is this improved access to a wider range of city centre destinations from the south east that, in part, explains the higher overall tram demand for this option (described in the next section).

Demand and Benefits Estimation

3.101 Tram demand for both options has been estimated using the Edinburgh Strategic Transport Model – the Council's strategic transport model. The Council's model suite is comprised of a strategic network model (using VISUM software – an established framework for forecasting strategic transport demand and benefits) covering the city centre and key arterial corridors.

3.102 The Edinburgh Strategic Transport Model was originally developed in 2005 to support the Airport-Newhaven tram business case, and the model has subsequently been periodically updated with new public transport and traffic surveys and planning data. The model has previously been used to support the Trams to Newhaven business case and the development of City Plan 2030.

3.103 As part of the TGBB work the model has been updated to include and represent:

- Up-to-date planning assumptions consistent with CEC population and employment forecasts. These inform trip ends and development assumptions.
- Latest transport network assumptions including, for example, the representation of the Newhaven extension in the Do Minimum, the updating of bus routes and frequencies and more detailed representation of zone connectors and parking charges.
- Updates to model parameters (values of time, vehicle operating costs, fares).

3.104 The updates above provide the basis for the forecasting of Granton to Edinburgh BioQuarter route options as described below.

3.105 Forecasts have been prepared for 2032 forecast year. A second forecast year of 2042 has also been developed which will be used to support the future development of a SBC (subject to funding and approvals from Scottish Government/Transport Scotland).

3.106 Demand modelling has been undertaken for the Roseburn (via Roseburn Path) and Orchard Brae options[12].

Forecasting Assumptions

Do Minimum (without Tram) and Do Something Specification

3.107 Both options assumed, for the purposes of comparative assessment, a common set of network and service pattern assumptions in the 'Do Minimum' (without TGBB) and 'Do something' options. Differences in the options specification related to the different routes and associated stop locations and journey times on the option specific sections.

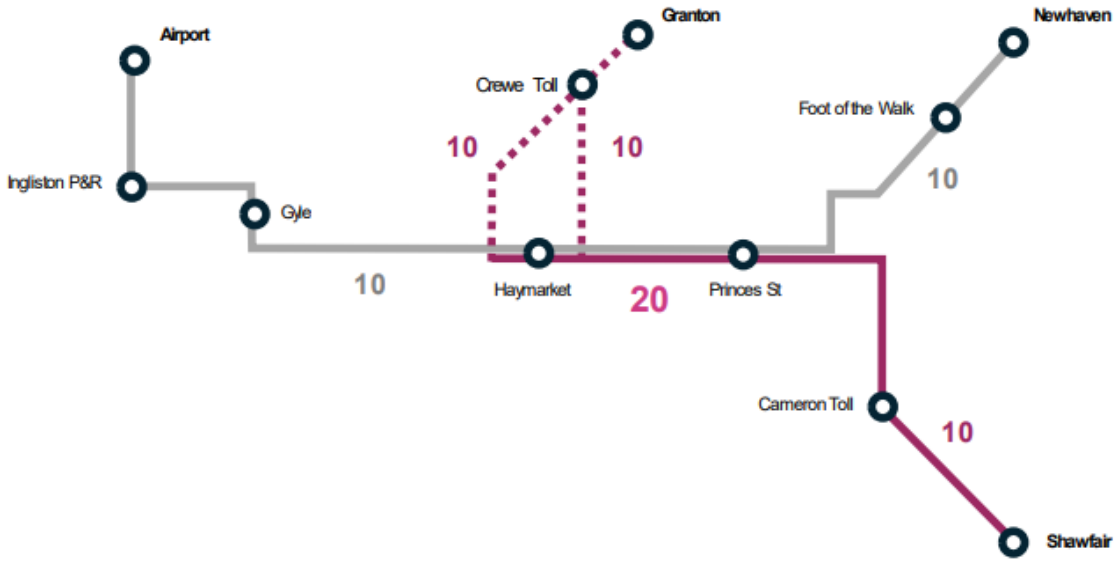
3.108 These are summarised in Table 3-5 and Figure 3-4.

Table 3-5 Specification for Demand Modelling

Assumption	Roseburn (via Roseburn Path)	Orchard Brae
Do Minimum tram service frequency (Airport to Newhaven)	• 10 trams per hour *(with 20 trams per hour serving Haymarket and West End)*	• 10 trams per hour *(with 10 trams per hour serving Haymarket and West End)*
Assumed N-S route	• Granton to Shawfair via Roseburn [Figure 3-1]	• Granton to Shawfair via Orchard Brae [Figure 3-1]
Do Something service frequency	• 10 trams per hour *(with 20 trams per hour serving Haymarket and West End)*	• 10 trams per hour *(with 10 trams per hour serving Haymarket and West End)*
Journey times (Granton to City Centre)	• Peak: 26-minutes • Inter-peak: 25 minutes [as per Table 3-2]	• Peak: 34-minutes • Inter-peak: 27 minutes [as per Table 3-2]
Bus service recast	Same for both options; as described below	Same for both options; as described below

[12] As a sub-option, Telford Road may be revisited during development of an Outline Business Case.

Figure 3-4 Assumed Do Something Service Pattern



Bus Network Recast

3.109 The development of a tram network offers the potential to transform the quality and attractiveness of the overall public transport network and deliver against the City's objectives for regional and city-wide public transport, and to transforming the city centre by reducing the volume of traffic.

3.110 Realising and maximising the potential benefits requires tram to be integrated with bus (and other public transport and sustainable modes) to ensure:

- Bus services could be optimised on the inner and city centre sections of the tram route, where there would otherwise be duplication of bus and tram provision.
- Overall public transport capacity into the city centre can accommodate demand. Tram, as a higher capacity mode, enables this to be achieved in a more efficient manner.
- Overall public transport accessibility would be maintained throughout the corridor. This would require a balance of bus provision to ensure that some services to be operate direct to the city centre (those that do not parallel the tram corridor), while other bus services would act as feeders into the tram network.
- Interchange between public transport modes is facilitated through high-quality physical interchange, integrated network planning (routes, services and timetabling) and integrated fares and ticketing.

3.111 For the assessment of tram options initial assumptions have been developed to support an indicative potential complementary recast of the bus network based on bus services that would be served by TGBB. The same indicative recast is assumed for both the Roseburn and Orchard Brae options and the impact of the recast would not materially affect the comparative performance of options.

3.112 Further consideration will be given to the optimal integration of bus and tram networks as the scheme design is developed.

Estimated Tram Demand

3.113 The strategic model has been used to forecast tram demand and benefits. Forecasts are based on the AM Peak (07:00-09:00) and interpeak (10:00-12:00) models, from which annual demand estimates have also been prepared.

Annual Tram Demand

3.114 There will be further refinement of the Edinburgh Strategic Transport Model, and further optimisation of the tram option to support a future SBC. Further assessment has been undertaken to assess the impact of an optimised service pattern and frequency, and these results are also in Table 3-6, in brackets.

Table 3-6 Annual Forecast Tram Demand 2032 (million pax per year)

Annual Demand 2032	Roseburn (via Roseburn Path)	Orchard Brae	Difference – Roseburn vs Orchard Brae
Do Minimum Tram demand (Airport to Newhaven)	21.6	21.6	
Do Something Tram Demand	• Core: 33.8 • (Further optimised: 38.8)	• Core: 31.4 • (Further optimised: 36.3)	
Incremental Demand (Granton to South East)	• Core: 12.3 • (Further optimised: 17.3)	• 9.9 • (Further optimised: 14.7)	Roseburn • Core: +2.4m • (Optimised: +2.6m)

3.115 The Do Minimum forecast is 21.6m passengers per year by 2032. Under the further optimised runs, total do minimum network demand would be in the order of 36m to 39m passenger per annum, compared to 31m to 34m in the core runs. However, the refinements and optimisation do not materially affect the comparative or relative demand for the Roseburn vs Orchard Brae assessment.

3.116 Under both cases, Roseburn would attract around 2.5m more passengers per annum compared to Orchard Brae. As part of this Options Assessment the comparative demand numbers have been reported.

3.117 Overall, annual tram demand for the route option via Roseburn would be around 25% higher than for Orchard Brae, as shown in Table 3-7.

Table 3-7 Indexed Demand (Roseburn Path = 100)

Demand	Roseburn (via Roseburn Path)	Orchard Brae	% difference (Roseburn vs Orchard Brae)
Peak	100	60	+66%
Inter peak	100	90	+11%
Annual	100	80	+24%

Demand by Time Period

3.118 Within this, analysis of the demand forecasts *by time period* show that:

- Roseburn demand in the AM peak is around two-thirds (66%) higher than that for Orchard Brae. This reflects the significantly better journey time in the peaks for Roseburn vs. Orchard Brae.
- Roseburn demand in the Inter-peak is over 10% higher in the inter-peak. The lower comparative increase reflects the reduced journey time differential in the inter-peak, whereby Roseburn remains better but by a less extent.

3.119 The Roseburn demand in the peak (66%) and inter-peak (11%) result in the overall annual difference of around a quarter (+24%)[13].

Demand by Area

3.120 The tram demand forecasts are disaggregated to the individual stop level. The demand at the stop level has been aggregated to show the demand to/from key sections of the route, and to assess differences in demand between route options.

3.121 There are several main drivers that underpin the comparative performance of each route in attracting demand for key movements served by tram. These are:

- **The journey times for each option:**. Roseburn journey times are faster to the city centre and, by extension, to the South East and Newhaven corridors. The journey time from Granton to the West (West Edinburgh and the Airport) is significantly faster via Roseburn, as it routes via Haymarket (whereas for Orchard Brae passengers would be required to route via interchange at Princes Street).
- **The catchment of the new stop infrastructure for each route option**: South of Crewe Toll, the Orchard Brae route serves a significantly higher population and employment catchment compares to Roseburn.
- **The comparable catchment of the city centre served by each option:** Roseburn, by virtue of serving Haymarket directly, provides direct access to a large jobs catchment in the city centre compared to Orchard Brae. This provides greater accessibility to jobs (and other city centre purposes – education, leisure etc.) from both the Granton corridor and, in particular, the higher demand South East corridor.

3.122 These factors underpin the differences if demand for key locations / movements that are forecast based on the Edinburgh Strategic Transport Model. The key findings are that:

- Roseburn attracts significantly more demand from the northern section of Granton (the section common to both route options). This reflects the faster journey times to the city centre and, by extension, to the South East corridor.
- Orchard Brae attracts more demand than Roseburn on the discrete sections of route served by each option respectively. This reflects the higher in-scope population catchment served by Orchard Brae, and that it serves more jobs on the corridor.
- Overall, the level of demand on the Roseburn and Orchard Brae corridors on the respective Granton routes are essentially the same i.e. the greater demand attracted

[13] The annualisation factors from modelled AM 2-hours to annual peak demand is 622, while the factor from the 2-hour inter-peak to off-peak demand is 1,823.

by Roseburn on the 'common' section north of Crewe Toll is counterbalanced by the higher demand attracted by Orchard Brae on the discrete route sections.

- The overall higher demand for Roseburn is driven, in large part, by virtue of the fact that it serves a significantly larger city centre catchment, through directly serving Haymarket and West End stops. This provides significantly better accessibility from the Granton corridor and the South East corridor.

Tram & Public Transport Benefits

Public Transport Benefit Forecasting

3.123 Transport benefits have been estimated using the Edinburgh Strategic Transport Model. The benefits are based on the difference in generalised journey time between the Do Minimum scenario (without the TGBB route) and the Do Something. The model includes representation of rail, bus and tram at a detailed level covering of Edinburgh and its hinterland.

3.124 The generalised journey time (GJT) metric encompasses key facets of each journey, including the time taken to access a stop (from a model zone to a stop), the wait time at a stop (function of service frequency), the in-vehicle time (journey time to destination) and the egress time at the destination end (from the stop to final destination). The GJT also includes behavioural weightings that reflect peoples typical (or the average persons) inherent preferences for different modes or journey element. For example, tram includes a modal preference over bus (reflecting user preferences for reliability, quality, perception of personal safety due to on-board conductors etc) while interchange is penalised over and above the time taken to interchange (as people prefer the equivalent time 'on-board' a service rather than interchanging). These behavioural parameters are based on research and have been used to calibrate/ validate the Edinburgh Strategic Transport Model; calibration/ validation is the process by which the model developed to best represent existing trip volumes and mode shares.

3.125 The representation of TGBB route options in the respective Do Something scenarios forecasts benefits associated with the improved public transport accessibility (new direct routes), improved journey times, enhanced quality and enhanced service frequency.

3.126 There will be further refinement of the Edinburgh Strategic Transport Model, and further optimisation of the tram option to support the SBC and future Outline Business Case. These further updates are likely to increase the overall forecast benefits for tram at the overall network and route level. However, these refinements and optimisation would not materially affect the comparative or relative demand for the Roseburn vs Orchard Brae assessment.

Total Benefits by Time Period

3.127 The forecast benefits based on the Edinburgh Strategic Transport Model are summarised in Table 3-8.

Table 3-8 Indexed Benefits (Roseburn Path = 100)

Demand	Roseburn (via Roseburn Path)	Orchard Brae	% difference (Roseburn vs Orchard Brae)
Peak	100	53	+90%
Inter peak	100	73	+38%
Annual	100	66	+52%

3.128 The key findings of the benefits assessment are that:

- In the modelled AM peak period the overall public transport benefits delivered by the Roseburn option are almost double (90% higher) those of Orchard Brae. This reflects the significantly faster journey times along with the better accessibility to the city centre offered by this option.
- In the inter-peak the overall public transport benefits delivered by the Roseburn option are almost 40% higher than Orchard Brae. The reduced differential (compared to the AM) reflects the better journey time on Orchard Brae in the inter-peak compared to the AM (still slower than Roseburn, but by a lesser proportion).
- Overall, the above suggests that the annual benefits (i.e. accounting for peak and inter-peak) for Roseburn would be over 50% higher for the Roseburn option.

Interpretation

3.129 The modelling analysis overall therefore suggests that the annual Roseburn demand would be around 25% higher and benefits 50% higher than Orchard Brae. The proportionately higher scale of benefits reflects the:

- Significantly better journey time differential for Roseburn compared to existing (bus) provision.
- Improved accessibility offered by Roseburn for key movements:
  - Whereas Orchard Brae services a large catchment along its discrete route section south of Crewe Toll, this catchment is well served by bus in the Do Minimum. By contrast, the catchment served by Roseburn is less well serviced by bus and therefore, while the demand is lower the 'benefit per user' will be higher.
  - Roseburn also serves the wider city centre much better than Roseburn, offering direct access to a much higher city centre catchment than Orchard Brae.

Impact on Environment: Landscape, Ecology and Biodiversity

Roseburn

3.130 The Roseburn alignment runs along the disused railway corridor currently functioning as an active travel route. The route has been evaluated using the Preliminary Ecological Appraisal (April 2025), Landscape, Streetscape and Heritage Report (July 2025) and Technical Note 04 - Infrastructure Costs, Phasing and Construction (March 2025).

Route Context and Relevant Designations

3.131 The corridor lies within a LNCS and forms part of Edinburgh's Green-Blue Network, reflecting its combined ecological, recreational, and placemaking value. It is characterised by mature vegetation, informal access paths, and a sense of retreat from the surrounding urban fabric.

Impact of Tram Scheme and Potential Mitigations

3.132 The tram scheme would result in a material change to the visual and functional character of the corridor. Vegetation clearance, particularly within the single-track section between Craigleith and Roseburn, will result in tree and habitat loss. The proposed reinstatement of active travel facilities and planned environmental improvements aim to mitigate these changes by enhancing ecological connectivity and corridor quality.

3.133 The natural continuity of the Roseburn corridor supports wildlife habitats and provides a valued community resource. Its transformation into a tram route will alter the landscape from semi-natural green space to a more structured multi-modal corridor (with less vegetation). While this may improve safety and infrastructure quality, the tranquillity and informal ambience of the current corridor may be diminished.

Assessment of Impacts

- **Landscape:** Moderate to major impact during construction, with potential for long-term neutral or positive outcome if enhancements are successfully delivered.
- **Biodiversity and Habitats:** Localised but significant impacts requiring mitigation, including replanting and landscape integration.
- **Geology and Soils:** Minimal impacts expected.
- **Water, Drainage and Flooding:** Standard surface water management systems to be included.
- **Noise & Vibration:** Temporary construction impacts; low operational noise anticipated due to vehicle technology and segregated route.

Orchard Brae

This assessment draws on on-street route design details and environmental constraints identified in the VISSIM Modelling Report and TN04.

Route Context and Relevant Designations

3.134 The alignment follows a predominantly on-street corridor via Queensferry Street, Dean Bridge, Orchard Brae, and Crewe Road South. While it is not located within a designated LNCS, the route lies within Edinburgh's wider Green-Blue Network and includes multiple Tree Preservation Orders, notably on Crewe Road South near Comely Bank Roundabout. The corridor provides scattered but valuable tree cover and contributes to urban ecosystem functions such as shade, noise buffering, and biodiversity.

Impact of Tram Scheme and Potential Mitigations

3.135 The on-street alignment requires significant road space, which would result in the removal of trees and verge vegetation in constrained areas. The scope for replanting or environmental offset within the corridor is limited due to adjacent properties and the operational needs of both tram and general traffic. Unlike Roseburn, the Orchard Brae corridor offers few opportunities within the corridor for ecological enhancement, and any green infrastructure would need to be integrated creatively at a detailed design stage.

3.136 Although not a continuous ecological corridor, the existing tree cover plays a local role in urban ecosystem services such as air purification, shading, and noise mitigation. Their removal will impact the local environment. From a placemaking perspective, the current tree-lined avenue character will be disrupted, potentially reducing the perceived environmental quality of the corridor for residents and road users alike.

Assessment of Impacts

- **Landscape:** Moderate impact due to tree removal and alteration of the street's visual character; mitigations will be constrained by the available space within the corridor.
- **Biodiversity and Habitats:** Minor to moderate impact, mainly through the loss of street trees and small-scale habitat features; limited opportunity for reinstatement or enhancement.
- **Geology and Soils:** Minimal anticipated impact, with standard urban construction techniques expected.
- **Water, Drainage and Flooding:** No major concerns identified; existing drainage infrastructure likely to be retained or upgraded.
- **Noise & Vibration:** Construction-phase impacts likely to be more noticeable in this built-up corridor; operational impacts expected to be low due to tram design, but closer proximity to dwellings could result in higher perception of noise.

Impact on Heritage

Roseburn

This assessment is based on route and structural analysis within the VISSIM Modelling Report and Technical Note 04 – Infrastructure Costs, Phasing and Construction. The Roseburn alignment largely avoids areas of statutory heritage sensitivity.

Route Context and Relevant Designations

3.137 The tram route follows the disused railway corridor of the Roseburn Path. While the Coltbridge Viaduct is historically significant, it is not a listed structure. The route avoids all listed buildings, scheduled monuments, and conservation areas, except the Roseburn Terrace Bridge, which substantially lowers its heritage sensitivity.

Impact of Tram Scheme and Potential Mitigations

3.138 Tram delivery will require modifications to the Roseburn Terrace Bridge. These works will be managed to preserve the historic character of the structure and ensure long-term functionality without introducing intrusive visual impacts. As the rest of the route lies within a green corridor, rather than a built heritage context, there are no further direct impacts on designated assets.

Assessment

3.139 The Roseburn alignment presents a low heritage risk. Impacts are limited to setting changes and structural interventions to a non-listed historic structure. With appropriate design treatment, there is an opportunity to integrate interpretive or aesthetic elements that reference the corridor's railway heritage and industrial past.

Orchard Brae

3.140 This route has been assessed based on the Dean Bridge Structures Report, the VISSIM Modelling Report, and heritage considerations within TN04. It intersects with several nationally and internationally significant heritage designations.

Route Context and Relevant Designations

3.141 The tram alignment crosses the Dean Bridge, a Category A listed structure designed by Thomas Telford and a landmark of historic engineering. The alignment also passes through or alongside multiple Conservation Areas, including parts of Queensferry Street and Lynedoch Place, and lies within the World Heritage Site. These designations denote areas of high historic, architectural, and visual sensitivity.

Impact of Tram Scheme and Potential Mitigations

3.142 Tram infrastructure on Dean Bridge would require significant slab track installation and may necessitate future strengthening interventions. According to the Dean Bridge Structures Report, these works present considerable technical, and heritage risks due to the bridge's age, structural limitations, and historic value. Additionally, within the wider route corridor, reallocating road space to tram infrastructure would reduce available space for pedestrians, cyclists, buses and general traffic, potentially altering the historic townscape character of the West End.

3.143 These impacts would require comprehensive engagement with heritage stakeholders, bespoke engineering solutions, and sensitive urban design to minimise the visual and structural effects on the built environment.

Assessment

3.144 The Orchard Brae option would have heritage impacts as summarised below:

- **Built Heritage and Structures:** Major adverse impact anticipated at Dean Bridge due to invasive structural works required. These would affect the physical integrity of a nationally important listed structure.
- **Townscape and Conservation Areas:** Moderate to major impact, as tram works would alter the visual character and functional balance of key heritage streets such as Queensferry Street.
- **Setting and Views:** Potential effects on key views within the Edinburgh World Heritage Site, particularly along the approach to the Dean Bridge and from the city centre westwards.
- **Mitigation Potential:** While some impacts can be softened through sensitive design and careful material selection, structural interventions on listed assets cannot be fully mitigated. The cumulative impact on setting and townscape must be considered significant.

Assessment Against STAG Transport Planning Objectives

3.145 The comparative STAG assessment highlights distinct strengths and weaknesses for the Roseburn and Orchard Brae alignments, informed by assessment scoring across economic, social, environmental and transport objectives, and informed by the evidence presented within this Chapter.

3.146 The scoring assessment have been undertaken using a scoring range of +3 to -3 in line with Transport STAG guidance[14], with the scoring assessment outlined in Table 3-9.

Table 3-9 STAG Scoring Framework

Benefit/Impact	Justification
Major benefit (+++)	These are benefits or positive impacts which, depending on the scale of benefit or severity of impact, the practitioner feels should be a principal consideration when assessing an option's performance against objectives.
Moderate benefit (++)	The option is anticipated to have only a moderate benefit or positive impact.
Minor benefit (+)	The option is anticipated to have only a small benefit or positive impact.
No benefit or impact (0)	The option is anticipated to have no or negligible benefit or negative impact.
Minor cost or negative impact (-)	The option is anticipated to have only a small negative impact.
Moderate cost or negative impact (--)	The option is anticipated to have a moderate cost or negative impact.
Major cost or negative impact (---)	These are costs or negative impacts which are significant and a material consideration when assessing an option's performance.

3.147 The assessment against STAG transport planning objectives (TPOs) is presented in Figure 3-5.

[14] scottish-transport-appraisal-guidance-managers-guide.pdf

Figure 3-5 Assessment Against TPOs

Policy Outcome	STAG Transport Planning Objectives	Roseburn (via Roseburn Path) STAG Assessment	Orchard Brae STAG Assessment	Rationale behind STAG Assessment
To support inclusive and sustainable economic growth	**Objectives**			
	·To support economic growth at the city, region and national level	+++	++	Roseburn offers faster peak journey times, higher demand, and direct access to Haymarket, boosting city-wide economic performance. Orchard Brae provides good central access but with slower and less reliable travel and no option for a direct route to the airport.
	·To support the development and success of Strategic Development Areas	++	+	Both options would directly serve the Granton, City Centre and the Edinburgh BioQuarter SDAs, and provide a tram connection to the West Edinburgh and Leith Waterfront SDAs. The better journey times and reliability mean that Roseburn would better support the development and success of the Granton SDA. Though at smaller scale, Orchard Brae would support housing or opportunity sites around Comely Bank and Orchard Brae.
	·To ensure growth is inclusive and sustainable	+++	++	Roseburn supports access for deprived communities and integrates well with active travel. Analysis shows a much higher employment catchment (125K jobs) compared to Orchard Brae (78K jobs). Orchard Brae improves access to Western General and job-rich zones, supporting inclusion differently.
To respond to climate change towards delivering net-zero	**Objectives**			
	·Encourage mode shift to more sustainable modes of transport	++	+	High segregation and journey time reliability on Roseburn strongly promote modal shift. Orchard Brae's on-street design limits attractiveness.
	·Improve the attractiveness of public transport through increased efficiency, journey time reliability and service quality	++	+	Roseburn's off-street design improves operational efficiency and resilience. Orchard Brae faces delays from traffic interaction.
	·Support sustainable land-use development, aligned with spatial planning and development policies	++	+	Roseburn aligns with City Plan 2030 and spatial development at Granton. Orchard Brae does not directly support new planned growth.

Policy Outcome	STAG Transport Planning Objectives	Roseburn (via Roseburn Path) STAG Assessment	Orchard Brae STAG Assessment	Rationale behind STAG Assessment
To promote equality and inclusion and help tackle the city's housing emergency	**Key Impacts (Trade-Offs)**			
	·Ecology, biodiversity and network resilience	--	0	Roseburn runs through an LNCS and Green-Blue Network, impacting continuous habitat for bats, badgers, birds, and amphibians. Despite proposed mitigation, it would weaken ecological connectivity and resilience. Orchard Brae affects isolated street trees with limited habitat value and no strategic ecological designations.
	Objectives			
	·Increase public transport accessibility to jobs, education, healthcare and leisure, especially for disadvantaged and vulnerable users.	++	++	Both options provide a high-quality and fully accessible transport option serving employment, health and leisure opportunities. Roseburn provides better accessibility to a wider range of destinations whereas Orchard Brae serves a larger in-scope catchment. Both options offer strong benefits but different focus.
	·Improve mobility through improving the physical accessibility of transport.	++	++	Roseburn would provide for high-quality segregated active travel. Orchard Brae is flatter but lacks room for cycling upgrades.
	Key Impacts (Trade-Offs)			
	·Affordability of public transport	++	++	Fares would be the same for both options, and would be the same as bus fares. Both options serve areas of high deprivation.
To improve health, wellbeing & safety	**Objectives**			
	·Reduce collisions and casualties from road transport through modal-shift to safer public transport and active travel methods.	++	0	Roseburn avoids road conflicts via off-street design. Orchard Brae adds on-street tram alignment in congested areas, with higher risk exposure.
	·Increase safety and security of the transport network.	++	++	Both options include safety features on-board and at stops and would include the presence of conductors.

Policy Outcome	STAG Transport Planning Objectives	Roseburn (via Roseburn Path) STAG Assessment	Orchard Brae STAG Assessment	Rationale behind STAG Assessment
	·Increase the attractiveness of the active travel network and increase active travel use.	+	0	Roseburn integrates walking and wheeling in a green corridor but would change the amenity setting within which people would walk and cycle. Orchard Brae would involve the removal of some cycling infrastructure due to space constraints.
	· Improve local air quality	+	-	Roseburn encourages modal shift and avoids congestion. Orchard Brae adds to congestion and lacks scope for emissions benefits.
	Key Impacts (Trade-Offs)			
	·Impact on key designations including the Green-Blue Network and Local Nature Conservation Area	--	0	The alignment runs through a LNCS and Edinburgh's Green-Blue Network. While mitigation and habitat enhancements are planned, the loss of habitat connectivity and tree cover would significantly affect biodiversity and the ecological character of the corridor.
	Objectives			
	·To protect and enhance the built and natural environment and support the enhancement of 'place'.	-	0	Roseburn would transform a calm natural corridor into a corridor including a tram route and environmental mitigations. Orchard Brae maintains an urban character with moderate impact.
	Key Impacts (Trade-Offs)			
To protect and enhance our environment	·Biodiversity and habitats	--	0	The route impacts woodland supporting foraging bats, birds, badgers, and amphibians. Though replanting and ecological design would be planned, continuity of habitat and corridor function would be significantly reduced.
	·Heritage	0	--	Roseburn avoids listed structures and sensitive townscape. Orchard Brae requires structural works on Dean Bridge with inherent technical and conservation risks and affects conservation areas and the World Heritage Site. Impact of both options mitigated by use of battery-powered trams.

Interpretation

3.148 The Roseburn option consistently outperforms Orchard Brae across the objectives related to inclusive and sustainable growth, access, and mode shift. Its off-street, segregated route supports faster, more reliable public transport journeys, and enhances access to strategic regeneration areas and lower-income neighbourhoods. These strengths align it closely with the City Mobility Plan, City Plan 2030 and national modal shift ambitions.

3.149 The Roseburn option, however, would entail key trade-offs with other objectives and impacts related to environment and ecology. The Orchard Brae route avoids designated ecological corridors and bypasses high-value green infrastructure, reducing the risk to biodiversity and habitat continuity. Its alignment also avoids structural risk to non-listed heritage and instead concentrates impacts in established urban corridors, albeit with significant heritage implications for listed structures such as Dean Bridge.

3.150 On balance, the Roseburn alignment delivers stronger performance on four out of five core STAG transport planning outcomes, particularly in supporting economic growth, inclusion, net zero, and active travel. However, it carries a notable ecological cost. This creates a clear policy-level trade-off whereby Roseburn performs better against transport and economic policy related objectives but would have environmental and ecological impacts. Conversely, Orchard Brae performs better in terms and ecological preservation, but less so on access, connectivity, and climate objectives.

3.151 The Telford Road variant reduces the tram's footprint within the LNCS by shifting part of the route onto Telford Road. This lessens direct ecological impact along the Roseburn Path but introduces localised impacts to street trees and verge habitats, with reduced habitat connectivity. Both options require mitigation, but the full Roseburn Path alignment (Option G1a) involves a more concentrated ecological trade-off in a continuous green corridor, whereas the Telford Road variant transfers some of these impacts to a more urbanised setting on Telford Road.

3.152 From a heritage perspective the most significant issue arises at Dean Bridge under the Orchard Brae alignment. Dean Bridge is a Category A listed structure of national significance, and tram delivery would require substantial interventions, including slab track installation and possible structural reinforcement. These works carry inherent technical and conservation risks and may impact both the physical integrity of the bridge and its setting.

3.153 In contrast, the Roseburn route avoids direct impact on listed buildings and passes through a non-designated historic corridor. Though listed, works on Roseburn Terrace Bridge would be managed to preserve the historic character of the structure and ensure long-term functionality without introducing intrusive visual impacts. Overall, Roseburn poses a lower heritage risk, whereas Orchard Brae involves major impacts on nationally significant built heritage, especially within the Edinburgh World Heritage Site.

Assessment of Comparative Economic Performance

3.154 The full economic assessment and appraisal of a preferred route option (or options) will be developed to support the SBC.

3.155 However, substantive work has been undertaken to inform the costs, benefits and impacts of each option that provide the evidence to support a comparative economic assessment of route options. This work is outlined below.

Capital Costs

Approach to Costing

3.156 Capital costs have been estimated at a high-level for the Granton to Shawfair routes via Roseburn (Roseburn Path), Roseburn (Telford Road) and Orchard Brae respectively at 2025/26 prices.

3.157 The costs have been developed for each route section, reflecting the route length and characteristics of each section, and also for 'system-wide' costs which are assumed, at this stage, to be the same irrespective of the route option.

3.158 The application of risk has been applied differentially by item, with total benchmarked to overall optimism bias allowance as per guidance. This application therefore reflects the absolute risk (at a system level) and the relative risk between options (at a route section level).

3.159 The costs will be refined and updated to support the SBC. The focus of this section of the report is to highlight the comparative costs of the route options under consideration.

3.160 The approach to costing of each element is presented in Table 3-10.

Table 3-10 Capital Cost Elements

Cost element	Cost driver	Estimation approach
Route specific costs		
Track infrastructure	Km route	Unit rate cost per route km based on route section type e.g. within a development area or suburban or urban context, and segregated or on street arrangement.
Utilities diversions	Utilities required to be diverted.	Captured in differential unit rates by section
Major structures	Costs associated with major structures not covered within infrastructure unit rate.	Bespoke assessment
Vehicles	Number of additional vehicles required	Cost per additional vehicle required.
System-wide costs		
Project development & CEC costs	• Costs associated with development to SBC,	High-level cost estimate at system level (i.e. overall cost

	OBC and FBC business case stages, including detailed design and assessment. • TAWS Inquiry costs • Procurement	would not be materially different between route options)
Land and depot costs	• Land purchase required to accommodate route or depot infrastructure. • Depot/ stabling build and fit-out costs	Land and depot costs assumed to be similar for both options.
Complementary measures		
Measured not required to deliver core tram scheme, but that would complement and enhance the overall performance of tram.	• Active travel corridor Pleasance <> Cameron Toll and beyond • Interchange/ Inter-modal Hub at Edinburgh Bio-Quarter (Bus - Tram) • Waverley Lift Access (Waverly station to tram stop)	High-level indicative estimate.

Cost Estimate Options

3.161 The overall cost for the TGBB tram extension is in the order of £2bn to £2.5bn, for the option via Roseburn Path. This includes all the cost elements in Table 3-10, including an overall indicative cost of just over £100m covering the complementary measures.

3.162 The Roseburn Path infrastructure costs (section from Haymarket to Granton) would be in the order of £350m to £480m (all figures in 2025 prices, inclusive of optimism bias/ risk allowance). The range estimate reflects the early stage of scheme development, associated high-level approach to costing and cost risk assessment. The Roseburn costs include cost provision for a parallel active travel provision, which would be required during scheme construction and would be retained post-construction.

Infrastructure Costs Results for Granton Options

3.163 The range estimate reflects uncertainties that apply to each route option, and to full route. However, the bottom-up approach to costing supports a comparative assessment of the relative costs of the route options.

3.164 The cost assessment undertaken concludes that the infrastructure costs for Orchard Brae would be between 60% to 80% higher than for Roseburn. The key drivers of this are:

- Track infrastructure costs would be around 20% higher for Orchard Brae. While the Orchard Brae length of new infrastructure requires is slightly less (see Table 3-1), the cost per kilometre would be higher due to the need to relocate utilities and due to the complexity of implementing tram tracks in a historic on-street environment.

- The costs associated with major structures/ corridor enhancements (i.e. anything out-with the track infrastructure estimate) would be significantly higher for Orchard Brae. In particular, these relate to the laying of track slab and structural strengthening of Dean Bridge. The overall costs for major structural works/ corridor enhancement on Orchard Brae are estimated in the range of between £200m and £400m, whereas the costs on Roseburn Path would be £50 to £90m (for environmental improvements along the Roseburn Path section, structural works along the corridor and provision of parallel active travel provision).

3.165 The indexed infrastructure costs are shown in Table 3-11.

Table 3-11 Indexed Infrastructure Costs (Roseburn Path = 100) (2025/26 prices)

	Roseburn (via Roseburn Path)	Roseburn (via Telford Road)	Orchard Brae
Costs	100	115 to 125	160 to 180

Operating Costs

Tram Operating Costs

3.166 With a TGBB route the overall operating costs form part of the system costs including the existing line. The overall operating costs for an expanded tram system would comprise a combination of operating costs that are broadly 'fixed' (systems, senior management, marketing) and more variable (drivers and vehicle maintenance).

3.167 The system operating costs, and incremental costs for the TGBB route, will be estimated as part of the SBC. However, the route option selection will affect the overall cost due to the relative operational performance on the Granton to City Centre section.

3.168 The longer journey times and greater level of journey time unreliability associated with Orchard Brae would results in higher operating costs than for Roseburn.

3.169 The key drivers of the increase would be:

- Increased costs associated with operating costs that vary with the route hours operated. These include driver and conductor costs, and increased electricity/power costs.
- Increased operating costs associated with increased vehicle requirements (vehicle maintenance).

3.170 Our assessment, based on comparative journey times, is that the Orchard Brae option would require two additional tram vehicles to support the assumed service frequency of 10 trams per hour. This would result in additional driver/conductor costs and additional vehicle maintenance costs which, across a TGBB route, would represent additional incremental operating costs (above that of Line 1) up to 10% higher than that for an Option via Roseburn Path.

Bus Operating Costs

3.171 There could be bus operating cost savings associated with any rationalisation of bus services on the tram corridor. It is likely these 'savings' would be redeployed to provide enhancements in bus services across the city. Any revisions to bus routes and services would be subject to a more detailed bus planning exercise, through discussion with Lothian Buses, at the point a preferred tram route was identified. These could differ

between options at a detailed level, but in either option the bus recast would reflect the same tram corridor capacity being delivered, so for the purposes of this assessment consistent recast assumption has been assumed. As such, the scale of bus operating cost savings associated with the Orchard Brae and Roseburn options would be broadly similar and therefore support a similar scale of redeployment across the wider network.

Tram and Public Transport Revenues

3.172 The comparative tram revenues would be directly proportionate to the tram demand by option summarised in Table 3-7. The indexed tram revenues are shown in Table 3-12.

Table 3-12 Indexed Tram Revenue (Roseburn Path = 100)

	Roseburn (via Roseburn Path)	Roseburn (via Telford Road)	Orchard Brae	% difference (Roseburn vs Orchard Brae)
Revenues	100	n/a	80	+24%

Scheme Benefits

Public Transport Benefits

3.173 The comparative tram benefits are as per those presented in Table 3-8.

3.174 The tram benefits reflect the difference in tram journey times as reported in Table 3-2. However, no assumption in made within the strategic transport modelling of the impact that each option would have on bus journey times and hence any benefits (or disbenefits) resulting from any change in bus journey times.

3.175 As described from paragraph 3.81 the Roseburn options would be expected to support a slight improvement in bus journey times, as the combination of segregated running and higher modal shift would result in less traffic and congestion on existing bus routes. This would be in contract to Orchard Brae, where on-street running would conflict with other road users and increase congestion, with the likely effect that bus journey times could worsen.

Road User Benefits & Impacts

3.176 The same impacts on bus journey times would apply to road journey times, whereby the Roseburn option would deliver an improvement and Orchard Brae a worsening of road journey times.

3.177 We have not sought to quantify the impact on bus or road journey times, but it is assessed qualitatively in Table 3-13.

Table 3-13 Road User Benefits & Impacts

	Roseburn (via Roseburn Path)	Roseburn (via Telford Road)	Orchard Brae
Tram-related benefits (Roseburn Path = 100)	100	n/a	60
Bus benefits	+ve	+ve	-ve
Road benefits	+ve	+ve[15]	-ve

[15] Benefit overall, but potential localised disbenefits associated with Telford Road section.

Assessment of Comparative Economic Performance

3.178 The evidence presented above suggests that the Roseburn options would perform significantly better in terms of their economic performance, and that the Roseburn (via Roseburn Path) option would perform better than Roseburn via Telford Road.

3.179 In terms of the choice between Roseburn versus Orchard Brae, the key conclusions are that:

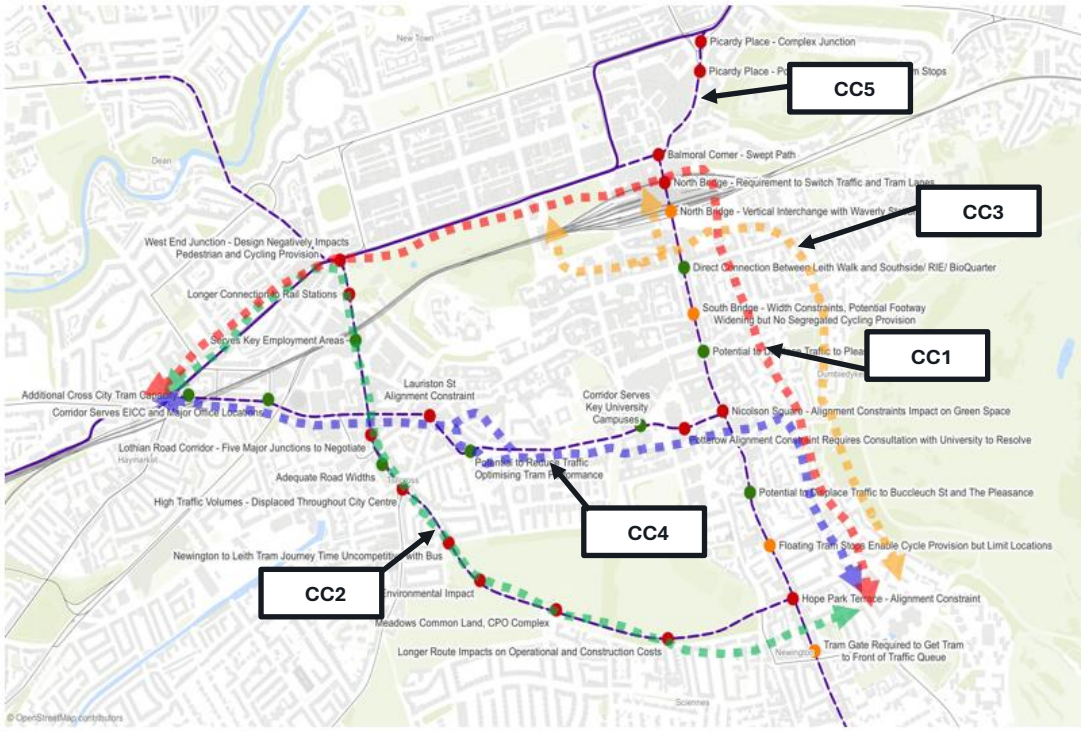
- **Costs and Financial Impacts**
  - The infrastructure costs for Orchard Brae would be between 60% and 80% higher than those for Roseburn. As such, the overall costs and funding requirement for Orchard Brae would be significantly greater than for Roseburn.
  - The operating costs would also be higher for Orchard Brae, as would the associated vehicle requirement.
  - Tram revenues and net public transport revenues would be higher for Roseburn.
  - The combination of lower operating costs and higher revenues would mean that the ongoing financial performance and affordability would be materially better for Roseburn.
- **Transport Benefits**
  - Public transport benefits would be significantly higher for Roseburn compared to Orchard Brae (around 50% higher). This would form the largest proportion of total scheme benefits.
  - Benefits to bus users and general road users would be positive for Roseburn and negative for Orchard Brae (not quantified).
  - Cycle benefits (also unquantified) would, in terms of overall transport accessibility, be better for Roseburn. However, there would be a significant effect on the character of the corridor which may adversely affect the quality of environment for cyclists and pedestrians.
  - Overall Roseburn would deliver significantly higher overall benefits compared to Orchard Brae.
- **Overall Economic Performance**
  - The combination of lower costs (capital and operating) and higher benefits (to tram, bus and general road users) means that Roseburn would perform significantly better in economic terms as part of an overall TGBB tram route.

4 City Centre Routes: Options Assessment

Introduction

4.1 To deliver TGBB, routing the tram through the city centre would be required. This chapter provides an overview of options considered, including those not taken forward at this time on feasibility grounds. Five options were considered during an earlier study[16], as summarised in Figure 4-1.

Figure 4-1 City Centre options



[16] Edinburgh Strategic Sustainable Transport Study (Phase 2)

Options considered previously and not taken forward to full option assessment

4.2 Three of the five options (options CC3, CC4 and CC5) have been sifted out and consequently not taken forward to full MCAF evaluation for the reasons presented in Table 4-1 below.

Table 4-1 City Centre options not taken forward to full option assessment

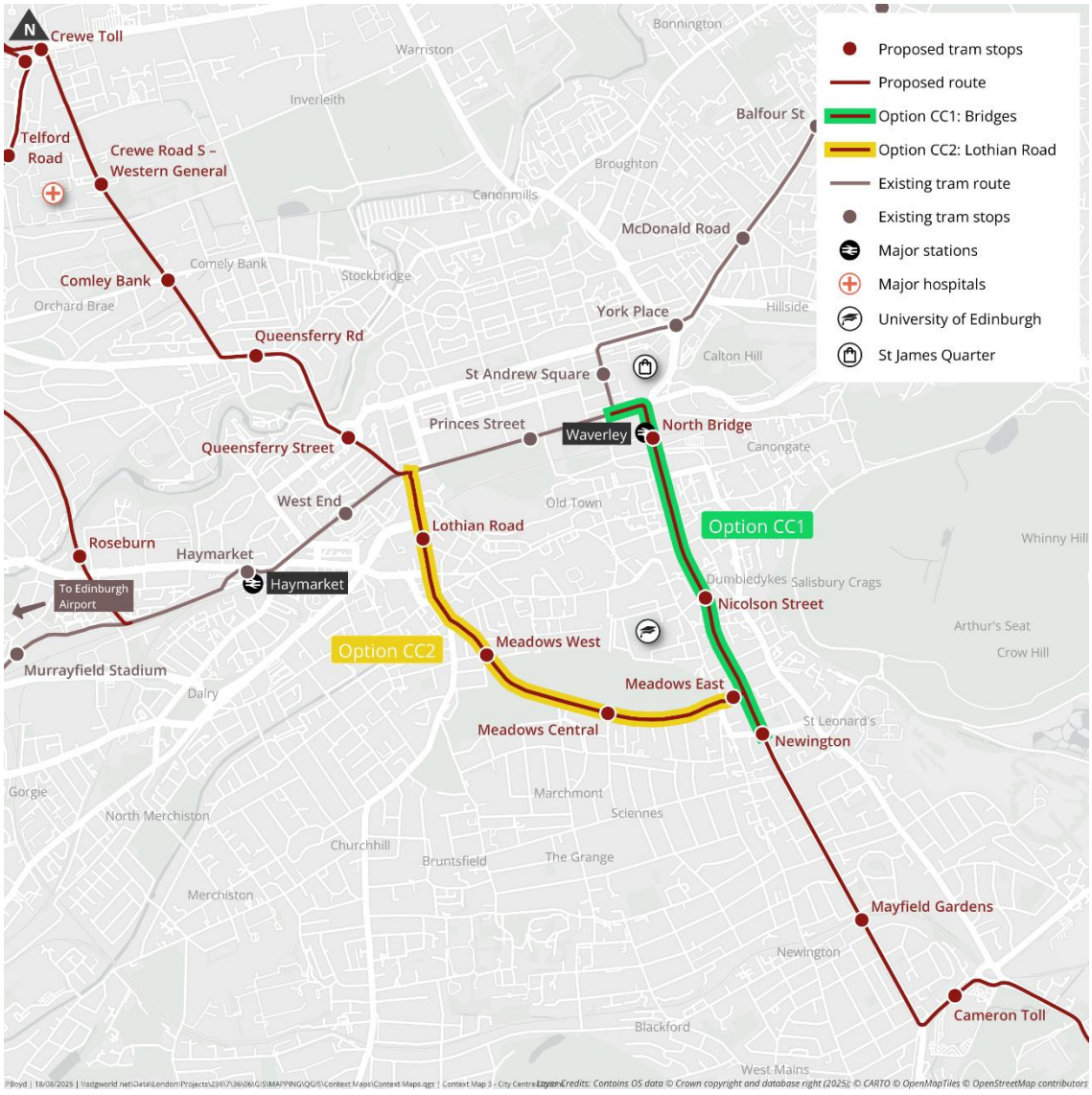
Option	Route	Outcome
CC3. The Pleasance	St Leonard Street, The Pleasance, St Mary's Street, Jeffrey Street, Market Street, The Mound, Princes St.	• Rejected due to adverse gradient of the Pleasance. Gradient is approximately 10%, the typical maximum gradient for tram is 6%. • Alignment via St Mary's Street and Jeffrey Street to Waverley Bridge extremely challenging. • Complex connection at Princes Street / Waverley Bridge would limit tram and wider bus network capacity.
CC4. Cross City Route	South Clerk Street, Nicolson Square, Marshal Street, Lauriston Place, Lauriston Street/Lady Lawson Street, Bread Street, Morrison Street, joining existing infrastructure at Haymarket Station or Shandwick Place (dependent on the City Centre to Granton option progressed)	• Considered at ESSTS Phase 2, and significant challenges identified in securing alignment / property impacts/ heritage impact. • Feasibility uncertain in terms of securing route for prospective scheme for in the short term. Future University of Edinburgh redevelopment around Bristo Square could enable scheme. • Would require a Delta Junction at Shandwick/ Haymarket to facilitate movement onto the existing network. • Could be longer-term option (expanded network).
CC5. Leith Street	Leith Street	• Offers potential to enable direct SE to Newhaven services • Initially identified as a potential network opportunity during ESSTS2, however, subsequent more detailed work demonstrated as unfeasible
Hybrid CC2/CC4 option	Haymarket Station, Morrison Street, Lothian Road, Melville Drive	• Would require complex interaction between tram and road traffic between Morrison Street/ Lothian Road • Could be longer-term option (expanded network).

Options Overview

Potential Options

4.3 Two city centre options have been carried forward for more detailed assessment: The Bridges route and the Lothian Road route (as presented in Figure 4-2) below. Both options provide connections between the new tram corridors to the north (Roseburn or Orchard Brae) and the existing tram line in the city centre.

Figure 4-2 City Centre Route Options



Option CC1: Bridges

Scheme Design Overview / Properties

Tram alignment

4.4 The Bridges alignment extends south from Princes Street via North Bridge, South Bridge, and Minto Street, continuing toward Cameron Toll, the Edinburgh Royal Infirmary and the Edinburgh BioQuarter (and potentially onwards into East and/or Midlothian in the future). A delta junction would be created at Princes Street/South St Andrew Street, enabling movements in all directions between the existing tram and the new extension.

4.5 A tram stop would be constructed on North Bridge with platforms offset to reduce the corridor width and improve pedestrian space. The design includes direct lift access to

Waverley Station (delivered through the Waverley Station Masterplan[17]) facilitating a high-quality interchange, particularly for passengers with mobility impairments or luggage.

4.6 The route seeks to prioritise public transport and walking, with traffic restricted to local access only in the northern section of South Bridge. It is also expected that time restricted loading would also be provided. Between Salisbury Place and Lady Road, the alignment would be largely on-street, though the junction at Craigmillar Park/Lady Road presents a key constraint due to required tram turning radii and traffic staging.

Active Travel Provision

4.7 Active travel infrastructure would be designed to align with the City of Edinburgh Council's Our Future Streets. Pedestrian improvements are a core component, including widened footways, particularly on South Bridge where previous space limitations around bus stops hindered access.

4.8 Cycle provision would not be provided on this corridor. Instead high-quality alternatives for cyclists would be provided on parallel corridors.

4.9 South of Cameron Toll, in order for the tram design to integrate with existing proposals for an active travel route to the Edinburgh BioQuarter, it is expected that the active travel scheme would be introduced in the short term, which, would then be re-worked in the longer term to ensure final design aims for tram support/active travel continuity and user safety.

Ecology and Biodiversity

4.10 Tree Preservation Orders are present along parts of the corridor, including the A701 between Ventnor Terrace, Craigmillar Castle Park, and Cameron Toll shopping centre. The current design avoids impact on these protected areas.

4.11 The route alignment has been designed to avoid Bridgend Farm, an area of historical value. Proposed mitigation includes careful routing and trams running at speeds appropriate to the track curvature to minimise local disturbance.

Heritage

4.12 The Bridges route traverses a historically rich area, including the World Heritage Site and several Category A-listed structures such as North Bridge and South Bridge. The design proposes battery-powered trams along this section to avoid the use of OLE, thereby preserving important views and reducing visual impact.

[17] https://scotlandsrailway.com/assets/site/Waverley-Station-Masterplan-Leaflet-Web.pdf

Option CC2: Lothian Road

Scheme Design Overview / Properties

Tram alignment

4.13 The Lothian Road alignment would connect the Edinburgh BioQuarter to the Orchard Brae corridor via Queensferry Road. This is the principle north-south route for general traffic and tram tracks would run alongside general traffic on Lothian Road, with buses also operating in this corridor.

4.14 The alignment would allow full interchange at West End tram stop, with operations routed westward toward Haymarket and the airport. The corridor design needs to balance multiple modes of transport while negotiating steep gradients and constrained road widths, particularly at the junction with Queensferry Street.

4.15 As detailed later in section 4.20, the tram alignment would require trade-offs with active travel, bus and general traffic set out in the City Mobility Plan (CMP) and Our Future Streets: a circulation plan for Edinburgh.

4.16 Delivering tram priority on Lothian Road is more complex than on The Bridges corridor. While there are a number of junctions on The Bridges / Southside, crossing / turning traffic movements are much lower; with the primary direction of travel being north / south. As a result, microsimulation modelling illustrates that it is possible to provide a high level of tram priority (similar to Leith Walk) on The Bridges corridor with through-traffic restrictions enhancing tram reliability.

4.17 At Lothian Road there are five large and complex junctions in close proximity:

- Lothian Road / Princes Street
- Lothian Road / West Approach Road
- Lothian Road / Morrison Street
- Lothian Road / Fountainbridge
- Tollcross

4.18 Microsimulation modelling to-date has highlighted that it would not be possible to deliver similar levels of tram priority on Lothian Road. Trams are stopped at multiple junctions in both directions due to the complex signal staging required, impacting journey times and reliability. Bus delays and traffic congestion are also significantly increased.

4.19 Finally, although tram stops on Lothian Road and Brougham Street are assumed in passenger forecasting, their exact position would need to be confirmed as part of further concept design. Unlike on The Bridges / Southside, the initial locations chosen require trams to stop in traffic, increasing delays to other vehicles behind.

Active Travel Provision

4.20 Due to road space limitations and high traffic volumes, the Lothian Road route offers fewer opportunities for segregated active travel provision. Unlike the Bridges corridor, this option does not prioritise pedestrian enhancements. Existing pedestrian routes would largely remain unchanged, with limited scope for widened footways or enhanced crossings.

Ecology and Biodiversity

4.21 The route is predominantly urban and on-street, which limits direct interaction with habitats or protected landscapes. However, the tram passes through the Green-Blue Network, including The Meadows. The corridor includes a number of Tree Preservation Orders and forms part of a well-used recreational and ecological space. However, any tree loss or vegetation removal associated with junction modifications or stop locations would be mitigated through landscaping and planting proposals.

Heritage

4.22 The Lothian Road option intersects with parts of the West End Conservation Area, runs adjacent to The Meadows, and passes through a number of historic civic spaces and junctions such as Tollcross and Melville Drive.

Policy Context: Circulation Plan

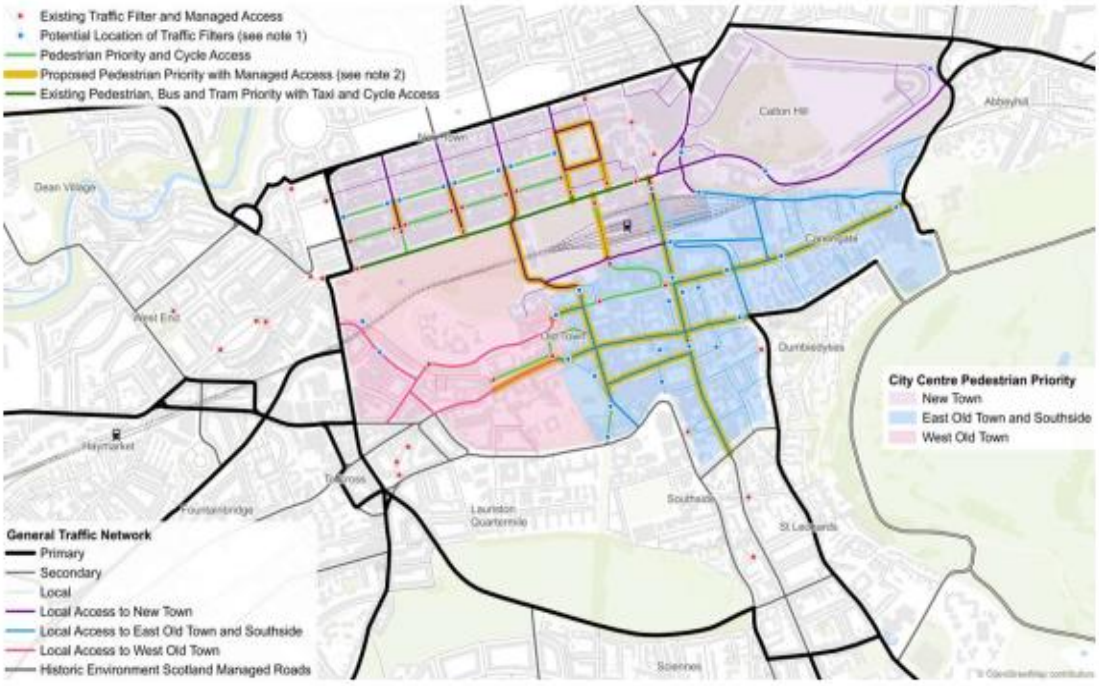
Our Future Streets: a circulation plan for Edinburgh

4.23 Our Future Streets: a circulation plan for Edinburgh (formerly known as a 'circulation plan' and referred to as Our Future Streets for the remainder of this document) recommends adoption of a Streetspace Allocation Framework (SAF). The Framework seeks to ensure that limited space on the city's streets is used to best effect, in line with the aims and objectives of the CMP, seeking to address the Climate and Nature Emergencies, with individual projects and initiatives always taking the SAF as the starting point".

4.24 The recommendation presented at TEC in February 2024 (summarised in Figure 4-3), and subsequently approved, included:

- A general traffic network including a primary network that incudes Melville Drive, Lothian Road, Bread Steet and Queensferry Road on all options, including the recommended Option C;
- Existing pedestrian, bus and tram priority with taxi and cycle access on North Bridge South Bridge on Option C (the recommended option).

Figure 4-3 Option C Recommendation (Feb 24 TEC)[18]



Source: Transport and Environment Committee, City of Edinburgh Council, 1st February 2024

4.25 This recommendation on the proposed function on specific routes in the city centre would mean that:

- **The Bridges route** option would be a priority for bus and tram with priority given to pedestrians and access for cycles. General north / south through traffic would be restricted, although local access would be retained.
- **The Lothian Road option** would function as the primary route for general traffic, connecting through to Queensferry Road (on the Orchard Brae corridor) for strategic road movements between the south-east (Edinburgh BioQuarter and toward Shawfair/ Dalkeith) and north west (Queensferry / Fife).

4.26 Key trade-offs relate to potential impact on the Meadows, and proposals for active travel and bus network on Lothian Road/Melville Drive as well as general traffic as set out in the CMP and Our Future Streets. Potential policy conflict is also evident from proposals for Strategic Active Travel Projects on this route.

Key Option Attributes (Transport outputs)

4.27 This section summarises the key attributes of each option in terms of what would be delivered 'on the ground'. These attributes help inform an understanding of how each impact delivers against option performance metrics described later in this section.

4.28 The key attributes are summarised in Table 4-2.

[18] Traffic filter locations are indicative. They represent streets that would be subject to restrictions rather than specific locations, which would be subject to further detailed work if the relevant option is approved. Categories of vehicle and times of day subject to further detailed work.

Table 4-2 City Centre Route Options: Key Attributes

Transport Outputs	Bridges	Lothian Road
Total route length (Princes Street/Shandwick Place to South Clerk Street/Hope Park Terrace)	2.65km	2.35km
Route length of new infrastructure within City Centre	1.49km	2.35km
% of route fully segregated (Princes Street/Shandwick Place to South Clerk Street/Hope Park Terrace)	0%	0%
Number of total stops (new stops) for route option.	3 (3 new)	4 (4 new)

Commentary

Tram Attributes

4.29 The key differences between the Bridges and Lothian Road options are:

- The Bridges option is longer in overall length at approximately 2.65km, compared to 2.35km for the Lothian Road alignment however the length of new infrastructure is shorter (1.49km vs. 2.35km). Neither corridor is fully segregated, but the Bridges option proposes to limit general traffic to local traffic only, operating primarily as a tram and bus-only priority corridor. This design supports greater journey time reliability, operational resilience, and aligns with modal shift goals.
- In contrast, the removal of significant traffic from Lothian Road is not possible. The route retains mixed traffic throughout (consistent with Our Future Streets) increasing the risk of congestion, reducing tram priority, and potentially impacting both tram and bus journey times and reliability. The more complex (section 4.16) and circuitous path of the Lothian Road corridor also increases its exposure to peak-hour traffic delay and limits opportunities for operational efficiency. On these grounds, the Bridges alignment presents a stronger case in terms of overall public transport performance and integration.

Active Travel

4.30 The Bridges corridor offers enhanced opportunities for pedestrian and public realm improvements, with footway widening, improved crossings, and pedestrian priority measures made possible by the removal of general traffic. These enhancements support active travel goals and contribute positively to the city centre experience. While the route itself does not include segregated cycling infrastructure, the reallocation of space and simplified streetscape supports pedestrian movement and may reduce cyclist exposure to vehicle conflicts.

4.31 In contrast, the Lothian Road option is more constrained. The need to accommodate general traffic limits the scope for footway enhancement and precludes dedicated cycling provision. The route intersects with existing east–west cycling routes at The Meadows and Melville Drive, introducing potential safety risks where tram tracks intersect cycle paths particularly at complex junctions such as Tollcross. While access would be retained, the overall quality and safety of the active travel environment may diminish under this option.

Ecology and Biodiversity

4.32 The ecological impacts of the Bridges alignment are minimal, as the route runs through a heavily urbanised environment with limited biodiversity value and no direct impact on designated sites. There is potential for greening or tree planting as part of associated public realm works, but the ecological baseline is low.

4.33 By contrast, the Lothian Road alignment runs alongside Melville Drive and The Meadows, which forms part of Edinburgh's Green-Blue Network. The route would necessitate the removal of mature trees, affecting local habitat connectivity and potentially disturbing protected species such as bats and nesting birds. These impacts are considered moderate to significant, and while mitigation through replanting and ecological oversight is feasible, the loss of mature canopy cover and urban biodiversity value remains a concern.

Heritage

4.34 The Bridges route runs through the Edinburgh World Heritage Site and several Conservation Areas, including the historic core around South Bridge, Princes Street, and the Old Town interface. However, it avoids direct interventions on listed buildings and is designed to operate using battery-powered trams, removing the need for OLE. This significantly reduces potential visual intrusion. Streetscape enhancements, including public realm upgrades, offer the opportunity to positively contribute to the heritage setting if designed in line with conservation principles. Overall, impacts are considered moderate and manageable, subject to design quality and stakeholder engagement.

4.35 The Lothian Road corridor intersects with parts of the West End Conservation Area, runs adjacent to The Meadows, and passes through a number of historic civic spaces and junctions such as Tollcross and Melville Drive. While the route avoids direct impact on listed buildings, the setting and visual character of these spaces may be affected by new tram infrastructure and associated junction works. The corridor's narrow geometry and urban density heighten the sensitivity of townscape changes. As a result, heritage impacts are considered moderate negative impact, particularly in relation to changes in streetscape character and key views.

Impact on Tram Users: Journey Times and Journey Time Reliability

Tram Journey Times Estimates

4.36 Tram journey times have been estimated based on VISSIM micro-simulation modelling. The VISSIM model represents the existing network in terms of traffic, road lane configurations and junction layouts. The tram route options have been represented by adding tram routes, stops and associated junction and lane configurations which would deliver sufficient general traffic capacity while providing stop-to-stop priority for tram.

4.37 The journey times are summarised in Table 4-3.

Table 4-3 Public Transport Journey Time & Journey Time Reliability

Criterion	Bridges	Lothian Road
Tram journey time: average (mins)	15	16
Journey times (indexed: Bridges = 100)	100	107

Assessment of Tram Journey Times and Journey Time Reliability Commentary

4.38 Between Princes Street / Lothian Road and South Clerk Street / Hope Park Terrace, journey times are similar between the two route options. Nevertheless, the journey time between South St David Street and South Clerk Street / Hope Park Terrace is significantly faster via The Bridges corridor, improving north south connectivity from Leith Walk to the Southside, Cameron Toll and RIE / Edinburgh BioQuarter.

4.39 In terms of reliability, while both routes would operate on-street, there is an opportunity to restrict through traffic on The Bridges corridor; this is not possible at Lothian Road.

4.40 As above, Microsimulation modelling to-date has highlighted that it would not be possible to deliver high levels of tram priority on Lothian Road. Trams are stopped at multiple junctions in both directions due to the complex signal staging required, impacting journey times and reliability.

Impact on Road Users: Journey times & reliability

4.41 Tram can impact on road journey times and journey time reliability in two main ways. First, where trams operate on-street the physical presence of tram infrastructure and journey time priority measures can impact general traffic, by reducing the effective capacity for general traffic. This has the effect of potentially increasing congestion, especially where traffic flows are close to capacity.

4.42 Secondly, tram has the potential to remove car trips from the road network as a result of modal shift. The effect of this, other things equal, would be to reduce congestion by reducing road demand and therefore improving network conditions for those remaining on the road network.

Bridges Route

4.43 The Bridges option would route via the existing alignment along Princes Street and then over North Bridge / South Bridge continuing along the A7 (Bridges corridor).

4.44 General traffic is already largely restricted on Princes Street and, under Our Future Streets, the Bridges corridor would also be restricted for general traffic.

4.45 From a policy-led perspective the intention is therefore to route general traffic away from the Bridger Corridor to prioritise movements for pedestrians and public transport.

4.46 The Bridges option is therefore consistent with the Our Future Streets and this would reduce the level of conflict between tram and general traffic.

Lothian Road

4.47 Tram on Lothian Road is inconsistent with Our Future Streets and would therefore require a major review of policy.

4.48 The route would have a range of physical challenges as detailed in 4.16 to 4.18 including the presence of five large complex junctions which would impact tram journey time and reliability and also result in bus delays and traffic congestion. Proposed tram stop locations would also create delays.

Impact on Bus Users: Journey Times and Journey Time Reliability

4.49 The impact on traffic congestion and road users would result in a similar impact on bus journey times.

Bridges Route

4.50 A key issue on the Bridges corridor and Princes Street is that the volume and throughput of buses. Accommodating further demand on these routes by providing additional bus services would exacerbate issues of bus unreliability.

4.51 The introduction of tram would provide the ability to accommodate current demand and future growth in a more efficient and effective manner, due to the higher level if corridor capacity that tram can deliver.

4.52 The restrictions in general traffic in line with the Our Future Streets would support improved public transport journey time and journey time reliability in the future baseline (do minimum) situation.

4.53 The combined effects of introducing tram and restrictions in general traffic would mean the impact of bus service journey times and reliability would be expected to be broadly neutral.

4.54 The adoption and implementation of the Our Future Streets proposals could support the enhanced further improvements in public transport (tram and bus) reliability through further reducing conflict with traffic.

Lothian Road

4.55 The introduction of tram on the corridor would exacerbate road congestion and, by extension, impact on bus journey times and reliability.

4.56 In contrast to the Bridges, the volume of buses on Lothian Road / Melville Drive is significantly lower, with only 22 services per hour in the Melville Drive section compared to 90 services per hour on the Bridges corridor. This means that fewer potential bus users would be affected by worsening bus journey times and reliability.

4.57 However, the fact that significantly fewer bus services serve/ route via Melville Drive / Lothian Road compared to the Bridges corridor is reflective of the fact that the Bridges corridor serves the city centre and its key employment, retail, leisure, cultural destinations.

Impact on/Interaction with Cycling, Walking & Wheeling

4.58 There are two elements regarding the impact on / interaction with walking and cycling. First, the impact on journey accessibility and connectivity which reflects the availability and quality (e.g. degree of segregation from traffic) of routes that can be used for cycling and walking and, in the context or tram route options, the extent to which these are maintained and enhanced.

4.59 Second, the impact on journey ambience, which reflects the quality of the environment in which people can walk of cycle.

Bridges Option

4.60 The Bridges corridor offers a relatively favourable environment for walking and wheeling, particularly due to the proposed removal of general traffic. This reallocation of space enables the widening of footways, enhanced pedestrian crossings, and a calmer overall street environment. Although the scheme does not introduce segregated cycle infrastructure along this corridor, cyclists would benefit from significantly reduced vehicle volumes and simplified traffic dynamics.

4.61 In terms of accessibility, the route serves key destinations including Princes Street, South Bridge, and the Old Town, improving pedestrian connectivity to cultural, retail, and employment centres. From an ambience perspective, the tram's integration with a pedestrian-oriented street design is likely to enhance the user experience, especially if supported by high-quality materials and lighting. The absence of general traffic would improve air quality and perceived safety, particularly for vulnerable users such as wheelchair users and children.

Lothian Road Option

4.62 The Lothian Road alignment is more constrained for walking and cycling due to the need to maintain general traffic flow. While footways would be retained or slightly improved in certain sections, limited scope exists for widening or significant enhancement. The route passes through high-traffic areas including Tollcross and Melville Drive, where current active travel conditions are already compromised by congestion and narrow footways.

4.63 There are also known conflict risks for cyclists at tram-track intersections, particularly in areas where the route intersects east–west cycle flows including near The Meadows and at junctions such as Brougham Street. These concerns are highlighted in the North South Lothian Road report, which identifies potential safety risks for cyclists due to the tight angles at which tram tracks would be crossed.

4.64 In terms of journey ambience, the busy traffic environment, limited greening, and constrained urban space reduce comfort and safety for active travel users. The presence of trams in this already congested corridor would be unlikely to offer significant net improvement and may reduce the attractiveness of walking and cycling for some users.

Tram Accessibility (Population Catchment Analysis)

Approach

4.65 The accessibility analysis considers the 'in-scope' population and jobs that would be served by the respective route options.

4.66 The analysis considers the 800m catchment of stops along each route. The catchment is reported in terms of:

- The **total catchment** of each route between Haymarket and Mayfield Gardens[19]. The total catchment does not count any overlapping 800m catchments between stops and captures the population / employment within the areas shown in Figure 4-4 and Figure 4-5.
- The **additional catchment** served by each route option, over and above that already served by the existing tram line (i.e. excluding any common catchment within 800m of the Haymarket, West End, Princes Street, St Andrews Square and Picardy Place)

Population Catchment

4.67 The population catchment area, overlaid on a map showing population density, is shown in Figure 4-4 and the catchment results in Table 4-4.

Table 4-4 Population Catchment

	Bridges	Lothian Road
Total catchment (people)	56,000	61,000
Indexed catchment (Bridges = 100)	100	109
Additional catchment of new infrastructure only (people)	17,000	38,000
Indexed catchment (Bridges = 100)	100	224

4.68 Considering the overall population catchment, the Lothian Road option has a slightly larger catchment than the Bridges option (61,000 to 56,000). Though some dense residential areas near Cannonmills are not within the catchment of the Lothian Road option, there is an overall increase through inclusion of Marchmont, as the route passes the Meadows.

4.69 However, when only the incremental catchment (additional to existing Tram line) is considered, the Lothian Road option provides much greater additional catchment to the Bridges (38,000 to 17,000), due to the inclusion of Marchmont.

[19] Haymarket tram stop and Mayfield Gardens tram stop are common stops to both the Bridges and Lothian Road options, providing a consistent points upon which to compare population and employment catchments for each option.

Employment Catchment

The employment catchment area, overlaid on a map showing jobs density, is shown in Figure 4-5 and the catchment results in Table 4-5.

Table 4-5 Employment Catchment

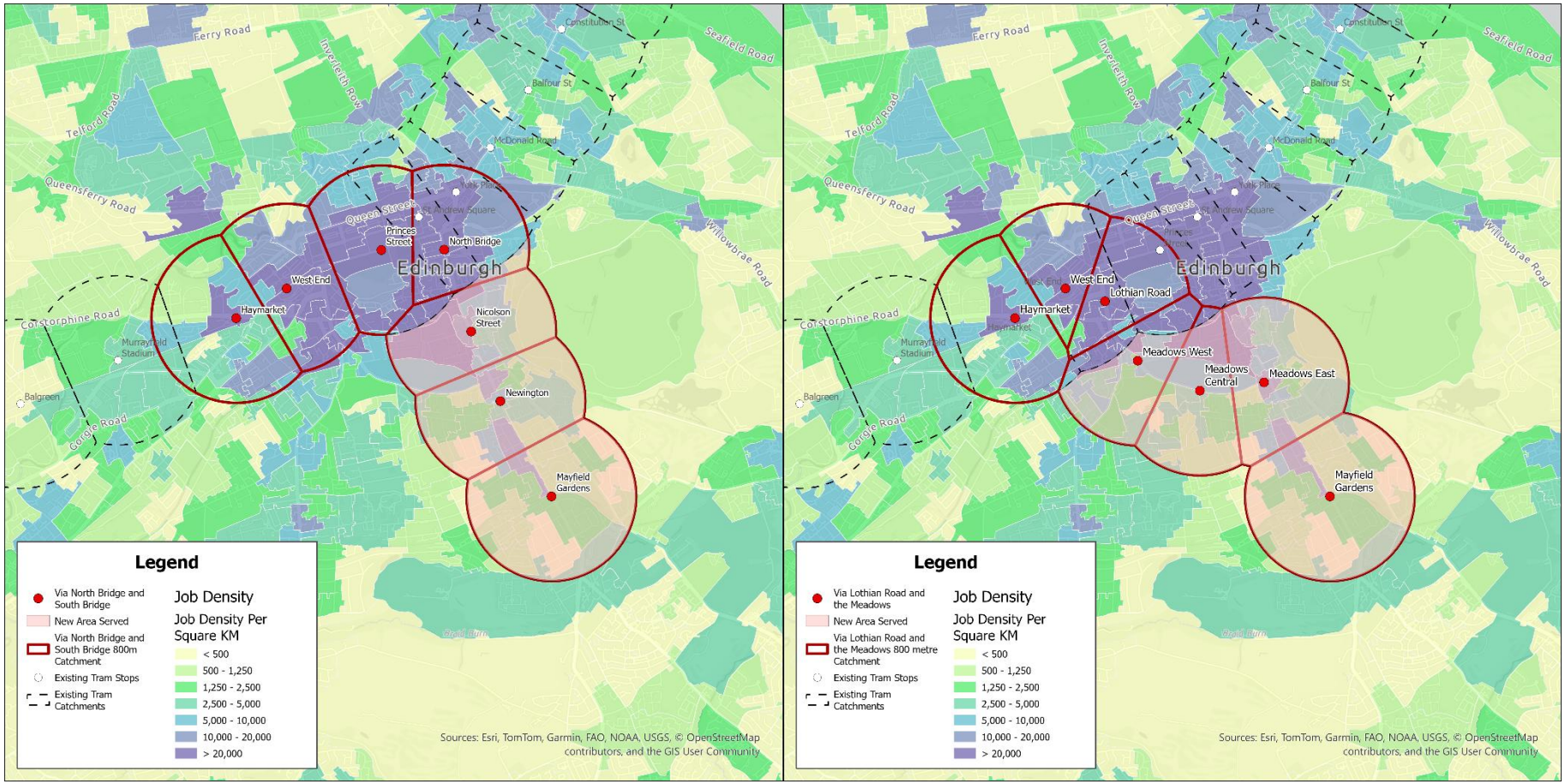
	Bridges	Lothian Road
Total catchment (jobs)	149,000	103,000
Indexed catchment (Bridges = 100)	100	69
Additional catchment of new infrastructure only (jobs)	22,000	23,000
Indexed catchment (Bridges = 100)	100	105

4.70 When the overall employment catchment is considered, the Bridges option has a much larger catchment than Lothian Road (149,000 to 103,000). This is achieved by the route covering key employment areas at the eastern end of Princes Street, including the St James Quarter.

4.71 When only the incremental catchment is considered, employment catchments are broadly similar with Lothian Road having a slightly higher additional catchment compared to the Bridges (23,000 to 22,000). This is due to the incremental catchment of Lothian Road being predominantly residential in nature, rather than employment.

Figure 4-4 Population Catchment - City Centre Routes

Figure 4-5 Employment Catchment - City Centre Routes



Implications for Option Performance : Population

4.72 The Lothian Road option performs better in terms of providing increased accessibility to tram for a higher population catchment, whereby 38,000 of the total 61,000 Lothian Road catchment is 'new' i.e. not served by existing tram.

4.73 The 'new' catchment served by the Bridges option is lower at 17,000, out of the total catchment of 56,000. A population of 39,000 (56,000 minus 17,000) are served by the existing tram route. However, those served by the current route would benefit from an additional tram connection to the south-east including Edinburgh BioQuarter.

Implications for Option Performance : Employment

4.74 Both the Bridges and Lothian Road option perform similarly in terms of providing increased accessibility by tram for a higher jobs catchment, where between 22,000 and 23,000 additional jobs are not served by existing tram.

4.75 However, the Bridges option overall provides much greater connectivity to a much larger catchment of jobs (149,000 for Bridges compared to 103,000 for Lothian Road) as it has a more comprehensive coverage of the city centre and associated city centre jobs.

Demand and Benefits Estimation

4.76 Tram demand for both options has been estimated using the Edinburgh Strategic Transport Model.

Annual Tram Demand and Benefits

4.77 The modelling undertaken suggests that the overall annual tram demand for the route option via Bridges would be over 20% higher than for Lothian Road, as shown in Table 4-6.

Table 4-6 Indexed Demand (Bridges = 100)

Demand	Bridges	Lothian Road	% difference (Bridges vs Lothian Road)
Annual	12.3	10.1	+22%

4.78 This difference represents lower tram demand of over 2m trips per annum, with a corresponding reduction in revenue. The lower demand reflects the fact that the Lothian Road route would not directly serve the core city centre destinations that are the focus of public transport demand in the city including Waverley Station and key retail sites such as St James Quarter and Princes Street.

4.79 The Lothian Road route would serve a jobs catchment of around a third less than the Bridges corridor, and would also not serve the retail, historic, cultural and education destinations which are directly served by the Bridges corridor.

4.80 Moreover, while the Bridges corridor would facilitate movements between the South East route and Newhaven (either direct or via interchange at Princes Street) the Lothian Road option would not provide for attractive cross-city connectivity, due to its more circuitous routing and resulting longer journey times.

4.81 The lower demand would translate into a significantly lower level of annual benefits for the Lothian Road option.

Impact on Environment: Landscape, Ecology and Biodiversity

Bridges

4.82 The Bridges alignment runs through Edinburgh's historic core, following a dense, built-up corridor with limited vegetation or open space. This assessment draws on the TGBB Landscape Report (July 2025).

Route Context and Relevant Designations

4.83 The corridor intersects the Edinburgh World Heritage Site, several Conservation Areas, and parts of the Green-Blue Network, though it does not pass through a LNCS. The setting is primarily urban with streetscapes dominated by hard surfaces and built form, particularly along South Bridge, North Bridge, and Princes Street.

Impact of Tram Scheme and Potential Mitigations

4.84 Vegetation removal is expected to be minimal, limited to small-scale trees or planters near stop infrastructure. The key environmental impact relates to changes in urban landscape character and visual quality due to new tram infrastructure. The use of battery-powered trams within the World Heritage Site avoids the need for OLE, significantly reducing visual intrusion.

4.85 Drainage and surface water runoff would be managed using existing infrastructure, with local upgrades as required. There are no known areas of ecological or geological constraint within the tram corridor.

Assessment of Impacts

- **Landscape:** Minor to moderate impact due to new tram features in a heritage townscape; mitigated through high-quality public realm integration.
- **Biodiversity and Habitats:** Neutral to minor impact; no designated sites affected.
- **Geology and Soils:** No impact expected.
- **Water, Drainage and Flooding:** Minor, managed through existing drainage upgrades.
- **Noise & Vibration:** Construction-phase impacts expected; operational impacts mitigated by electric tram technology and urban masking.

Lothian Road

4.86 This assessment covers the Lothian Road–Melville Drive alignment, including the West End and The Meadows. It is informed by the TGBB Landscape Report (July 2025).

Route Context and Relevant Designations

4.87 The tram would pass through the Green-Blue Network, including The Meadows. The corridor includes a number of Tree Preservation Orders and forms part of a well-used recreational and ecological space. The route also lies within multiple Conservation Areas and the World Heritage Site.

Impact of Tram Scheme and Potential Mitigations

4.88 The route would result in the removal of mature trees at The Meadows and along Melville Drive, potentially impacting local biodiversity. The Preliminary Ecological Appraisal (April

2025) identifies habitats suitable for common pipistrelle and soprano pipistrelle bats, as well as breeding birds.

4.89 Recommended mitigation would include bat surveys, supervision by an Ecological Clerk of Works (ECoW), and ecological replanting. There is also potential for surface water management improvements in flood-prone areas near Melville Drive.

Assessment of Impacts

- **Landscape:** Moderate impact due to tree loss and visual change at The Meadows.
- **Biodiversity and Habitats:** Moderate adverse impact; loss of habitat and potential disturbance to protected species.
- **Geology and Soils:** Minimal impact; standard urban conditions.
- **Water, Drainage and Flooding:** Minor to moderate impact due to existing flood risks; drainage upgrades required.
- **Noise & Vibration:** Temporary impacts during construction; long-term impacts expected to be low due to advances in vehicle technology.

Impact on Heritage

Bridges

4.90 This assessment draws on the TGBB Landscape Report (July 2025), which identifies key sensitivities along the alignment.

Route Context and Relevant Designations

4.91 The alignment passes through the Edinburgh World Heritage Site, along historic corridors including North Bridge and Princes Street, and within multiple Conservation Areas. These streets contain Category A listed buildings, including The Balmoral Hotel, Register House, and North Bridge itself.

Impact of Tram Scheme and Potential Mitigations

4.92 The tram infrastructure introduces potential visual and material impacts within the historic core. However, the exclusion of OLE due to battery-powered trams significantly reduces the extent of visual intrusion.

4.93 The scheme avoids direct impact on listed structures and uses sensitive urban design to manage changes in streetscape character. Temporary impacts during construction will require careful coordination with stakeholders, including Historic Environment Scotland.

Assessment

- **Built Heritage and Structures:** Minor to moderate impact; managed through design choice (battery operation) and stakeholder coordination.
- **Townscape and Conservation Areas:** Moderate; visual change to sensitive streets but mitigated by absence of OLE.
- **Setting and Views:** Some key viewlines affected, but overall impact is reduced through public realm integration.
- **Mitigation Potential:** High – impacts considered acceptable with appropriate detailing and consultation.

Lothian Road

4.94 Based on the North-South Lothian Road Report and TGBB Landscape Report (July 2025), this section evaluates the alignment's interaction with built heritage.

Route Context and Relevant Designations

4.95 The tram alignment intersects several Conservation Areas, including the West End and Marchmont, and lies within the World Heritage Site buffer zone. It passes by multiple Category B and C listed buildings, as well as structures of local historic value such as Masons' Pillars on Melville Drive.

Impact of Tram Scheme and Potential Mitigations

4.96 Key impacts include structural interventions at historic junctions and visual change to civic settings. As with the Bridges route, battery-powered trams are proposed to avoid OLE. However, tram stop infrastructure and slab track installation could impact the setting of listed façades and monuments.

4.97 Mitigation would include sympathetic materials, recessed track design, and engagement with heritage bodies to ensure compatibility with the historic context.

Assessment

- **Built Heritage and Structures:** Moderate impact; physical works close to listed assets but no direct interventions.
- **Townscape and Conservation Areas:** Moderate to major impact where streetscape character is altered.
- **Setting and Views:** Impacts on long views across The Meadows and along Lothian Road; partly mitigated by battery operation.
- **Mitigation Potential:** Moderate; physical constraints reduce flexibility, and cumulative effects on setting require careful design.

Overall Assessment Against STAG Transport Planning Objectives

4.98 The comparative STAG assessment highlights distinct strengths and weaknesses for the Bridges and Lothian Road alignments, informed by assessment scoring across economic, social, environmental and transport objectives, and informed by the evidence presented within this Chapter.

4.99 The scoring assessment have been undertaken using a scoring range of +3 to -3 in line with Transport STAG guidance[20], with the scoring assessment outlined in Table 4-7.

Table 4-7 STAG Scoring Framework

Benefit/Impact	Justification
Major benefit (+++)	These are benefits or positive impacts which, depending on the scale of benefit or severity of impact, the practitioner feels should be a principal consideration when assessing an option's performance against objectives.
Moderate benefit (++)	The option is anticipated to have only a moderate benefit or positive impact.
Minor benefit (+)	The option is anticipated to have only a small benefit or positive impact.
No benefit or impact (0)	The option is anticipated to have no or negligible benefit or negative impact.
Minor cost or negative impact (-)	The option is anticipated to have only a small negative impact.
Moderate cost or negative impact (--)	The option is anticipated to have a moderate cost or negative impact.
Major cost or negative impact (---)	These are costs or negative impacts which are significant and a material consideration when assessing an option's performance.

4.100 The assessment against STAG transport planning objectives (TPOs) is presented in Figure 4-6.

[20] scottish-transport-appraisal-guidance-managers-guide.pdf

Figure 4-6 Assessment Against TPOs [assess by Objectives]

Policy Outcome	STAG Transport Planning Objectives	Bridges STAG Assessment	Lothian Road STAG Assessment	Rationale behind STAG Assessment
To support inclusive and sustainable economic growth	**Objectives**			
	·To support economic growth at the city, region and national level	+++	++	Bridges route better serves significantly larger jobs catchment in city centre, provides for better cross city linkages between the south east and Newhaven corridors and provides direct access to Edinburgh Waverley. Lothian Road does not serve the city centre as well.
	·To support the development and success of Strategic Development Areas	++	+	Both options would directly serve the City Centre, Granton and the Bio-Quarter SDAs, and provide a tram connection to the West Edinburgh and Leith Waterfront SDAs. The Bridges route provides better connectivity to the city centre overall and also provides better cross city linkages between the south east and Leith Waterfront SDAs.
	·To ensure growth is inclusive and sustainable	++	++	Both options provide sustainable and inclusive access. The Bridges route provides better access between more deprived areas on the tram route (towards Granton, and on the South East corridor) and employment in the city centre (larger jobs catchment) and leisure/ cultural destinations. Both options improve access to education and health services.
To respond to climate change towards delivering net-zero	**Objectives**			
	·Encourage mode shift to more sustainable modes of transport	++	+	Better accessibility to city centre and higher forecast tram demand mean that modal shift via the Bridges option would be higher. Bridges option is consistent with the Our Future Streets aims to prioritise walking, cycling and public transport on this corridor. Lothian Road is not consistent with the Our Future Streets and would introduce tram onto a primary traffic route.
	·Improve the attractiveness of public transport through increased efficiency, journey time reliability and service quality	++	+	Both options would be similar in terms of journey time between Haymarket and Newington. The Bridges corridor provides better north-south connectivity between Leith Walk and the Southside. Tram journey time reliability would be higher on The Bridges, due to higher levels of signal priority and proposed traffic restrictions.

Policy Outcome	STAG Transport Planning Objectives	Bridges STAG Assessment	Lothian Road STAG Assessment	Rationale behind STAG Assessment
				Overall attractiveness would be greater for Bridges corridor due to serving city centre much better, reflected in the tram demand forecasts.
	·Support sustainable land-use development, aligned with spatial planning and development policies	++	+	Both options would support the development of a tram network that would serve the major Strategic Development Areas identified in the City Plan 2030 and associated spatial development policies. The city centre section is at the heart of the overall network and the single largest destination for tram demand (employment, education, leisure etc.). The Bridges corridor provides better access to city centre destinations, better access to major interchange (Waverley) and better cross-city connectivity (to Newhaven). The Lothian Road option, in skirting the city centre, would not deliver as well against the wider spatial planning objective that a tram network is intended to meet.
	Key Impacts (Trade-Offs)			
	·Ecology, biodiversity and network resilience	0	-	Bridges passes through dense built-up areas with limited biodiversity. Lothian Road impacts The Meadows, part of Edinburgh's Green Blue Network.
To promote equality and inclusion and help tackle the city's housing emergency	**Objectives**			
	·Increase public transport accessibility to jobs, education, healthcare and leisure, especially for disadvantaged and vulnerable users.	++	+	Both options provide improved transport accessibility. The Bridges route provides better access between more deprived areas on the tram route and employment in the city centre (larger jobs catchment) and leisure/ cultural destinations. Both options improve access to education and health services.
	·Improve mobility through improving the physical accessibility of transport.	++	++	Bridges offers new public realm space. Lothian Road offers existing high-accessibility corridors.
	Key Impacts (Trade-Offs)			

Policy Outcome	STAG Transport Planning Objectives	Bridges STAG Assessment	Lothian Road STAG Assessment	Rationale behind STAG Assessment
	·Affordability of public transport	++	++	Fares would be the same for both options and would be the same as bus fares. Both options serve areas of high deprivation.
To improve health, wellbeing & safety	**Objectives**			
	·Reduce collisions and casualties from road transport through modal-shift to safer public transport and active travel methods.	+	0	Bridges options performs better due to higher overall public transport demand and modal shift, and better alignment with Our Future Streets.
	·Increase safety and security of the transport network.	++	++	Both options include safety features on-board and at stops and would include the presence of conductors.
	·Increase the attractiveness of the active travel network and increase active travel use.	+	0	Bridges option aligns better with Our Future Streets, which aims to prioritise the attractiveness and use of active travel.
	·Improve local air quality	++	+	Bridges options performs better due to higher overall public transport demand and modal shift.
	Key Impacts (Trade-Offs)			
	·Impact on key designations including the Green-Blue Network and Local Nature Conservation Area	0	-	Bridges runs through highly urbanised areas. Lothian Road intersects The Meadows, part of Edinburgh's Green Blue Network.
To protect and enhance our environment	**Objectives**			
	·To protect and enhance the built and natural environment and support the enhancement of 'place'.	0	-	Bridges involves limited ecological disruption. Lothian Road has small visual and habitat impact.
	Key Impacts (Trade-Offs)			
	·Biodiversity and habitats	0	-	No designated sites are affected on the Bridges. Lothian Road is expected to have a small adverse impact on habitat.

Policy Outcome	STAG Transport Planning Objectives	Bridges STAG Assessment	Lothian Road STAG Assessment	Rationale behind STAG Assessment
	·Heritage	--	--	Both the Bridges and Lothian Road options potentially alter streetscape and views. Impact of both options mitigated by use of battery-powered trams.

Interpretation

4.101 The Bridges option outperforms Lothian Road across all core STAG transport planning outcomes and is closely aligned with the City Mobility Plan, Our Future Streets, City Plan 2030 and national modal shift ambitions.

4.102 The Bridges option performs particularly well compared to the Lothian Road option in terms of supporting inclusive and sustainable economic growth and promoting equality and inclusion:

- **The Bridges option provides significantly better connectivity** between the south east (including strategic development at Edinburgh BioQuarter) and the Leith / Newhaven corridor. These corridors are the highest demand corridors on the tram network.
- **The Bridges option's routing would also directly serve a significantly larger portion of the city centre and its key destinations** including employment, retail (including St James Quarter), leisure (Festival Theatre), education (University of Edinburgh), cultural and tourism attractions (such as National Museum of Scotland and The Old Town), as well as providing access to Waverley Station. In contrast, Lothian Road only provides direct connections to employment and leisure in the West End of Edinburgh.
- **The Bridges option has also been assessed as increasing public transport accessibility for those living in more deprived areas** of the city to jobs in the city centre, through the larger jobs catchment (as well as leisure and cultural destinations).
- **This catchment means that the Bridges option would attract significantly more demand than Lothian Road**. The greater demand underpins the Bridges option's better performance against other MCAF criteria.

4.103 The Bridges option also performs well compared to Lothian Road in terms of responding to climate change and delivering net zero. This includes:

- **The Bridges option has direct connectivity to the city centre.** This would result in increased tram demand and encourage mode shift, improving attractiveness of public transport, and supporting sustainable land use. Overall, the Bridges option has been assessed as having moderate benefit compared to Lothian Road's minor benefit.
- **The Bridges option has fewer complex junctions impacting on journey times and reliability.** Direct services between the south east and Newhaven would be facilitated by a delta junction at Princes Streer / St. Andrews square. By contrast, the tram link between the south east and Newhaven with the Lothian Road option would be less attractive than the bus alternative and would have a range of physical challenges including the presence of complex junctions which would impact tram journey time and reliability.

4.104 Considering improved health, wellbeing and safety, the Bridges option is strategically better aligned with 'Our Future Streets'. Its modelled higher demand, results in an assessment of minor benefits in terms of reduced collisions and increased attractiveness of the active travel network and increase in active travel use, compared to no impact for Lothian Road which is not strategically aligned with Our Future Streets and has lower modelled demand.

4.105 Assessment of the Bridges option shows that no fundamental trade-offs are required when the core STAG transport planning outcomes are considered, whereas for Lothian Road, routing via the Meadows results in minor negative impacts on the Blue Green Network, and thus minor negative assessments in terms of improving health wellbeing and safety and protecting and enhancing our environment.

4.106 In summary, the Bridges option outperforms Lothian Road across the range of transport-led objectives and hence in supporting wider economic, growth and sustainability related objectives. While option performance across local environmental/ heritage impacts differ by virtue of being route/ location specific, these do not represent the fundamental policy trade-offs.

Assessment of Comparative Economic Performance

4.107 The full economic assessment and appraisal of a preferred route option (or options) will be developed to support the SBC.

4.108 However, substantive work has been undertaken to inform the costs, benefits and impacts of each option that provide the evidence to support a comparative economic assessment of route options. This work is outlined below.

Capital Costs

Approach to Costing

4.109 The approach to costing has been undertaken as detailed for the Bridges and Lothian Road options, as set out in paragraph 3.156.

Infrastructure Costs Results for City Centre Options

4.110 The cost assessment undertaken concludes that the infrastructure costs for the Bridges corridor would be slightly higher than the Lothian Road option. The key drivers of this are:

- The track infrastructure costs would be similar on a cost per km for new infrastructure, and the cost per kilometre for would reflect the need to relocate utilities and due to the complexity of implementing tram tracks in a historic on-street environment.
- The costs associated with major structures would be significantly higher for the Bridges Corridor. Specifically this would cover strengthening works on North Bridge and South Bridge, and for the provision of a delta junction at Princes St/ St. Andrews Square. The delta junction would enable direct services between the south-east corridor and Newhaven. The overall costs for major structural works/ corridor enhancement on the Bridges corridor is estimated in the range of between £120m and £180m.
- On Lothian Road, there are five major junctions that would need major works to accommodate tram. A high-level cost allowance of £40-£60m has been included to cover this.

4.111 Overall, this suggests that the overall infrastructure costs for the Bridges corridor, including risk, could be in the range of £250-350m, while that for Lothian Road would be £200-300m. The mid-range estimate for the Bridges would be just over or 20% higher than for Lothian Road.

4.112 The indexed infrastructure costs are shown in Table 4-8.

Table 4-8 Indexed Infrastructure Costs (Bridges = 100) (2025/26 prices)

	Bridges	Lothian Road	% difference (Bridges vs Lothian Road)
Costs	100	82	+22%

Operating Costs

Tram Operating Costs

4.113 The similar level of tram journey time and journey time reliability suggests that the operating costs for each option would also be similar.

Bus Operating Costs

4.114 There could be bus operating cost savings associated with any rationalisation of bus services on the tram corridor.

4.115 The Bridges route is currently served by around 90 buses per hour per direction. With the introduction of tram there would be the opportunity for public transport capacity to be balanced across bus and tram, with a focus on improving journey times and reliability.

4.116 If tram were to route via Lothian Road, the potential to rationalise bus services on the Bridges Corridor would be significantly less, as this would result in poorer overall public transport accessibility to the city centre.

4.117 Under a scenario in which any rationalised bus services on the tram corridor would be redeployed elsewhere on the network, the overall bus operating costs for each option would be similar. However, the greater potential to rationalise services with the Bridges route would mean that this option would facilitate bus enhancements (additional routes and / or services) across the wider network at the same given level of overall cost.

Tram and Public Transport Revenues

4.118 The comparative tram revenues would be directly proportionate to the tram demand by option summarised in Table 4-6.

4.119 The indexed tram revenues are shown in Table 4-9.

Table 4-9 Indexed Tram Revenue (Bridges = 100)

	Bridges	Lothian Road	% difference (Bridges vs Lothian Road)
Revenues	100	82	+22%

Scheme Benefits

Public Transport Benefits

4.120 The comparative tram benefits would reflect the level of demand for each route, suggesting that the Bridges Corridor would deliver significantly greater benefits.

4.121 The Bridges route would also offer greater scope for discussion with Lothian Buses in relation to bus rationalisation on the corridor and hence the redeployment of resources to support the delivery of benefits to public transport (bus) users across the wider network.

Road User Benefits & Impacts

4.122 The Bridges Route would go via the existing alignment along Princes Street and then over North Bridge / South Bridge continuing along the A7 (Bridges corridor). General traffic is restricted on Princes Street and, under the Our Future Streets proposals, the Bridges corridor would also be restricted for general traffic.

4.123 Lothian Road currently acts as the strategic traffic route for movements between the southeast and northwest of the city. It is therefore characterised by very high volumes of traffic compared to those on the Bridges route. Its current and future function as a primary traffic route is reflected in Our Future Streets.

4.124 Introducing tram on the Lothian Road corridor would therefore result in significantly greater adverse impacts on road users compared to the Bridges Route.

4.125 Regarding bus journey times on the Bridges option, these would be improved on the as there would be less traffic on the corridor.

4.126 The Lothian Road option could also deliver bus journey time benefits, but to a lesser extent than the Bridges option. On Melville Drive/ Lothian Road the introduction of tram could result in worsening bus journey times, due to conflict with general traffic. Buses operating on the Bridges corridor would experience journey time benefits due to any reduction in bus services (as part of the recast), though the scope of any bus recast is less for Lothian Road than for the Bridges corridor.

4.127 We have not sought to quantify the impact on bus or road journey times, but it is assessed qualitatively in Table 4-10.

Table 4-10 Indexed Road User Benefits & Impacts (Bridges = 100)

	Bridges	Lothian Road	Notes
Tram-related benefits	100	82	
Bus benefits (Journey Time)	+ve	+ve	Significantly better with Bridges option
General road user benefits	-ve	-ve	Significantly worse with Lothian Road option

Assessment of Comparative Economic Performance

4.128 The evidence presented above suggests that the Bridges options would perform significantly better in terms of their economic performance.

- **Costs and Financial Impacts**
  - The infrastructure costs for the Bridges option would be around 20% higher than those for Lothian Road. This means the overall costs and funding requirement for this option would be higher than for Lothian Road. The difference would be in the order of £50m out of a total project cost of between £2 to £2.5bn (assuming the Roseburn Path option, higher for Orchard Brae). This therefore represents about 2-2.5% of the overall project cost.
  - The operating costs would also be similar for both options.
  - Tram revenues and net public transport revenues would be higher for the Bridges corridor, and the higher revenues would mean that the ongoing financial performance and affordability would be materially better for Bridges.

- **Transport Benefits**
  - Tram demand and benefits would be significantly higher for the Bridges option. This would form the largest proportion of total scheme benefits.
  - The benefits to bus users and general road users would be greater for the Bridges option.
  - Overall the Bridges route would deliver significantly higher overall benefits compared to Lothian Road.
- **Overall Economic Performance**
  - The higher demand and benefits that the Bridges option would deliver would outweigh any higher capital cost requirement, such that the Bridges option would perform significantly better in economic terms as part of an overall TGBB tram route.

Control Information

Prepared by

Steer
14-21 Rushworth Street
London SE1 0RB
+44 20 7910 5000
www.steergroup.com

Prepared for

City of Edinburgh Council
4 East Market Street
Edinburgh
EH8 8BG

Steer project/proposal number

23673608

Client contract/project number

n/a

Author/originator

Fernando Ardavin

Reviewer/approver

Tom Higbee

Other contributors

John Geelan
Alexander Williams

Distribution

Client:

Steer:

Version control/issue number

Draft for Comment
Revised Draft
Final for approval
Revised final for approval
Revised final for approval (indicating 2025/26 prices)

Date

9th June 2025
9th July 2025
6th August 2025
19th August 2025
19th August 2025

Jacobs steer anturas

QUALITY SYSTEM CERTIFICATION
DNV·GL
ISO 9001:2015

steergroup.com

steer