EDINBURGH TRAM NETWORK

EDINBURGH TRAM (LINE TWO) BILL

Environmental Statement:
Volume 2: Main Report

SCOTTISH PARLIAMENT – SESSION 2
PREFACE

The Edinburgh Tram Line 2 Environmental Statement is published in five volumes:

- Volume 1 Non-Technical Summary
- Volume 2 Environmental Statement: Main Report
- Volume 3 Figures
- Volume 4 Appendices to Main Report
- Volume 5 Protected Species Report (Confidential)

This document is Volume 2.
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#### VOLUME 2

**ENVIRONMENTAL STATEMENT: MAIN REPORT**

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1 Introduction

1.1 BACKGROUND

As traffic congestion continues to increase causing problems in Edinburgh and the surrounding areas, the City of Edinburgh Council’s (CEC) vision is to provide the city with a revitalised transport infrastructure which will promote and support a growing economy, creating a healthy, safe and sustainable environment. The aim is to cut congestion and improve the city’s environment by providing real choices for travel for all those living in and around Edinburgh.

Over £1.5 billion will be invested in realising the improvements. The Council will be working in co-operation with other authorities in South East Scotland to deliver an integrated package. These proposals for transport improvements will be phased in over the next 10 – 15 years, linked to and partly funded by the introduction of a congestion charging scheme.

Key elements of the CEC’s investment package include a tram network for the capital; major improvements to the city’s bus services; enhancing the existing rail network, providing a ring of Park and Ride facilities; delivering a network of pedestrian and cycles routes around the city and increasing expenditure in road infrastructure.

In May 2002 transport initiatives Edinburgh (tie) was formed to deliver major transport projects for the CEC. tie is a private limited company, wholly owned by CEC. A non-profit making organisation, tie provides the procurement, project management and finance management capability to ensure that a number of major transport related projects are delivered. One of these major projects is Tram Line 2.

1.2 TRAM LINE 2 AND THE TRAM NETWORK

Tram Line 2 provides a link to the west of Edinburgh, from St Andrew Square to Edinburgh Park and the South Gyle shopping complex, Edinburgh Airport and on to Newbridge. The route of Line 2 is shown on Figure 1.1. As the name implies, the scheme comprises one part of a larger network of trams for the City of Edinburgh. Another line, ‘Tram Line 1’ or the ‘Northern Loop’ (also shown on Figure 1.1) is a circular route which connects St Andrew Square with Leith, the Granton Waterfront, Haymarket, and Princes Street. The relationship between Line 1 and Line 2 is explained in Section 1.5 below.

1.3 THE ENVIRONMENTAL IMPACT ASSESSMENT OF TRAM LINE 2

CEC is seeking powers from the Scottish Parliament, by means of a Private Bill, to construct and operate Tram Line 2. As part of the application for the Private Bill, an Environmental Impact Assessment (EIA) is to be undertaken to identify the construction and operational effects of Tram Line 2. This document, the Environmental Statement (ES), summarises the EIA.

Following the submission of a Private Bill to Scottich Parliament, it is anticipated that Royal Assent to the Bill will be obtained in 2005/6. Contracts would subsequently be issued for the construction of both Line 1 and Line 2 and it is anticipated that the tram would be running by 2009.

1.4 THE EIA PROCESS

An explanation of the approach to undertaking the EIA and producing the ES is set out in Chapter 3. In summary, EIA is the process of compiling, evaluating and presenting all the significant environmental effects of a proposed development. The assessment is designed to help produce an environmentally sympathetic project, where detection of potentially significant adverse environmental impacts
leads to the identification and incorporation of appropriate mitigation measures into the scheme design. The main steps in the assessment procedure can be summarised as follows:

- Examine the environmental character of the area likely to be affected by the development through baseline studies.
- Predict the possible effects, both beneficial and adverse, of the development on the environment.
- Introduce design and operational modifications or other measures to avoid, reduce or offset adverse effects, and where possible, enhance positive effects.
- Summarise the results of the EIA in the ES. A Non-technical Summary of the ES is also provided.

1.5 RELATIONSHIP BETWEEN TRAM LINE 1 AND TRAM LINE 2

Separate Private Bills are to be sought for Tram Lines 1 and 2. In assessing the impacts of Line 2 this ES generally assumes that Line 1 does not exist. However, Line 1 is the subject of a separate ES. There is a common section for both Tram Lines 1 and 2 from Roseburn to Haymarket, along West Maitland Street, Shandwick Place, Princes Street and St Andrew Square. In order to ensure compatibility, the Line 1 and 2 environmental teams have agreed a standard range of issues to be covered in the EIA (see Chapter 3 below) and the ES for Tram Line 2 has assimilated text from the Line 1 ES for the common study area. Furthermore, a ‘Network’ tram solution is to be developed whereby the two lines would function as a single system. The cumulative impacts of Line 1 and Line 2 running together are examined in Chapter 15 of this ES.

1.6 AUTHORS

The EIA team was lead by FaberMaunsell, with the assistance of the consultants listed below. The roles were as follows:

- FaberMaunsell, Environmental Planning and Development Team – Project management of the EIA, air quality, ecology, noise and vibration, surface water, hydrogeology, geology, soils and contamination, land use, planning policy, socio-economics, and traffic and transport.
- ASH Ltd – landscape and visual amenity, landscape mitigation.
- CFA - archaeology and heritage.

In addition, supporting information was provided by:

- FaberMaunsell, Transport Group, and Egis Semaly – traffic data, route alignment, tram infrastructure, network effects, safety, accessibility, integration.
- Roger Tym and Partners – Appraisal of economic development and regeneration issues associated with Tram Line 2.
- Land Aspects – Land referencing information.
- Environmental Resources Management Ltd (ERM) – Line 1 environmental baseline data relating to the common study area and selected text from the Line 1 ES relating to the common study area.
• Gillespies – Line 1 environmental baseline data relating to landscape and visual impacts and text from the Edinburgh Tram Design Guide (November 2003).

• Dundas and Wilson Ltd – Details on planning applications as obtained from CEC.

1.7 STRUCTURE OF ES

The assessment described in this ES relates to the design of the scheme as it stood in December 2003. The ES is published in five volumes:

• Volume 1 Non-Technical Summary.

• Volume 2 Environmental Statement: Main Report.

• Volume 3 Figures.

• Volume 4 Appendices to Main Report.

• Volume 5 Protected Species Report (Confidential)

A summary of the ES is provided in Volume 1, the Non-Technical Summary. This is intended for review by the general public. It is brief and includes a description of the proposal, a summary of the environmental effects and proposed mitigation measures.

Volume 2 has been structured around the following chapter headings:

• Introduction.

• The Proposed Scheme – including an explanation of the need for the scheme, alternatives considered, route alignment and infrastructure description, construction and operational activities.

• Approach to the EIA – summarising the legal requirements, scope and methods used in undertaking this EIA.

• Policy Context – provides a review of compliance of Tram Line 2 to relevant national, regional and local policies.

• Traffic and Transport.

• Land Use - including potential impacts to the agricultural use of land along the route.

• Geology, Soils and Contamination – including references to hydrogeology and waste management.

• Landscape and Visual Amenity.

• Ecology and Nature Conservation.

• Surface Water – including water quality and hydrology.

• Heritage - including archaeology.

• Socio-economic Effects.

• Noise and Vibration.
- Air Quality - including local air quality (PM$_{10}$, NO$_2$), global air quality (CO$_2$) and dust.

- Cumulative Impacts.

Volume 3 is a stand-alone document containing all of the figures referred to in the main text of the ES (Volume 2). It should be noted that the Tram alignment shown on the Figures is not definitive and reference should be made to the Parliamentary Plans and Section. Volume 4 includes supporting information cross-referenced within Volume 2. Volume 5 supplements the ecological assessment; to ensure the well being of protected species access to Volume 5 of the ES is restricted.

Copies of the ES are available for £50, or on CD for £15 including postage and packaging. VAT is chargeable on CDs. Further copies can be purchased from tie at:

Transport Initiatives Edinburgh
91 Hanover Street
Edinburgh
EH2 1DJ

A Non-technical Summary of the ES is also available at no cost from the same address.
2 The Proposed Scheme

2.1 INTRODUCTION

This section explains how Tram Line 2 has been developed and the alternatives that have been considered prior to selection and adoption of the preferred route. A description of the Tram Line 2 route alignment proposal is provided together with an outline of the proposed tram system and associated infrastructure. Information on the construction phase and operation of Tram Line 2 has also been described.

2.2 SCHEME ALTERNATIVES

2.2.1 Alternative Modes Considered

Alternative modes were considered in the Feasibility Study For A North Edinburgh Rapid Transit Solution (Anderson, 2001). Although the focus of the study, as the title suggests, was to examine enhanced public transport system for the North Edinburgh, there was work undertaken that was relevant to the proposed Edinburgh network as a whole.

During the course of the study a range of transportation technologies were reviewed and their suitability considered. Of the available technologies, Traditional Bus, Monorail, Guideways, Magnetic Levitation (MAGLEV) and Peoplemovers were discounted at an early stage for a variety of reasons. Monorails, Guideways and MAGLEV are generally more suited to end to end journeys along a wholly segregated routes. They would not afford the same opportunities as other modes for future expansion into a broader North Edinburgh network, which is one of the key objectives of that scheme. Traditional bus services would not promote the desired high quality segregated solution with the performance required to attract investors. Peoplemovers cannot provide the necessary capacity for the transport link.

The remaining technologies, assessed in detail were broadly split between light rail and guided bus. Both systems are high quality and offer the potential to act as a catalyst for development. They also offer the flexibility for future expansion.

Of the guided bus options, the review concentrated on the tried and tested technology provided by kerb guidance, since it was essential that the technology can be delivered on time. Other systems such as electronic guidance have failed to perform in practice and could pose an unacceptable risk to the overall project. A review of developments in these technologies should be undertaken as the scheme develops, as they may with time gain greater acceptance and become proven in practice.

Overall it was concluded that for the North Edinburgh loop the light rail system should be adopted but that Advanced Guided Bus developments should be monitored. Alternative light rail technology such as the LR5S was noted. However, it is recommended that the scheme be developed based on proven technologies. Quality Bus technology should be considered as a possible interim measure to meet the short-term transport demands of the development site, prior to the final solution being implemented.

These recommendations, together with Integrated Transport Initiative (ITI) work undertaken as part of the preferred packaged resulted in Light Rail (or Tram) technology being adopted for the Edinburgh network. This resulted in the LRT Masterplan Feasibility Study being commissioned by CEC in December 2001. This report included an initial scoping of available alignments and a broad evaluation of LRT in each route corridor. It then produced a shortlist of routes for further assessment. A second phase examined in more detail the corridors for which LRT was considered most attractive including a more detailed evaluation and a preliminary environmental assessment.
Based upon this feasibility study undertaken, tie submitted a report on 30 September 2002 to the Scottish Executive that sought in principle to proceed with the ITI for Edinburgh and South East Scotland. The report outlined that the achievement of the recommended ITI programme would require the early backing of the Scottish Executive. This has been achieved principally through agreement to provide £375 million of funding towards the development and construction of three tram lines, which form a key part of the improved transport infrastructure.

### 2.2.2 ‘CERT’ and ‘WEBS’

The provision of public transport for west Edinburgh has a long history arising out of previous work on potential busways. This is well documented and culminated in the City of Edinburgh Rapid Transit (CERT), which was being developed by a design and build consortium that would then have had exclusive operator rights. This scheme did not proceed for a variety of reasons. However, the concept of providing guided busway infrastructure to assist in bus priority has been brought forward by CEC. This is being achieved through the West Edinburgh Bus System (WEBS), adopting the CERT proposals for a shorter length of dedicated guided busway (between South Gyle Access and Stenhouse Drive) linked with on-street provisions through West Edinburgh. Current expectations are that Tram Line 2 would follow and supersede the WEBS guided busway alignment.

### 2.2.3 Tram Line 2 Route Selection

FaberMaunsell/Semaly were commissioned in October 2002 to ‘Carry out all necessary technical and environmental work to enable Council to promote the passage of a Private Bill through the Scottish Parliament giving powers to construct and operate the second line of the Edinburgh Tram and all associated features.’ The route was initially defined as follows:

‘The West Edinburgh Tram scheme will consist of a predominantly segregated tram alignment from the city centre, where it will connect with line one and is likely to proceed south of and then along the A8 corridor to Newbridge. There are a number of options for initial phases of the scheme to terminate at Edinburgh Park, Gogarburn or Edinburgh Airport before extending to Newbridge. Possible extensions on to Livingston or Queensferry may also be considered as later phases of development.’

The whole route development process is documented in a number of reports prepared for tie by the consultants. Generally it could be considered that this work has been carried out in three Stages with each being detailed in the report noted below. In addition there have been specific reports covering specialist issues such as the location of stops and development of the depot:


- **Stop Location Report (FM/Semaly, 2003)** - Provides a rationale for the selection of stop locations.

- **Depot Location Report (FM/Semaly, 2003)** - Provides a review of alternative Depot locations and a rationale for the selection of the site at Gogar.
The design team’s first activity was to undertake a wide ranging options generation exercise to ensure a full range of routes were considered. This stage included consultation with key consultees notably including tie and the various elements of CEC (Planning and Transport). During this phase of the study, over thirty route options were defined and three basic corridors identified as follows:

- North – along the A8.
- Central – a similar corridor to that used for the City of Edinburgh Rapid Transit generally following the heavy rail line from West Edinburgh to the city.
- South – following the A71 and Western Approach Road.

Each corridor and option was subject to review as outlined in the sections below.

**Methodology for Route Selection**

At an early stage in the commission, the key team members undertook a general site inspection to view the constraints and opportunities for route alignment options, keeping the principle scheme objectives in mind. Confirmation walk-over visits followed to establish specific local route characteristics as possible alignments were considered in more detail.

In a workshop environment, a number of route options were developed using as a guiding principle “possible until proved impracticable”. Subsequently these options were discussed with tie representatives taking into account previous work. As a result some adjustments were made and some new options were added.

A total of about 30 alignment options were drawn up with a very large number of combinations being possible from these. In some stretches of the route (for example from Newbridge to Gogar Roundabout) the options were similar but on slightly different alignments. Between Gogar Roundabout and the city centre there were distinctly different choices to be made between ‘corridors’ (for example a northerly corridor along the A8, a second ‘central’ corridor generally following the Edinburgh-Glasgow railway and previously developed CERT corridor, and a third southerly one following in part the A71). It was essential to reduce the options and combinations to a manageable number for onward analysis towards a preferred route. The results of this sifting process are summarised in the Sections below with further information provided Appendix 2, Volume 4 of this ES.

**Route Options Appraised**

All 30 alignment options were appraised using the following criteria:

- Engineering.
- Traffic and Transportation.
- Safety.
- Environment.
- Economy/Development.
- Accessibility.
- Integration.

The methods adopted for appraisal purposes were generally based on Scottish Transport Appraisal Guidance (STAG) (Scottish Executive, 2003) methodology, although a number of adaptations and simplifications to the STAG approach were
adopted. The results of this process are summarised in Appendix 2, Volume 4 of this ES.

**Summary of Route Selection Process**

Following a STAG based appraisal process, the central corridor was shown to perform significantly better than the North and South corridors in six of the seven main categories and was therefore adopted on the preferred corridor. This, therefore, was the corridor that was presented to the public at an extensive consultation process. During the consultation the public were asked to comment on sub-options of the corridor at:

- Princes Street/George Street.
- The Roseburn to Carrick Knowe section.
- Gogar roundabout.
- Near to the Airport.

Based on the results from the Public and Stakeholder consultation further work was carried out to further refine a number of areas along the route (notably at Baird Drive, Gogarburn, the airport and Newbridge.) This included both further consultation and technical investigation. The results are summarised in *Route Development Report: Part B - Route Finalisation*. The final route presented in the above report represented FaberMaunsell's recommendation or the preferred route for Tram Line 2. The approval process for the preferred route was defined as follows:

- Agreement by tie.
- Ratification by CEC Transport and Planning.
- Final Approval by Elected Members of the Council.

It is anticipated that final approval of the preferred route will be signed off at the meeting CEC Elected Members on 22 December 2003.

### 2.3 SCHEME DESCRIPTION

#### 2.3.1 Route Alignment

Tram Line 2 is approximately 18 km in length (see Table 2.5 below). A description of the preferred route alignment is described in Table 2.1. This description should be read in conjunction with Figure 2.1, which provides an overview of the route alignment. Reference should also be made to Figures 4.1 to 4.10 Environmental Summary Plans, and 6.1 to 6.10 Land Use Plans. It should be noted that the alignment of the tram route is not definitive and reference should be made to the Parliamentary Plans and Sections.

The tram would be running on street for some lengths of the route, most notably at the eastern end of the scheme between St Andrew Square and Haymarket. Additionally, on street running would be required along the access roads to Edinburgh Airport and within Newbridge. Integration of the tram track in the street space can be by means of one of the following options:

- Segregated - the track is physically isolated from other road traffic.
- Dedicated – where trams run on-street but are segregated from other traffic. Other vehicles can occasionally drive on the tracks, for example to pass a stationary vehicle.
- Shared (or street) running - cars or buses and trams can use the same lane.

**Table 2.1 Tram Line 2 Route Alignment Summary**

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<td>City Centre (St Andrew Square to Haymarket)</td>
<td>Tram Line 2 travels along the western and eastern sides of St Andrew Square, looping around Queen Street. The tram would continue along Princes Street to Shandwick Place and along West Maitland Street to Haymarket Station.</td>
<td>Shared running with buses.</td>
</tr>
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<td>Haymarket to Russell Road</td>
<td>The tram alignment would run parallel with Haymarket Terrace from Haymarket Station. It then runs along Haymarket Yards for a short distance before running to the north of Elgin House and the Institute of Chartered Accountants building. The tram would then pass between the heavy rail tracks and the south of the properties on Balbirnie Place. The tram would then run parallel to the existing heavy rail Glasgow/Edinburgh line until the Russell Road overpass. It is at this approximate location that the Tram Lines 1 and 2 would diverge, with Line 1 heading in a northerly direction along a disused rail alignment and Line 2 continuing towards Edinburgh Airport. A delta junction has been incorporated within the Tram Line 2 design to provide operational flexibility for services between Line 1 and Line 2.</td>
<td>Segregated from traffic and pedestrians</td>
</tr>
<tr>
<td>Russell Road to Carrick Knowe</td>
<td>A new structure would be built to carry the tram over Russell Road. From Russell Road, Edinburgh Tram Line 2 alignment skirts around the northern boundary of the Haymarket Rail Depot, encroaching into an industrial estate area along Roseburn Street. A bridge would be built to provide access over Roseburn Street adjacent to Murrayfield Stadium. The tram alignment then runs parallel to the northern side of the heavy rail Edinburgh/Glasgow line, past the Murrayfield playing fields and over the Water of Leith. It then progresses west within the heavy rail reservation to Balgreen Road. Properties lie to the south of the heavy rail corridor at Baird Drive. The tram would then run along the southern boundary edge of Carrick Knowe Golf Course on land previously reserved for CERT.</td>
<td>Segregated from traffic and pedestrians</td>
</tr>
<tr>
<td>Carrick Knowe to Bankhead Drive (Edinburgh Park Station)</td>
<td>At the western extremity of the Carrick Knowe Golf Course the tram would cross the Edinburgh/Glasgow heavy rail line, which would involve the construction of a new bridge structure. The tram would then follow the WEBS/CERT alignment, which is a designated corridor (TRA1 in the West Edinburgh Local Plan) from Stenhouse Drive to South Gyle Access and then on to Edinburgh Park Station. Footpath modifications and a new structure to bridge over South Gyle access are proposed.</td>
<td>Segregated from traffic and pedestrians</td>
</tr>
<tr>
<td>Edinburgh Park to Gogar Roundabout</td>
<td>Tram Line 2 would pass through Edinburgh Park on a dedicated alignment. It would interface with the Edinburgh Park rail station and then bridge over the main Edinburgh/Glasgow rail line. The tram would head in a northerly direction and travel through Edinburgh Park before crossing South Gyle Broadway. Footpath and cycleway provisions would be along Lochside Crescent, Lochside Avenue, Edinburgh Park and South Gyle Broadway. The tram would run through the South Gyle Shopping Centre car park before crossing under the A8 Glasgow Road, to the east of the Gogar Roundabout.</td>
<td>Segregated from traffic and pedestrians</td>
</tr>
<tr>
<td>Route Section</td>
<td>Description</td>
<td>Level of Integration</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Gogar Roundabout – Ingliston Park and Ride - Edinburgh Airport Terminal</td>
<td>The main depot for Tram Line 2 is proposed to the north of Gogar roundabout and would be separated from the A8 and roundabout by retaining walls. From the depot Tram Line 2 would head in a westerly direction, adjacent to the A8, across Green Belt land used for agriculture until it reaches the newly constructed Royal Bank of Scotland Headquarters access at Gogar. Where the tram line crosses existing access roads into the agricultural areas traffic would be managed using formalised level crossings. From the Royal Bank Access Tram Line 2 would turn to head in a northerly direction for approximately 300 metres before turning to the west again. The tram alignment would be parallel but approximately 350 meters to the north of the A8 Glasgow Road. At the proposed Ingliston Park and Ride facility (approx. 100m from Eastfield Road), the alignment turns to head in a northerly direction towards Edinburgh Airport. The tram would travel behind the existing Hilton Edinburgh Airport Hotel and run parallel with a portion of the Gogar Burn along Burnside Road as it runs through the BAA car park and airport facilities area. The Edinburgh Tram Line 2 stop would be located at the point where the main bus station for the airport is currently positioned.</td>
<td>The tram line would be shared with traffic along Burnside Road. All other areas of the line would be segregated from traffic and pedestrians.</td>
</tr>
<tr>
<td>Ingliston Park and Ride to Newbridge</td>
<td>A shuttle service would run between the Ingliston Park and Ride stop and Newbridge. From Ingliston Park and Ride Tram Line 2 would run in a westerly direction along the northern boundary of the existing Ingliston Park and Fly facility. At the eastern end of the Royal Highland Showground the alignment crosses the eastbound carriageway of the A8 to run in the central reservation for 750m. At Hallyards Road the tram line would cross to the south of the A8 travelling in a south-westerly direction through agricultural land till it nears the Glasgow/Edinburgh heavy rail line. The route then runs to the south of Ratho Station and parallel to the mainline railway until it reaches Harvest Road. The tram alignment would share Harvest Road with existing traffic until it intersects with Cliftonhall Road. At this juncture, the tramline would follow Cliftonhall Road and enter Newbridge Industrial Estate. The tram would run through the Industrial Estate, skirt the edge of Huly Hill and then cross the A89 Edinburgh Road at the Newbridge roundabout. A stop at this location would define the Newbridge terminus of the tram alignment.</td>
<td>It is proposed that the tram would have a dedicated space along the A8 and footpath arrangements would be incorporated. The tram alignment would share Harvest Road with existing traffic until it intersects with Cliftonhall Road. Shared traffic arrangements would also be through Newbridge Industrial Estate. All other areas of the line would be segregated from traffic and pedestrians.</td>
</tr>
</tbody>
</table>

1 The assessment assumes that the tram would run below the heavy railway in a false cutting and that an at-grade crossing of Balgreen Road would be implemented. The Parliamentary submission allows for flexibility at this location to alter the vertical alignment of the tram (see Section 3.5).

2 From the Gogar Depot the ES assumes an alignment through existing bunds adjacent to the A8. There is a presumption in favour of retaining these bunds. The limits of deviation have therefore been extended to allow for adjustments to the alignment to be made to route the tram behind these bunds.
2.4 **TRAM LINE 2 INFRASTRUCTURE**

Infrastructure required for the operation of the Tram Line 2, and the area required for its installation, would be incorporated into the Parliamentary submission and included in the Limits of Deviation (LOD) and Limits of Lands to be Acquired or Used (LLAUs) (see Section 3.5 for more information). Infrastructure associated with the operation of Tram Line 2 is described in the sections below. Further information on the design of individual elements is provided in Section 2.4.6. Artist impressions are shown on Figure 2.3.

### 2.4.1 Tram Line 2 Depot

A depot is necessary for operating and maintaining a tramline. It provides a location for stabling tram vehicles, performing regular cleaning and maintenance, and housing ancillary facilities and control rooms. After an extensive selection process the Gogar Roundabout site was chosen as the proposed Tram Line 2 depot site because of its location along the route alignment (ensuring possible phased implementation) and the potential impacts on the surrounding area (e.g., the depot lies adjacent a mainline railway busy road is not in close proximity to nearby residences). This location would however require substantial civil works to ensure a level site consistent with the A8 crossing and providing for all structures to be completely below the Edinburgh Airport flight envelope.

A plan and section of the Gogar Depot is provided in Figure 2.2. The depot at Gogar would accommodate the complete fleet of trams and would contain the following facilities:

- Stabling: requiring a flat open area for storing trams when not in use.
- Maintenance workshop and service station.
- A washing machine.
- A control centre.
- Staff facilities including offices, washrooms, catering.
- Road access and parking.
- 24-hour Security.

In addition, for reasons of operational flexibility, land would be required for short term stabling of trams during off-peak periods during the day (but not at night) at land on the edge of pitches at Murrayfield Stadium. No maintenance facilities would be required, only limited support facilities would be required, and the site would be unmanned.

### 2.4.2 Stops

A total of 19 stops are proposed between St Andrew Square and Newbridge. These are listed below and identified on Figure 2.1. The precise locations of these stops would be determined during detailed design (see Section 3.5). Further information on stop design is provided in Section 2.4.6 below.
Table 2.2 Stop Information

<table>
<thead>
<tr>
<th>Stop Number</th>
<th>Stop Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 2</td>
<td>South St Andrew Street</td>
<td></td>
</tr>
<tr>
<td></td>
<td>South St David Street</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Princes Street</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Shandwick Place</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Haymarket</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Murrayfield</td>
<td>Stop proposed east of Stadium turnstiles.</td>
</tr>
<tr>
<td>7</td>
<td>Balgreen Road</td>
<td>Stop proposed south of Jenners Depository</td>
</tr>
<tr>
<td>8</td>
<td>Saughton Road North</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>South Gyle Access</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Edinburgh Park Station</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Edinburgh Park</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>The Gyle</td>
<td>Stop proposed in front of Safeway</td>
</tr>
<tr>
<td>13</td>
<td>Gogarburn</td>
<td>Passenger would alight here for Royal Bank of Scotland World Headquarters (under construction).</td>
</tr>
<tr>
<td>14</td>
<td>Inglisston Park &amp; Ride</td>
<td>Passengers would alight here for shuttle to Newbridge.</td>
</tr>
<tr>
<td>15</td>
<td>Airport</td>
<td>Tram terminates. Provision of ticket barriers.</td>
</tr>
<tr>
<td>16</td>
<td>Inglisston West</td>
<td>Passengers would alight for Royal Highland Showground.</td>
</tr>
<tr>
<td>17</td>
<td>Ratho Station</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Newbridge South</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Newbridge North</td>
<td>Tram terminates.</td>
</tr>
</tbody>
</table>

2.4.3 Power Supply and Substations

The tram would be electrically powered. Electricity supply would be derived from the Scottish Power network at 11 kV AC and would be converted into 750V DC by substations. Substations would be enclosed within buildings and secure compounds. The standard substation size is 8m x 16m. A total of 8 sub-stations would be required for Tram Line 2 at the locations shown on Figure 2.1.

Power would be delivered to the trams through overhead line equipment (OLE), which would be supported by a combination of poles or columns. Alternatively, in urban areas OLE may be supported by fixings to buildings or structures. The design of poles, OLE and fixings would be determined at a later stage (if the Bill is passed) through a process known as ‘Prior Approvals’ (see Section 3.5.2).

2.4.4 Electromagnetic Issues

Electrified transport systems often lead to public concern about electrical safety. Safety is the first consideration in all design matters. Her Majesty’s Railway Inspectorate (HMRI) enforces regulations on behalf of the Health and Safety Executive (HSE). The Railway Safety Principles and Guidance (HSE, 2002) specify a maximum 750V DC current for tram systems. DC current has been chosen as it greatly reduces electromagnetic emissions. Moreover electromagnetic conducted and radiated emissions are supervised by British Standard EN 50121-2. This standard dictates the maximum level of emission of a tram system. Electromagnetic pollution from a tram system would be very low and well within HMRI guidelines and British Standards.
2.4.5 Structures

Table 2.3 provide a summary of the main structures that would be constructed. Each structure has been assigned a reference number (e.g. S1), which refers to Figure 2.1. The dimensions and descriptions of the structures have been used for assessment purposes but it should be noted that the precise specifications of structures would be determined during the detailed design of Tram Line 2 (see Section 3.5).

Table 2.3 Outline of Main Structures Required for Tram Line 2

<table>
<thead>
<tr>
<th>Structure Name</th>
<th>Crosses</th>
<th>Clear Span / Length (m)</th>
<th>Form of Superstructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Russell Road Bridge</td>
<td>Russell Road</td>
<td>16</td>
<td>Precast concrete Y beams</td>
</tr>
<tr>
<td>S2 Roseburn Street Bridge</td>
<td>Depot Access Roseburn Street</td>
<td>175</td>
<td>Steel I-beams with composite concrete</td>
</tr>
<tr>
<td></td>
<td>Access Murrayfield</td>
<td></td>
<td>deck</td>
</tr>
<tr>
<td>S3 Murrayfield Elevated Track</td>
<td>Murrayfield</td>
<td>370</td>
<td>Precast concrete Y beams</td>
</tr>
<tr>
<td>S4 Water of Leith Bridge</td>
<td>Water of Leith</td>
<td>45</td>
<td>Arched steel beams with composite</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>concrete deck</td>
</tr>
<tr>
<td>S5 Baird Drive Screen Wall</td>
<td></td>
<td>300</td>
<td>Details to be determined</td>
</tr>
<tr>
<td>S6 Carrick Knowe Rail Crossing</td>
<td>Edinburgh to Glasgow railway</td>
<td>31</td>
<td>Steel beams with composite concrete</td>
</tr>
<tr>
<td></td>
<td>4 tracks. Allow for electrification.</td>
<td></td>
<td>deck</td>
</tr>
<tr>
<td>S7 Saughton Road Bridge</td>
<td>Saughton Road</td>
<td>19</td>
<td>Precast concrete Y beams</td>
</tr>
<tr>
<td>S8 Broomhouse Road Bridge</td>
<td>Broomhouse Road</td>
<td>19</td>
<td>Precast concrete Y beams</td>
</tr>
<tr>
<td>S9 South Gyle Bridge</td>
<td>South Gyle Access</td>
<td>30</td>
<td>Steel beams with composite concrete</td>
</tr>
<tr>
<td>S10 Hermiston Gait Rail Crossing</td>
<td>Edinburgh to Glasgow railway</td>
<td>400</td>
<td>deck</td>
</tr>
<tr>
<td></td>
<td>4 tracks electrified.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S11 A8 Gogar Underpass</td>
<td>Under A8 road and slip roads.</td>
<td>52</td>
<td>Reinforced concrete box</td>
</tr>
<tr>
<td>S12 Depot Area Retaining Walls</td>
<td>Up to 740</td>
<td>Varies</td>
<td></td>
</tr>
<tr>
<td>S13 Gogar Burn Bridge</td>
<td>Gogar Burn</td>
<td>21</td>
<td>Precast concrete Y beams</td>
</tr>
</tbody>
</table>

2.4.6 Design Specifications

*Edinburgh Tram Network Design Manual*

CEC and tie recognise that the introduction of a tram system could have a considerable effect on the quality and character of Edinburgh’s townscape and landscape. tie and its consultants, including specialists from both Line 1 and Line 2 teams, have therefore prepared a design strategy in liaison with a number of key interest groups including CEC, Historic Scotland and the World Heritage Trust. The strategy is set out in the Edinburgh Tram Network Design Manual (Working Draft, October 2003).

The Design Manual provides a basis against which the effects of the tram system can be assessed. It is divided into two sections. Part One addresses strategic and generic issues relating to the tram. Part Two (Design Parameters) sets out Key Issues, identifies Principles of Design, provides supporting Guidance and states Design Requirements for each element of the associated tram system. It is intended that a draft of the Design Manual will form part of the evidence to be given to the Scottish Parliament in support of the Bills for the tram schemes. The final
version of the Design Manual would be incorporated in the contracts for the construction of the tram scheme.

The Design Manual is considered a key document in the ‘prior approval process’ (see Section 3.5 below). The Design Manual will have three key roles. It will:

- Outline aspirations and set design objectives to influence the design process.
- Act as a reference point - the key document to be used by the planning authority in assessing design details at the prior approval stage.
- Constitute an important tool in the procurement process to check that the detailed design and implementation meet the standard required to deliver a quality tram system.

For the purpose of this ES we have provided current information on some of the key design aspects of the tram system.

**Vehicle Design**

At this time no final decision has been made on the appearance of the tram. However, it is recognised that the tram vehicles are one of the most important factors for the success of the tram system; both in terms of the impact that the tram has on the townscape and landscape and as a marketing tool for encouraging its use.

Besides being attractive, practical and robust, the tram must be designed to make passengers feel secure and comfortable. This can be achieved through such features as good quality seating, large glazed areas for clear views, effective interior lighting and a clear information system. It is proposed that a low floor tram system would be used to allow easy street level access. Some of the likely characteristics of the tram are summarised in Table 2.4.

**Table 2.4 Likely Vehicle Specifications**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Likely Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of tram</td>
<td>30 to 40m</td>
</tr>
<tr>
<td>Tram height</td>
<td>3.365m (from top of rail to roof)</td>
</tr>
<tr>
<td>Tram width</td>
<td>2.65</td>
</tr>
<tr>
<td>Seating capacity</td>
<td>65-80</td>
</tr>
<tr>
<td>Passenger capacity (maximum)</td>
<td>200—320</td>
</tr>
<tr>
<td>Maximum operating speed</td>
<td>80km/h</td>
</tr>
</tbody>
</table>

**Overhead Line Equipment (OLE)**

Due to its vertical dimension, the overhead equipment would have the most significant impact on the townscape and landscape. The potential visual intrusion and visual impact of the equipment would be borne in mind at all stages of the design process. It would be necessary for all visible parts of the equipment to be simply and elegantly designed and detailed, and as far as possible reduced to minimum dimensions. The layout of poles and support wires would be designed to fit the pattern of the townscape and reflect the structure of the wider landscape. Particular care would be given to the design of the support layouts and their coordination with other services at city centre junctions and as far as possible, poles would have more than one function, thereby reducing the vertical clutter in the streetscape and more open landscape.
Tram System Components

The tram system would consist of a number of components including stops, street furniture, and surface materials. Tram stops are the focal points of the system and their quality of design and finishes would greatly affect how the whole system is perceived. While the design of stops has not been decided at this time, there are a number of clear design objectives:

- A complete, individually designed, set of forms and materials would be introduced which is instantly recognisable throughout the system. Stop layouts would be coherent, but distinguished by varying details or materials to respond to local situations and to enhance local identity.

- Good quality lighting both at the tram stops and at the pedestrian approaches is necessary to create a safe environment and to make the system attractive to use during Edinburgh’s dark winter mornings and evenings.

- Platforms would be paved with attractive high quality materials appropriate to their locations. They would be slip resistant and durable. Tram platforms would be approximately 40m in length. The platforms would be designed to be very low, raised slightly above the level of the street/rails to a height of 0.35m. Ramps would be provided at each end to provide access to the mobility impaired. Tram stops would incorporate small shelters, seating, lighting, public address systems and two ticket machines. Closed circuit television systems (CCTV) would be installed at each stop to provide security.

- Considerable attention would also be given to the design, coordination and arrangement of street furniture, including shelters and lighting. The street furniture and lighting would be of high quality, functional, elegant and robust as well as forming a coordinated family of elements that create an identity for the system.

2.5 THE CONSTRUCTION PHASE

2.5.1 Construction Programme and General Activities

Construction of the tram route is likely to take up to 3 years, although works at any one location may be significantly less than this. The 3 year period includes a 6 month period for testing and commissioning. A detailed construction methodology would be prepared by the contractor selected to construct Tram Line 2.

At this stage an indicative construction programme has been developed based on previous experience of elsewhere in the UK and Europe. The construction stage, which is estimated to take 30 months, has been divided into 12 works sections and includes the following typical construction operations:

- Statutory utility diversions.
- Site clearance and earthworks.
- Construction of new bridges and structures.
- Construction of tram stops and drainage system.
- Track formation and installation of track.
- Installation of OLE masts and wire.
- Installation of signalling equipment.
- Installation of telecommunication systems.
- Landscaping works.

The construction stage also includes the development of the proposed depot at Gogar. This has been divided into the following typical activities:
- Site preparation.
- Construction of buildings.
- Building fitout.
- External works.
- External fitout.
- Installation of trackwork.
- Installation of signalling and OLE equipment.

Following on from the estimated 30 month construction stage, testing and commissioning is estimated to take 6 months. This would include the following typical activities:
- Power testing and commissioning.
- OHLE testing and commissioning.
- Signalling testing and commissioning.
- Retail telecoms testing and commissioning.
- Health and Safety Approval (from HMRI).
- Driver Training / Operational Familiarisation.

2.5.2 Environmental Management System and Public Liaison

The contractor would be required to operate under an Environmental Management System (EMS). The EMS would be prepared by the contractor and approved by the CEC. It would set out a variety of control measures for managing the environmental effects of construction works including, for example, restrictions on working hours, limits on noise and dust, pest control, and temporary protection for properties closest to the route. A procedure would also be proposed for establishing Community Liaison Groups. The contractor would be required to participate in consultations prior to and during works and inform the public prior to activities that may cause disturbance. The contractor and CEC would work with the Community Liaison Groups to agree mitigation proposals at agreed locations. Issues that would be discussed with these groups may include the types of planting, the appearance of noise barriers, and in some locations alterations to the vertical alignment would be considered. The EMS would also include procedures dealing with complaints, ensuring that they are logged and that prompt action is taken where necessary.

2.5.3 Construction Compounds

Construction compounds/worksites would be required along or close to the route for storage of plant and materials and for site offices. In summary, these locations are:
- Industrial Estate off Roseburn Street and Russell Road, including Haymarket Rail Depot.
- Murrayfield playing fields.
- Area in between Pansy Walk and Edinburgh/Glasgow railway line, bordered by Balgreen Road to the west.
- Area adjacent to the Royal Air Cadets Hall off Stenhouse Drive.
- Area in between Stenhouse Drive and Saughton Mains Street.
- Area in between Broomhouse Drive and the Edinburgh/Glasgow rail line, opposite the Saughton House Government Offices.
- Area bounded by Broomhouse Drive and Broomhouse Road at the roundabout.
- Area bounded by Bankhead Drive and Broomhouse Road at the roundabout, opposite Sighthill Park.
- Area in between Bankhead Drive and the southern boundary of Tram Line 2 from South Gyle Access opposite Bankhead Industrial Estate.
- Undeveloped area of Edinburgh Park, approximately 65 metres either side of Tram Line 2 centre line. However this is only proposed and would not be used as a construction storage area should this area be developed at time of construction.
- South Gyle shopping centre car park, in area between Gogar Roundabout and South Gyle Broadway. The use of this area as a temporary construction compound may require revisions to car parking layout, however this would be in liaison with centre management.
- An area in an agricultural field, where Tram Line 2 crosses the Gogar Burn.
- Two areas approximately 20 metres by 70 metres in an area of agricultural land just north of the Ingliston Park and Ride stop.
- Land at the proposed Ingliston West stop.
- An area surrounding the proposed Airport stop.

These sites are indicative of those which may be used as construction compounds around the route, and have been identified to inform the assessment of the traffic and environmental effects of construction of Tram Line 2 in this ES. The final choice of compound locations and the responsibility for agreements with landowners for these, or other, construction compounds would be the responsibility of the contractor or concessionaire for the tram.

There would be several access points from the public highway onto the corridor for construction and transport of plant and materials along the corridor. The exact phasing of construction and the duration and timing of the works in individual areas would depend on the contractor’s chosen method of construction.

2.5.4 Utility Diversions

Unlike buses, a tram is restricted by the track alignment and cannot change lanes to avoid obstructions caused by public utilities works. Thus it is important to ensure either that the alignment is designed to be free of public utility apparatus (e.g. pipes and cables for gas, water, electricity and telecommunications) and that the services are located clear of the vehicle swept path, or that the equipment left in the swept path is in sufficiently robust condition that the risk of equipment maintenance interrupting the tram operation is at a very low level. To this end, it would be necessary to undertake maintenance, protection or diversion of services along the
route. This work would be along the full route of the tramway, dependant on the historic development of the service networks within the city. Services are more prevalent within a heavily urbanised area (e.g. between St Andrew Square and Haymarket) than rural areas; and within the urban area there is less roadspace available to fit all services. This work would generally need to be undertaken at the onset of the project construction phase, so that tramtrack construction can proceed without interruption at a later date. Thus the effects of service diversion are to lengthen the period of the construction phase; require land outside the swept path of the tramway; and cause disruption of the road networks as a variety of tasks are undertaken for each of the utilities involved. The impacts of utility diversions are considered with the assessment of construction impacts within the specialist sections of the ES.

2.6 OPERATION OF TRAM LINE 2

Tram Line 2 could be operating by 2009. Service frequency would vary at different sections of the route and at different times of day. Current patronage forecasts indicate that the peak time frequency should be a tram every ten minutes (6 trams per hour) in each direction. While not finalised, it is envisaged that the trams would run from 04:30 in the morning to midnight from Sunday through to Thursday, and until 1:00 am on Fridays and Saturdays. Further information is provided in Table 2.5 below.

Table 2.5 Operation of Tram Line 2

<table>
<thead>
<tr>
<th>Operating Assumptions</th>
<th>Airport Service</th>
<th>Newbridge Shuttle</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route Kilometres</td>
<td>13.64</td>
<td>4.18</td>
<td>17.82</td>
</tr>
<tr>
<td>Stops</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Fleet size (number of trams)</td>
<td>10</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Running times</td>
<td>Approx 30 minutes from St Andrew Square to Airport</td>
<td>Approx 9 minutes from Ingliston Park and Ride to Newbridge North</td>
<td></td>
</tr>
<tr>
<td>Service patterns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak frequency</td>
<td>6 trams/hour (tph)</td>
<td>6 tph</td>
<td></td>
</tr>
<tr>
<td>Off peak frequency</td>
<td>6 tph</td>
<td>3 tph</td>
<td></td>
</tr>
<tr>
<td>Operating Hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>0430 - 2430</td>
<td>0530 - 2430</td>
<td></td>
</tr>
<tr>
<td>Weekend</td>
<td>0430 - 0100</td>
<td>0630 - 0100</td>
<td></td>
</tr>
</tbody>
</table>

The operation of Tram Line 2 would be coordinated from the control centre located at the Gogar Depot. The tram route would operate on a line-of-sight basis, designed such that vehicles would be able to stop within the distance visible ahead at all times. The system shall be designed such that, in the event of a tram breakdown, another tram vehicle would be able to rescue the stranded vehicle.

After an emergency incident, the emergency services would be able to reach the site of the incident either along the tram route itself, or via additional access points provided as part of the scheme. The emergency services are being consulted during the development of the preferred route. In the event of a breakdown or emergency, the driver can contact the control centre.
2.6.1 Special Events

The operator would be responsible for providing suitable tram services to cater for any special events that are likely to be taking place on or near to the tram routes. These events include the closure of Princes Street during the Festival and Hogmanay, sporting and other events at Murrayfield, and the Royal Highland Show. The system would be designed to allow special tram services during such events. A stop at Ingliston West would serve the Royal Highland Showground. A crossover ahead of the stop would offer the opportunity to terminate service from the city at the showground. Crowds from Murrayfield are normally considerable in number. The system would be designed to maximise passenger capacity to serve a good proportion of the stadium crowd. Murrayfield stop would be elevated. This position would facilitate the management of the crowd going to the tram stop after the game, and would allow tram operations to continue undisturbed by crowd flows entering and exiting the stadium. A third track would be implemented between the Stadium and Water of Leith (see Figure 2.1a). This track would be used as stabling area (up to 3 trams) for special events. A crossover would be implemented to offer the possibility of implementing partial services between the stadium and the city.
3 Approach to the EIA

3.1 INTRODUCTION

This chapter sets out the broad approach that has been used in the EIA. It summarises the key stages which have been followed, in line with EIA best practice. This chapter also provides a section on the assumptions made during the EIA process.

3.2 PARLIAMENTARY REQUIREMENTS AND THE EIA REGULATIONS

Line 2 is being authorised by a Private Bill in the Scottish Parliament. As part of the Private Bill process an EIA should be undertaken and an ES produced to accompany the application for a Private Bill (as required by Rule 9A.2 of the Standing Orders of the Scottish Parliament (Edition 1 10.12.99, Revision 06.01.03)).

EIAs have been required for certain major developments since the implementation in the UK of the European Council Directive on Environmental Assessment (EC Directive 85/337/EEC). The Directive was implemented in the UK in 1988 and subsequently amended by Directive 97/11/EC. Directive 97/11/EC is implemented by the Environmental Impact Assessment (Scotland) Regulations 1999 (as amended). These Regulations set out the information that must be included in the ES. The Regulations require that an ES should include at least:

- A description of the development, comprising information about the site and the design and size of the project.
- An outline of the main alternatives considered and an indication of the main reasons for the chosen scheme.
- The data necessary to identify and assess the main effects which the project is likely to have on the environment.
- A description of the likely significant effects of the project on the environment.
- A description of the measures envisaged in order to avoid, reduce or remedy significant adverse effects.
- An indication of any difficulties encountered in compiling the required information.
- A Non-Technical Summary of the above information.

3.3 THE EIA PROCESS

EIA is the process of compiling, evaluating and presenting all the significant environmental effects of a proposed development. The assessment is designed to help produce an environmentally sympathetic project. Detection of potentially significant adverse environmental impacts leads to the identification and incorporation of appropriate mitigation measures into the scheme design.

The main steps in the assessment procedure are as follows:

- Baseline surveys are carried out to provide a description of the environmental character of the area likely to be affected by the development. This information is provided to the scheme designers at the earliest opportunity.
- In addition, we identify relevant natural and manmade processes that may change the character of the site.
• Consideration is then given to the possible interactions between the proposed development and both existing and future site conditions.

• Using the initial designs of the development we predict the possible environmental effects, both direct and indirect.

• Recommendations can then be made to avoid, minimise or mitigate adverse effects and enhance positive effects. Alterations to the design can then be reassessed and the effectiveness of mitigation proposals determined.

• Any uncertainties inherent in the methods used, impact predictions made and conclusions drawn would be identified during the course of the assessment process.

• The results of the EIA are set out in the ES.

The requirements of STAG have also informed this assessment.

3.4 APPROACH TO THE ASSESSMENT OF IMPACTS

3.4.1 Significant Impacts

The determination of the significance of the impacts arising from the proposed scheme is a key stage in the EIA process. It is this judgement that is crucial to informing the decision-making process. However, defining what is significant is not a simple task. The following criteria have been used, where appropriate to the issue being addressed, in this EIA to inform the assessment of the significance of an impact:

• Type of impact (adverse/beneficial).

• Extent and magnitude of impact.

• Duration of impact (short term/long term).

• Reversibility of impact.

• Sensitivity of receptor.

• Comparison with legal requirements, policies and standards.

• Comparison with applicable environmental thresholds.

• Effectiveness of mitigation. (The significance of impacts is assessed taking into account mitigation i.e. the assessment applies to the residual impacts. A residual impact is any impact that would remain following the implementation of proposed mitigation measures). Assumptions relating to mitigation and detailed design are set out in Section 3.5 below.

Using these criteria, the significance of the impacts arising from the proposed development has been categorised throughout the ES using a seven point scale, as follows:

• Negligible.

• Minor (adverse or beneficial).

• Moderate (adverse or beneficial).

• Major (adverse or beneficial).
For some topics, alternative categories have been added where a greater level of definition is required (e.g. “substantial” is used for the assessment of landscape and visual impacts). Explanations of the meaning of the ‘significance categories’ are included in the various chapters. However, in general terms if an impact is negligible it is environmentally acceptable; minor significance reflects the fact that the impact is manageable; and moderate and major significance relates to the fact that the impact is environmentally damaging and requires, as far as possible, mitigation measures to minimise the impact. Impacts assessed as moderate or higher are therefore considered ‘significant’. It should be noted that throughout the ES, the terms impact and effect are interchangeable.

3.4.2 Construction, Permanent and Operational Impacts

Impacts have been separated into three ‘types’ based on different phases of the development. Construction impacts are temporary, short term impacts which occur during the construction phase only. Permanent impacts are those long term effects which would occur as a result of the development and may include the introduction of new structures, the loss of habitat, or the demolition of buildings. Permanent impacts are considered together with operational impacts i.e. those impacts resulting from operation of the tram system e.g. noise from the trams.

Construction is assumed to begin in 2006 and last for three years, although the phases of development would mean that impacts in a single location are typically much shorter (see Section 2.5.1). The scheme could be operational by 2009. However, for the purpose of traffic modelling the years 2011 and 2026 have been used. This is because the traffic model can provide data for five year gaps from the 2001 census up to the year 2026. 2011 is therefore the closest date to the proposed opening year of 2009, and 2026 the latest possible date at which modelling can be undertaken.

3.4.3 Interrelationships Between Impacts

For the purposes of the EIA, the potential impacts of the scheme are considered in terms of impacts on each of the discrete environmental topic areas. In reality, topic areas such as ‘water quality’, ‘ecology’ or ‘landscape’ cannot be considered in isolation since changes affecting one factor may often have secondary implications for other areas. Thus, if one impact of the scheme is to alter the quality and quantity of a watercourse, flora and fauna may be affected as a secondary effect. Under some circumstances, it is possible for the secondary or indirect impacts to be more significant than the changes that triggered them.

3.4.4 Cumulative Impacts

Cumulative impacts are considered in two ways in this ES.

- The combined effects of Lines 1 and 2 running simultaneously between Roseburn and St Andrew Square.
- The combined effects on a specific resource or receptor.

The approach to assessing the cumulative impacts of Line 1 and Line 2 operating together is described in Section 15 of this ES. The cumulative assessment examines the impacts of increasing the number of trams to 14 per hour (i.e. combining Tram Line 2’s 6 trams per hour with Line 1’s 8 trams per hour).

The combined effects on specific resources or receptors are described, where relevant in each of the specialist Chapters. An example would be the impact on a wildlife corridor resulting from a loss of vegetation in several locations.
3.5 UNCERTAINTY, ASSUMPTIONS AND LIMITATIONS

The EIA process is designed to enable good decision-making based on the best possible information about the environmental implications of a proposed development. However, there will always be some uncertainty as to the exact scale and nature of the environmental impacts. This arises through the detail of the information available at the time of the assessment or due to the limitations of the prediction process itself. Key issues relating to assumptions are described below. Other topic specific assumptions are set out, where necessary, in Chapters 4 to 15 of this ES.

3.5.1 Assumptions Relating to ‘Limits’

The Parliamentary plans identify the ‘limits’ within which the scheme must be constructed and operated. The limits mark out the precise boundaries of land for which powers are sought, comprising Limits of Deviation (LOD) and Limits of Land to be Acquired or Used (LLAU). In general, the LOD defines the area over which a permanent interest in land is required for the construction and operation of the tram system. The LLAU defines the area of land required, or rights over that land are required, either permanently for a specified purpose connected with the construction or operation of the tram system, or temporarily for construction purposes or access. The limits necessarily encompass a wider corridor than is necessary for the tram tracks since:

- Space is required to enable a future contractor to vary the alignment slightly from that which has been assumed in the design work leading up to the Bill.
- Space is required on either side of the tram alignment for construction, works to utilities and so on.

For on-street sections the limits typically extend across the width of streets where the tram is likely to be integrated with traffic, although the eventual construction works are unlikely to require the whole of this width. Similarly, the limits in segregated sections allow for a degree of flexibility during detailed design.

3.5.2 Level of Design Detail for EIA

Although the assessment has been undertaken to allow for the fact that the tram system could be constructed and operated anywhere within the limits defined by the Parliamentary plans, the design has been drawn up in sufficient detail to establish that a tram system can be built and operated along the corridor identified by the limits. This work has involved the specification of a tram alignment which has been used as the basis for the assessment presented in this ES. This has included identification of locations where the tram will be segregated and where it will be integrated with other traffic, and in the latter case, the development of workable solutions for the alignment such as whether the tram will run along the edges of the road carriageways or down the centre of the road. The corridor which has been assessed is intended to be sufficiently wide to accommodate either of these alternatives, and it is anticipated that the final scheme will comprise a combination of alignments depending upon the traffic, engineering and other issues relevant to each street or section of street.

Similar issues of design detail are raised for the EIA in relation to the design of the tram infrastructure. For example, whilst the location of potential tram stops has been identified, the assessment of factors such as landscape and visual impacts needs to take account of the fact that the location of stops is subject to detailed design. For these reasons, the environmental assessment team has used information provided by the scheme designers on the locations, dimensions and designs of tram stops, OLE supports, OLE cables and fixing points, and electrical substations.
It is acknowledged that the scheme which is eventually designed and constructed may differ slightly from the design details which have been used in the EIA and reported in this ES. A balance has been sought in the EIA between, on the one hand, specifying enough detail to undertake an assessment which meets the requirements of the EIA Regulations, and on the other hand, avoiding specification of the design to a point which restricts the scope for cost effective design and innovation offered by contractors and/or the concessionaire. The environmental impacts which are reported in this ES and the level of mitigation described effectively set the minimum standard which will be achieved by the final scheme. Where the details of the final scheme differ from those assumed in this ES, it will be necessary for the scheme designers to consider the environmental impacts of those changes and ensure that they would not be materially worse than those identified in the ES after mitigation.

Where matters of detail have still to be finalised these will be subject to Prior Approval by CEC under the terms of the Town and Country Planning (General Permitted development) (Scotland) Order 1992 as amended. Under Part 11, Class 29 of the order, development authorised by private Act of Parliament is permitted development, except that the erection of inter alia buildings and bridges and the formation, laying out or alteration of means of access to any road must be subject to prior approval by the planning authority, in this case CEC. This Prior Approval procedure will be adopted for these details of the scheme and to ensure that design and construction is undertaken in a manner which is environmentally acceptable and which meets high standards of design and finish.

3.5.3 Assumptions Relating Mitigation

Where the potential for significant impacts has been identified, the scope for their mitigation has been discussed with the design team. The promoter is committed to implementation of all those measures described in the text. The residual impacts identified are those remaining after this mitigation has been implemented.

Some mitigation measures will be developed in further detail during the final design and will be subject to the Prior Approval process (see Section 3.5.2 above). For certain effects, the mitigation identified in the ES is indicative of the proposals which will be implemented for the final scheme which is ultimately developed. These represent the type of measure expected to be required to achieve an appropriate standard of environmental performance. In these cases the final scheme would be developed such that its environmental impact would not be materially worse than that described in the ES after mitigation. This allows for flexibility in the design adopted. For example, the assessment assumes that the tram would run below the heavy railway in a false cutting near the rear gardens of properties on Baird, and that a level crossing of Balgreen Road would be constructed. The Parliamentary submission allows for flexibility at this location to alter the vertical alignment of the tram route.

3.5.4 Assumptions Relating to Transport Modelling

In addition to informing the Traffic and Transport element of the EIA (Chapter 5), outputs from transport models provide the basis for the assessment of changes in air quality and for predictions of changes to traffic noise. As stated in Section 3.4.2 for the purpose of traffic modelling the years 2011 and 2026 have been used. There are a number of assumptions relating to the traffic modelling:

- The effects of the Central Edinburgh Traffic Management (CETM) scheme are not taken into account in the model as the final decision to implement the scheme was not taken at the time of the development of the model. CETM will result in a number of traffic management measures in the New Town area. One of these measures will involve the closure of Princes Street to westbound car traffic during the day such that only buses, cycles and taxis will be permitted to use the route. This will result in the redistribution of west bound traffic along alternative city centre routes.
The effects on traffic resulting from congestion charging have not been included in the transport modelling.

The Tram Line 2 transport model assumes that no bus operations would change. The only exception to this is the removal of WEBS, which would be replaced by the tram (see Section 2.2.2).

3.6 SCOPE OF THE ENVIRONMENTAL STATEMENT AND CONSULTATION

Scoping is the process of identifying the likely significant environmental issues that should be considered in the EIA. As part of the scoping process, assessment methods were identified and consultations carried out to confirm the approach that is to be undertaken. The Edinburgh Tram Line 2 Environmental Scoping Report was published in August 2002 and sent to the organisations listed in Table 3.1 for comment.

Table 3.1 Organisations Contacted During Scoping

<table>
<thead>
<tr>
<th>Statutory Organisations</th>
<th>Non-statutory Organisations</th>
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</thead>
<tbody>
<tr>
<td>• CEC</td>
<td>• Architectural Heritage Society of Scotland</td>
</tr>
<tr>
<td>• Health &amp; Safety Executive</td>
<td>• BAA Edinburgh</td>
</tr>
<tr>
<td>• Historic Scotland</td>
<td>• Cockburn Association</td>
</tr>
<tr>
<td>• Scottish Environment Protection Agency (SEPA)</td>
<td>• Edinburgh &amp; Lothian Badger Group</td>
</tr>
<tr>
<td>• Scottish Executive</td>
<td>• Edinburgh Architectural Association</td>
</tr>
<tr>
<td>• Scottish Natural Heritage (SNH).</td>
<td>• Edinburgh Chamber of Commerce &amp; Enterprise</td>
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<tr>
<td>• Scottish Water</td>
<td>• Edinburgh Greenbelt Trust</td>
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The responses indicated that generally the scope of the EIA had been properly defined. A number of consultees made recommendations on particular subjects. These were incorporated into the assessment where relevant. In addition, the scope of the assessment was informed by the detailed consultations. The consultation process involved three key components, as outlined below:

- Client Consultation - There was continual consultation with the client group (tie and CEC) throughout the study. This included Steering Group consultations and monthly progress meetings with tie. Further meetings were held with CEC Transport and Planning divisions and the Scottish Executive as required.

- Stakeholder Consultation - “Stakeholders” were defined as a person or organisation that has an interest in the project proposals other than as a member of the public. Stakeholders include, but are not limited to, the organisations listed in Table 3.1 above.

- Public Consultation - The consultations involved a number of methods to achieve an inclusive approach along the length of the proposed tram corridor.

A detailed summary of consultations undertaken for Tram Line 2 is presented in Appendix 3, Volume 4 of this ES.
4 Policy Context

4.1 INTRODUCTION

This chapter of the ES is concerned with whether or not the Tram Line 2 proposals are consistent with planning and environmental policy at national, regional and local levels. Policy also provides guidance for the design of Tram Line 2, the need for mitigation, and, in addition it informs the assessment process by identifying key issues of significance. This chapter should be read with together with Figures 4.1 to 4.10, which identify the location of designated areas and other features of environmental importance.

4.2 METHODS

The methods used are straightforward. Relevant policy is briefly summarised and a judgement is made on whether the proposals are consistent with, or conflict with, policy. The assessment is guided by the results of the detailed assessments undertaken for each of the specialist environmental topics set out in this ES. Table 4.1 provides the criteria against which conformance with policy objectives have been assessed.

Table 4.1 Impact Definitions for Conformity with Policy

<table>
<thead>
<tr>
<th>Impact Significance</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Consistent</td>
<td>Consistent with development plan policies or objectives.</td>
</tr>
<tr>
<td>Neutral</td>
<td>Not inconsistent with or the impact is not directly covered by any development plan policies or objectives.</td>
</tr>
<tr>
<td>Inconsistent</td>
<td>Contrary to development plan policies or objectives.</td>
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</table>

National policies include Scottish Planning Policy (SPP), National Planning Policy Guidance (NPPG) and the West Edinburgh Planning Framework. Relevant Planning Advice Notes (PAN), which provide additional best practice guidance on planning matters, have also been reviewed.

The development plan (comprising the Structure Plan and Local Plans specific to the Edinburgh Tram Line 2 route alignment) is the main focus of the assessment. It has been reviewed and assessed in terms of compliance with the strategies and policies which provide effective control for development.

4.3 NATIONAL AND REGIONAL PLANNING GUIDANCE

The assessment of relevant national and regional environmental and planning policy and guidance is set out in Table 4.2.
### Table 4.2 Compliance with National and Regional Policy

<table>
<thead>
<tr>
<th>Policy Document and Issue</th>
<th>General Summary</th>
<th>Assessment</th>
</tr>
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<tbody>
<tr>
<td><strong>West Edinburgh – Planning Framework; 2003</strong></td>
<td>Long term, strategic planning framework for the A8 transport corridor to the west of Edinburgh. The Edinburgh Tram Line 2 is an integral part of the transport initiatives proposed in the framework for the west of Edinburgh. The tram provides a transport link to economic development sites, providing accessibility and reducing congestion.</td>
<td>Edinburgh Tram Line 2 is complimentary and of national interest for the development west of Edinburgh.  <strong>Assessment Score:</strong> Consistent</td>
</tr>
<tr>
<td><strong>NPPG 17 Transport and Planning</strong></td>
<td>The policy aims to promote integration “within and between different modes of transport, to promote genuine choice, so that each mode contributes its full potential and people can move easily between different modes”. Transport objectives are related to the reduction of greenhouse gases, transport proposals that will maintain and enhance the economic viability of town centres and the minimisation of environmental impacts.</td>
<td>Edinburgh Tram Line 2 is consistent with the objectives of the policy. Environmental impacts are addressed in this Environmental Statement.  <strong>Assessment Score:</strong> Consistent</td>
</tr>
<tr>
<td><strong>PAN 57 Transport and Planning 1999</strong></td>
<td>This Planning Advice Note accompanies NPPG17 Transport and Planning. It provides additional guidance on the integration of land use and transportation in a sustainable manner. It also details environmental guidance on transport proposals, including background information on air and water quality, landscape, natural and built heritage.</td>
<td></td>
</tr>
<tr>
<td>Policy Document and Issue</td>
<td>General Summary</td>
<td>Assessment</td>
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| SPP 2 Economic Development | The policy document recognises the need for transport systems “to meet Scotland's economic and social needs without threatening the health of the environment”. It emphasises that wherever new development sites are proposed, then these should be accessible by public transport. It also contains guidance on safeguarding and enhancing the environment. | Edinburgh Tram Line 2 is integral to the provision of a transport network, serving economic and housing areas proposed for the west of Edinburgh. Environmental impacts are addressed in this Environmental Statement.  
**Assessment Score:** Consistent |
| SPP 1 The Planning System | In specific relation to transportation issues, the SPP1 states, “the planning system is important in delivering the Executive’s commitment to a more sustainable, effective, integrated transport system”. The policy recognises the importance of transport in supporting the economy of Scotland. It also provides guidance for ways in which the planning system should be used to encourage more sustainable travel patterns. | Edinburgh Tram Line 2 is supported by the SPP 1, as it provides an alternative form of transport to growing economic areas of Edinburgh.  
**Assessment Score:** Consistent |
| PAN 51 Planning and Environmental Protection | This PAN gives advice on the role of the planning system in controlling pollution and its relationship to a number of environmental protection regimes. Environmental protection issues must be considered with arrangements in place that will minimise the risks to public health and to the environment. Consultation with the relevant environmental protection authority is also required. Environmental protection regimes are also summarised in the PAN. | Environmental protection issues potential impacts and mitigation measures have been examined in this Environmental Statement. This is consistent with PAN 51.  
**Assessment Score:** Consistent |
| NPPG 18 Planning and the Historic Environment | This guideline aims to set national policy, promote sustainable development and define objectives designed to protect and conserve Scotland’s historic environment.  
As such, the planning policy framework seeks to ensure that transport proposals do not undermine the quality of the historic environment. | Refer to Table 4.3  
**Assessment Score:** Inconsistent |
<table>
<thead>
<tr>
<th>Policy Document and Issue</th>
<th>General Summary</th>
<th>Assessment</th>
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<td>NPPG 14 Natural Heritage</td>
<td>The policy states that “Scotland's natural heritage includes its plants and animals, its landforms and geology, and its natural beauty and amenity”. The NPPG sets out statutory obligations, objectives and recommended approaches for the conservation and management of natural heritage. The planning policy aims to ensure that society's land requirements (including transport infrastructure) is developed so as to safeguard natural heritage features. The policy is supported by guidance and advice in PAN 60.</td>
<td>Refer to Table 4.3 <strong>Assessment Score:</strong> Inconsistent</td>
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<tr>
<td>PAN 60 Planning for Natural Heritage (2000)</td>
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<tr>
<td>NPPG 11 Sport, Physical Recreation and Open Space</td>
<td>This policy addresses the land use implications, providing and enhancing sport and physical recreation areas, urban open spaces, and significant areas of the countryside “which are shared by those enjoying outdoor pursuits and seeking places for quiet relaxation”. The policy provides specific guidance relating to former railway land and tracks. The guidance states that “local plans should contain policies to safeguard their potential for recreational use, nature conservation and for possible return to transportation use”. The policy is supported by guidance and advice in PAN 65. In relation to open space, the planning policy and advice relate to protecting areas that are valuable and valued and ensuring provision of appropriate quality in, or within easy reach of, new development.</td>
<td>The Edinburgh Tram Line 2 alignment utilises disused railway corridors around Ratho Station, Balgreen Road and Haymarket stops. For environmental conservation of the disused railways, refer to Table 4.3 <strong>Assessment Score:</strong> Inconsistent</td>
</tr>
<tr>
<td>PAN 65 Planning and Open Space (2003)</td>
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<tr>
<td>Policy Document and Issue</td>
<td>General Summary</td>
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<td><strong>NPPG 8 Town Centres and Retailing</strong></td>
<td>“This National Planning Policy Guideline (NPPG) sets out the [Scottish Executive's] policy for town centres and retail developments. It also addresses other non-retailing uses which have a role in contributing to the economic health and enhancement of the town centre.” The policy context is centred around the principles of sustainable development. Promotion of public transport to retail shopping areas is contained in the policy, as this promotes a sustainable approach; ensuring as many people as possible can take advantage of retail and leisure opportunities - leading to lesser dependence on the car.</td>
<td>Edinburgh Tram Line 2 will provide a fast, high quality link to retail areas, namely The Gyle and Hermiston Gait shopping complexes. <strong>Assessment Score:</strong> Consistent</td>
</tr>
<tr>
<td><strong>NPPG 7 Planning and Flooding</strong></td>
<td>This policy guidance is aimed at ensuring that &quot;the risk of flooding is taken into account in the planning of developments and that measures are taken to reduce the risk of flooding and the damage which floods cause&quot;.</td>
<td><strong>Assessment Score:</strong> Inconsistent</td>
</tr>
<tr>
<td><strong>PAN 56 Planning and Noise (1999)</strong></td>
<td>The PAN is not intended to be a prescriptive guidance document, rather as a reference document providing guidance on ways of mitigating the adverse impact of noise, noisy and noise-sensitive development and introduces the use of noise exposure categories (NEC). This is particularly relevant for residential areas potentially affected by noise from transport schemes.</td>
<td><strong>Assessment Score:</strong> Neutral</td>
</tr>
<tr>
<td><strong>NPPG 5 Archaeology and Planning</strong></td>
<td>This NPPG “sets out the Government's planning policy on how archaeological remains and discoveries should be handled under the development plan and development control systems, including the weight to be given to them in planning decisions and the use of planning conditions”. This is achieved through the promotion, provision of funding (private sector efforts), recording and legislatively protecting, maintaining and restoring heritage. The policy is supported by guidance and advice in PAN 42.</td>
<td>Refer to Table 4.3 <strong>Assessment Score:</strong> Inconsistent</td>
</tr>
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</table>
4.4 PLANNING POLICIES OF THE LOCAL AUTHORITY

CEC planning policies for the area are set out in the following documents:

- **Lothian Structure Plan 1994** – The Lothian Structure Plan (LSP) was approved by the Secretary of State for Scotland on 4 July 1997. The LSP sets a plan period from 1992 to 2005 for planning and development strategies for the area and was prepared by the former Lothian Regional Council, prior to local government reorganisation on 1 April 1996. This led to the formation of the four Councils of East Lothian, CEC, Midlothian and West Lothian, who now have joint responsibility for the LSP. The purpose of the LSP is to document the “policies and general proposals for the strategic development of land and transportation in Lothian and to provide guidance on issues of major importance”. The policies in the LSP are concerned with planning control matters and must be reflected in the local plans and development control.

- **Edinburgh and Lothians Structure Plan 2015** – The Edinburgh and Lothians Structure Plan (ELSP) sets out a long-term vision for planning and development to a horizon of 2015. The ELSP builds upon the LSP (see above). CEC, East Lothian Council, Midlothian Council and West Lothian Council have jointly prepared the ELSP. The ELSP focuses on strategic planning issues relating primarily to land-use and transportation. A finalised version of the ELSP has been produced and is currently awaiting approval from Scottish Ministers, as well as being placed on formal deposit. It is understood that CEC review and base planning decisions on the basis of the LSP and ELSP. Therefore, the policies outlined in the ELSP have also been reviewed.

- **City of Edinburgh Council; West Edinburgh Local Plan, 2001** - The consultative draft of the West Edinburgh Local Plan (WELP) was approved in June 2001, however it has not yet been adopted. In principal, the WELP replaces the two local plans currently in force for the area it covers, i.e. the North West Edinburgh and the South West Edinburgh Local Plans. The WELP covers an area from Cramond and Granton Waterfront in the north to the northern slopes of the Pentland Hills in the south. It extends from Gorgie suburb in the east to the city bypass in the west. It is understood however, that CEC have decided not to proceed further with the procedures to adopt the WELP, but have decided to incorporate the document into a new City of Edinburgh Local Plan, which will deal primarily with urban areas. With work on this document proposed in 2004 (the Rural West Edinburgh Local Plan will remain, focussing on rural planning). It is also understood that CEC planners currently use the WELP as the basis for its development control in this area of the city. On this premise, the WELP policies have been reviewed and the Tram Line 2 assessed against these policies.

- **City of Edinburgh Council; Rural West Edinburgh Local Plan, 1999** – The Rural West Edinburgh Local Plan (RWELP) was approved and finalised by CEC on 1 April 1999, following a consultative draft Plan in March 1994. The RWELP covers mostly open countryside lying on the outskirts of Edinburgh, and it encompasses the towns and villages of Balerno, Currie, Dalmeny, Kirkliston, Newbridge, Queensferry, Ratho and Ratho Station. The general aim of the RWELP is to “restrain growth in Rural West Edinburgh and to protect and enhance the Green Belt, while providing for Lothian’s development needs in more sustainable locations elsewhere”.


• **City of Edinburgh Council; Central Edinburgh Local Plan, 1997** - The Central Edinburgh Local Plan (CELP) was adopted by CEC on 29 May 1997. The CELP covers an area extending from Inverleith and Warrington in the north, to Blackford Hill and Kings Building in the south. It encompasses Holyrood Park to the east and reaches to Murrayfield and Ravelston in the west. The main aims of the CELP is to encourage developments that will create jobs and wealth in the city centre, conserve and enhance the historic environment, review housing developments and consider green issues in all aspects of development.

• **City of Edinburgh Council, Interim Local Transport Strategy 2000 to 2003** – The Local Transport Strategy (LTS) was authorised by the Council’s Transportation Committee on 9 August 1999. The LTS outlines the Council’s vision for the future of transport in Edinburgh and the policies, projects and objectives to put into action to make this possible. The LTS sets out the Council’s policies and programmes for the period up to 2020. The aims of the LTS include “developing the local economy, reducing poverty and disadvantage and promoting a healthy and sustainable environment”.

• **City of Edinburgh Council, Local Transport Strategy 2004 to 2007** – Edinburgh’s first LTS was adopted in 2000 (see above). However, CEC are currently reviewing and amending the LTS to incorporate and address new legislation, transport projects and structures necessary for the delivery of transportation projects. Policy areas examined in the LTS (2004-2007) include car travel; public transport; walking and cycling; travel awareness; travel plans and household travel choices. For each policy area, CEC have identified objectives, key policies and implementation schemes. The aims of the LTS (2004 – 2007) are to “improve safety for all road and transport users; reduce the environmental impacts of travel; support the local economy; promote better health and fitness; and reduce social exclusion”. The LTS (2004-2007) has recently been subject to public consultation during October and November 2003. Policies, however, contained in this document have not been assessed in this ES, as the strategy is yet to be adopted by CEC.

Table 4.3 summarises selected policies from the above documents and provides a review of compliance with policy objectives. Only those policy issues relevant for the local plan area have been noted. For instance, policies relating to the green belt have only been examined in the RWELP, as the Tram Line 2 alignment is proposed to extend into this green belt area only. For brevity key policy issues have been synthesised. Figures 4.1 to 4.10 identify the location of designated areas and other features of environmental importance.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Summary of Key Policy Issues</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General design and major developments</strong></td>
<td>WELP Policy DQ1; DQ2; DQ3; DQ10&lt;br&gt;RWELP Policy E1; E2; E3; TRA10&lt;br&gt;LSP Policy ENV4&lt;br&gt;Environmental impacts will need to be addressed for all major development proposals and include measures necessary to mitigate any adverse effects. Sustainable development principles should also be applied.&lt;br&gt;WELP Policy DQ6&lt;br&gt;RWELP Policy E42&lt;br&gt;Celp Policy CD10&lt;br&gt;ELSP Policy ENV1G&lt;br&gt;LSP Policy ENV4&lt;br&gt;The Council seeks to encourage and promote high standards of design.</td>
<td><strong>Assessment Score:</strong> Consistent</td>
</tr>
<tr>
<td><strong>Agriculture</strong></td>
<td>RWELP Policy E8&lt;br&gt;WELP Policy GE3&lt;br&gt;Prime agricultural land will need to be protected and be returned to its full agricultural potential.&lt;br&gt;LSP Policy ENV12; ENV16; H17; H18&lt;br&gt;Celp Policy GE3&lt;br&gt;WELP Policy GE1&lt;br&gt;ELSP Policy ENV2&lt;br&gt;There will be a presumption against development or changes or use in the green belt unless necessary for the purposes of agriculture, horticulture, forestry, countryside recreation or other uses appropriate to the rural character of the area.</td>
<td>Tram Line 2 would result in the loss of areas of agricultural land.&lt;br&gt;<strong>Assessment Score:</strong> Inconsistent</td>
</tr>
<tr>
<td><strong>Transport and Mobility</strong></td>
<td>WELP Policy R7; T1; T3; T5; ED2; ED3&lt;br&gt;RWELP Policy ED1; ED5; ED6; ED10; TRA1; R3; R7&lt;br&gt;Celp Policy CD18; S6; S10; L9; CS3&lt;br&gt;ELSP Policy ECON2; ECON6; TRAN2; TRAN4; RET2&lt;br&gt;LSP Policy ENV3A; ENV4; H10; ED11; ED17; ED21; TP11; S8; S9; S17&lt;br&gt;LTS Policy ED2; ED3; CF1&lt;br&gt;Developments, which are accessible by a range of sustainable modes of transport, including public transport,</td>
<td><strong>Assessment Score:</strong> Consistent</td>
</tr>
<tr>
<td>Topic</td>
<td>Summary of Key Policy Issues</td>
<td>Assessment</td>
</tr>
<tr>
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<tr>
<td>will be encouraged. This includes proposals for the development and enhancement of existing facilities, such as Edinburgh Airport and the Royal Highland Showground, new tourist amenities, retail, commercial, business and industrial areas, community services (healthcare, educational) and new housing estates.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textit{WELP Policy T6} \textit{REWLP Policy TRA8; TRA6} \textit{CELP Policy T4} \textit{ELSP Policy ECON5; TRAN1} \textit{LSP Policy TP32; TP35; TP39} \textit{LTS Policy PT1; A3}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land in west Edinburgh has been reserved and safeguarded for the implementation of public transport proposals. This includes the CERT alignment and the Edinburgh Park station (refer to Table 5.1 ELSP and Appendix 1 LSP). The Council will encourage proposals to improve the level and quality of public transport facilities and services.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textit{WELP Policy T7} \textit{REWLP Policy E27; TRA3; TRA7} \textit{CELP Policy GE6; T6; T7; T9; T10} \textit{ELSP Policy TRAN1} \textit{LSP Policy TP7} \textit{LTS Policy C3}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport proposals should make provisions for pedestrians and cyclists, particularly along disused railway lines.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textit{RWELP Policy E27} \textit{CELP Policy GE6} \textit{WELP Policy GE15}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rights of Way access will be protected and where appropriate improved.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation and Open Space</td>
<td></td>
<td>Loss of open space would occur at Huly Hill and Carrick Knowe Golf Course. Loss of open space of conservation value would occur at Huly Hill and this has been assessed as a moderate adverse impact. However, the need for the tram</td>
</tr>
<tr>
<td>Topic</td>
<td>Summary of Key Policy Issues</td>
<td>Assessment</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Nature Conservation</td>
<td>into account, as well as the need for, or benefits to be gained from allowing the development proposed. The recreational, amenity or nature conservation value of the open space will also be assessed.</td>
<td>transport scheme is of benefit to the Newbridge area. <strong>Assessment Score:</strong> Neutral</td>
</tr>
<tr>
<td></td>
<td><strong>WELP Policy GE11; GE12; GE13; GE16</strong>&lt;br&gt;<strong>RWELP Policy E18; E19; E20</strong>&lt;br&gt;<strong>CELP Policy GE5; GE7; GE8; GE9</strong>&lt;br&gt;<strong>ELSP Policy ENV 1D; ENV1F</strong>&lt;br&gt;<strong>LSP Policy ENV2; ENV24; ENV30</strong></td>
<td><strong>Assessment Score:</strong> Inconsistent with respect to impacts on nature conservation but consistent with policies aimed at habitat creation and mitigation.</td>
</tr>
<tr>
<td></td>
<td>Development within or affecting Urban Wildlife Sites (as termed in the WELP and CELP) and Sites of Interest for Nature Conservation (as termed in the RWELP) will require appropriate mitigation measures to enhance or safeguard the nature conservation value of the site(s). The creation and appropriate management of new habitats will also be encouraged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>RWELP Policy E6; E23; TRA10</strong>&lt;br&gt;<strong>ELSP Policy ENV1F</strong>&lt;br&gt;<strong>LSP Policy ENV16</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appropriate design and construction methods must be employed where proposals may harm protected plant or animal species and their habitat.</td>
<td></td>
</tr>
<tr>
<td>Heritage and Archaeology</td>
<td><strong>WELP Policy DQ14; DQ15</strong>&lt;br&gt;<strong>RWELP Policy E33; E35</strong>&lt;br&gt;<strong>CELP Policy CD2</strong>&lt;br&gt;<strong>ELSP Policy ENV1C</strong>&lt;br&gt;<strong>LSP Policy ENV3A; ENV5</strong>&lt;br&gt;<strong>WELP Policy DQ20; DQ21</strong>&lt;br&gt;<strong>RWELP Policy E30; E31</strong>&lt;br&gt;<strong>CELP Policy CD1; CD9</strong>&lt;br&gt;<strong>ELSP Policy ENV1C</strong>&lt;br&gt;<strong>LSP Policy ENV6; ENV7</strong>&lt;br&gt;The Council will seek to safeguard the character and setting of listed buildings.</td>
<td><strong>Assessment Score:</strong> Inconsistent</td>
</tr>
<tr>
<td></td>
<td>The Council will seek to protect, preserve and, if appropriate, enhance both scheduled and non scheduled ancient monuments and archaeological remains.</td>
<td></td>
</tr>
<tr>
<td>Topic</td>
<td>Summary of Key Policy Issues</td>
<td>Assessment</td>
</tr>
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<td>------------</td>
</tr>
</tbody>
</table>
| CELP Policy CD4; CD5; CD6; CD7  
WELP Policy DQ17; DQ18; DQ19  
RWELP Policy E36; E37; E39  
LSP Policy ENV5  
ELSP Policy ENV1D | The Council will seek to retain Conservation Areas and their features. All new developments in Conservation Areas should ensure that the development preserves or enhances the area’s character and appearance. | |
| Visual | WELP Policy DQ8; DQ9  
RWELP Policy TRA10  
CELP Policy CD11 | Development which may be viewed as intrusive and which may have the potential to make a significant impact on the image of different localities, and the city as a whole, will be subject to careful scrutiny. In particular, attention will be paid to the need to enhance main approach roads to the city centre. | Assessment Score:  
Inconsistent |
| Landscape and Green Belt | WELP Policy DQ7  
RWELP Policy E6; E11; E15; E16  
CELP Policy GE10; GE11; GE12  
ELSP Policy ENV2; ENV3  
LSP Policy ENV8; ENV16 | Proposals should account for new tree planting and robust landscaping. Designs should minimise impact on any trees subject to a Tree Preservation Order and the survival and retention of healthy trees must be accommodated throughout the construction period. The Council wish to renew and enhance the landscape setting of the A8 corridor. In rural settings and green belt areas, development should be integrated into the rural landscape. | Assessment Score:  
Inconsistent |

Historic gardens and parks included in
<table>
<thead>
<tr>
<th>Topic</th>
<th>Summary of Key Policy Issues</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Inventory of Gardens</td>
<td>the Inventory of Gardens and Designed Landscapes will be protected from development likely to affect adversely their character and interest. The appearance of the New Towns’ World Heritage Features should be protected.</td>
<td>CELP Policy GE1</td>
</tr>
<tr>
<td>Designed Landscapes</td>
<td>WELP Policy GE9</td>
<td>WELP Policy GE9</td>
</tr>
<tr>
<td></td>
<td>RWELP Policy E52</td>
<td>RWELP Policy E52</td>
</tr>
<tr>
<td></td>
<td>Areas locally designated as Open Space (due to landscape quality and townscape significance) shall be protected.</td>
<td>WELP Policy GE5</td>
</tr>
<tr>
<td></td>
<td>WELP Policy GE5; GE6; GE8</td>
<td>RWELP Policy E5</td>
</tr>
<tr>
<td></td>
<td>RWELP Policy E5; E6; TRA10</td>
<td>LSP Policy ENV8</td>
</tr>
<tr>
<td></td>
<td>Local landscape character of the Green Belt should be maintained and enhanced. Development in the Green Belt must meet high standards of design and landscaping and safeguard local amenity.</td>
<td>ELSP Policy ENV2</td>
</tr>
<tr>
<td></td>
<td>WELP Policy GE7</td>
<td>LSP Policy ENV21</td>
</tr>
<tr>
<td></td>
<td>RWELP Policy E9</td>
<td>RWELP Policy E9</td>
</tr>
<tr>
<td></td>
<td>LSP Policy ENV21</td>
<td>RWELP Policy E9</td>
</tr>
<tr>
<td></td>
<td>Development will not be permitted where it will detrimentally affect the landscape quality of the identified Areas of Great Landscape Value</td>
<td>RWELP Policy E46</td>
</tr>
<tr>
<td>Water Environment</td>
<td>RWELP Policy E46; E47</td>
<td>Assessment Score:</td>
</tr>
<tr>
<td>Water Environment</td>
<td>WELP Policy GE14</td>
<td>WELP Policy GE14</td>
</tr>
<tr>
<td>Water Environment</td>
<td>ELSP Policy ENV12</td>
<td>ELSP Policy ENV12</td>
</tr>
<tr>
<td>Water Environment</td>
<td>LSP Policy ENV55</td>
<td>LSP Policy ENV55</td>
</tr>
<tr>
<td>Water Environment</td>
<td>The risk of flooding should be assessed, taking into account the views of SEPA. Best management practices must be employed in order to minimise pollution and increasing the volume of surface waters to receiving water courses</td>
<td>RWELP Policy ED8</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>WELP Policy DQ5</td>
<td>Assessment Score:</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>RWELP Policy ED8; ED9</td>
<td>RWELP Policy ED8</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>The Council will seek the advice of the Health and Safety Executive for new developments within the Hazard Consultation Zones and the Civil Aviation Authority within the Airport</td>
<td>RWELP Policy ED8</td>
</tr>
<tr>
<td>Topic</td>
<td>Summary of Key Policy Issues</td>
<td>Assessment</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Safety Zones. For Edinburgh Tram Line 2 relevant areas are at Gogar roundabout and Newbridge respectively.</td>
<td>Refer to the ‘General design and major developments’ topic in this table.</td>
</tr>
<tr>
<td>Noise</td>
<td>Policies for noise relating to transport proposals are embedded in environmental impact assessments and the principles of sustainable development.</td>
<td><strong>Assessment Score:</strong> Neutral</td>
</tr>
<tr>
<td>Air Quality</td>
<td>Policies for air quality relating to transport proposals are embedded in environmental impact assessments and the principles of sustainable development.</td>
<td>Refer to the ‘General design and major developments’ topic in this table.</td>
</tr>
</tbody>
</table>
| Contaminated Land | **LSP Policy ENV40**  
Structure Plan policy recommends the continued rehabilitation of derelict and contaminated land within Lothian.  
Local Plan policies for contaminated land relating to transport proposals are embedded in the process of environmental impact assessments. | **Assessment Score:** Neutral                                                 |

4.5 **SUMMARY**

Tram Line 2 is strongly consistent with national, regional and local policy aimed at improving public transport infrastructure. The Tram Line 2 proposal is a direct response to the Local Transport Strategy and the West Edinburgh Planning Framework strategic objective for the provision of a Light Rapid Transit measure for the city. Indeed, it follows a reserved transportation corridor for the majority of the route (CERT alignment proposals as contained in the WELP and RWELP). A further objective, to which the Line 2 can be shown to contribute, is the enhancement of interchange, as it interfaces with Edinburgh Airport and the heavy rail line at Edinburgh Park and Haymarket. The Tram Line 2 is consistent with the principles of sustainable development, in so far as it provides a transport system to developing economic areas and whilst relieving dependence on cars.

Compliance with environmental policy has been based on the conclusions of the assessments contained in the specialist environmental sections of the ES. Inconsistencies with policy objectives reflect the negative impacts associated with Tram Line 2. In particular, negative impacts are related to heritage, landscape and visual impacts, noise, flood defence and ecology. Inconsistencies with policy objectives need to be weighed against the positive benefits of the trams, and the support gained from policies aimed at promoting public transport.
5 Traffic and Transport

5.1 INTRODUCTION

This section of the EIA is concerned with traffic, roads and safety, and mobility issues associated with Tram Line 2. The assessment specifically covers:

- Severance and delay for drivers.
- Severance and delay for pedestrians and others (including cyclists and equestrians).
- Amenity for pedestrians and others.
- Accidents and safety.

Traffic and transport impacts principally result at those locations where Tram Line 2 crosses or otherwise impacts on a road, cycle track, footpath or other route used by pedestrians, equestrians or vehicular traffic. All such locations would be on or close to the tram route. Additionally the tram may result in changes in traffic flow on routes away from tram alignment as people change their travel habits or a result of additional traffic during construction.

Users of roads, cycle tracks, footpaths or other routes may be affected by the noise and visual impact of the tram and its associated infrastructure. In addition the tram may result in changes in vehicular traffic flow on off-line roads that would affect other road users, principally pedestrians and cyclists, through increased noise, emissions to the atmosphere and visual impact. Both of these impacts are dealt with in the sections covering Noise Impacts, Impacts on Atmospheric Quality and Landscape and Visual Impacts.

5.2 METHODS

5.2.1 Information Sources

Current and forecast traffic levels and accident data have been taken from traffic modelling and traffic impact assessment studies. Two site visits have been made to the route covering its full length where access can be obtained from land open to the public.

In describing the existing situation for the route as a whole, local authority proposals and policies, as stated in the development plan and the Local Transport Strategy have been taken into account. Baseline traffic flows have been taken from traffic model output. These forecasts include traffic growth, where necessary, and make provision for planned and programmed schemes and developments which might have a material impact on baseline flows. No detailed appraisal of traffic accidents was considered practicable and this issue has been dealt with on a commentary basis.

5.2.2 Consultations

Consultations are summarised in Section 3.5 and Appendix 3 in Volume 4 of the ES.

5.2.3 Assessment Methods

General

The Institute of Environmental Management and Assessment (IEMA) has produced Guidelines for the Environmental Assessment of Road Traffic - Guidance Notes No 1 (IEMA GN1), which have been developed for assessing the environmental impacts of road traffic from new developments. Although the guidelines are not
designed for light rail or tram developments, the guiding principles have been taken on board in undertaking this assessment. At a basic level the guidelines indicate that it should be assumed that changes in traffic of less than 10% create no discernable environmental impact. It furthermore suggests that outside any specially sensitive areas this can be increased to 30%. Note however that specially sensitive areas include all residential areas, all streets where there is a significant pedestrian presence and conservation areas. Much of the Tram Line 2 route through Edinburgh passes through areas which are specially sensitive.

The assessment also takes into account the guidance set out in Design Manual for Roads and Bridges Volume 11 – Environmental Assessment (DMRB Volume 11) within which Section 3, Part 8 deals with Pedestrians, Cyclists, Equestrians and Community Effects and provides a methodology for assessing such effects. However neither of these documents provides a complete methodology for dealing with the environmental effects of traffic, and on traffic, that would result from installation of Tram Line 2.

The assessment of impacts is based on a combination of:

- On-site observations.
- An assessment of modelled forecast traffic flows both of the “null situation” and “with scheme”.
- A broad assessment of road network capacity.
- Experience in other cities and with other systems.

It is assumed that wherever possible the potential operational impacts of Tram Line 2 on existing traffic along the route will be minimised in the planning and design of the alignment and junctions.

**Scope of Assessment including Spatial and Temporal Scope**

The spatial scope of the assessment is:

- The route of the tram line itself and the area within the immediate vicinity that may be directly affected by the construction and operation of the tram line.
- All road links on which the annual average daily traffic is predicted to change by more than 30%, or in environmentally sensitive areas, for example, residential areas and the vicinity of schools and hospitals, to change by 10%.

The temporal scope of the assessment is:

- The period of construction prior to 2011.
- The opening year 2011.
- After 15 years of operation, i.e. 2026.

**Baseline Methods including Desk Studies and Field Surveys**

The baseline for the traffic and transport assessment has been based on:

- Examination of the mapping made available from the design team.
- Walkover survey.
Traffic predictions for 2011 and 2026 made by the transport modelling team.

**Assessment Methods including Significance Criteria**

Significance of effects has been based on a seven point scale as follows:

- Major Adverse Impact
- Moderate Adverse Impact
- Minor Adverse Impact
- No Significant Impact
- Minor Beneficial Impact
- Moderate Beneficial Impact
- Major Beneficial Impact

The diversity of traffic and transport impacts is such that it has not been regarded as practical to develop significance criteria that are specific to each category of impact, for example pedestrian diversion or pedestrian safety. A general rule of thumb for significance of on-route impacts has been developed as follows.

*Minor adverse impacts* are those that can be accepted in practice without undue concern on the part of the receptor. These would include, for example, an increased journey distance of less than 100 metres for a pedestrian or increased distance between a business and the nearest servicing bay of less than 25 metres.

*Moderate adverse impacts* are those that would result in substantial inconvenience on the part of the receptor. These would include, for example, an increased journey distance of between 100 and 300 metres for a pedestrian or increased distance between a business and the nearest servicing bay of between 25 metres and 50 metres.

*Major adverse impacts* are those that would result in substantial inconvenience on the part of the receptor and would undermine an activity to the point where it no longer takes place. These would include, for example, an increased journey distance of more than 300 metres for a pedestrian or increased distance between a business and the nearest servicing bay of more than 50 metres.

Benefits would be judged on a similar basis.

For off-route impacts, IEMA GN1 guidance (IEMA, 1993) proposes that 30%, 60% and 90% changes in traffic levels should be considered as ‘minor’, ‘moderate’ and ‘substantial’ (major) impacts respectively.

Note that in assessing the significance of impacts, account is also taken of:

- Who or what is affected.
- The probability of the effect occurring.
- Whether the effect has local, district, regional or national implications.
- The level and nature of impacts.
5.3 BASELINE SITUATION

5.3.1 General

Some of the baseline information for traffic and transport is best presented as tables while other information is more descriptive and best presented in text and specific to locations on the route. All tabled information is set out first followed by text description along the route from east to west. Where appropriate reference is made to the tables and to the photographs in the plates which are included in Appendix 5, Volume 4 of this ES.

No attempt is made here to summarise the overall traffic situation within the City of Edinburgh. The Interim Local Transport Strategy 2000 to 2003 prepared by the City of Edinburgh Council in 1999 summarises the situation in broad terms. There is clear concern about:

- The increasing level of traffic congestion, particularly outwith the centre and fuelled in part by dispersal of jobs to peripheral areas along the route of Tram Line 2.
- Deterioration in conditions for pedestrians and cyclists.
- The quality of public transport provision.
- The adverse effects of traffic on the occupiers and users of land uses fronting major roads.

This baseline situation focuses on describing existing conditions along the routes itself where the greatest impacts are likely to be felt.

5.3.2 Traffic Flows

Table 5.1 sets out existing known 2002 traffic flows for roads on the line of the route. Tables 5.2 and 5.3 set out predicted 2011 (year of opening of Edinburgh Tram Line 2) and 2026 (15 years after opening) traffic flows for roads on the line of the route.
Table 5.1 Existing (2002) Traffic Flows for Roads on the Line of Edinburgh Tram Line 2 in Passenger Car Units (PCUs)

<table>
<thead>
<tr>
<th>Link</th>
<th>AM Weekday Peak Hour Flow</th>
<th>PM Weekday Peak Hour Flow</th>
<th>24 hour Weekday Flow (based on factor of 10.608 from AM Peak Hour Flow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen St (W of Hanover St)</td>
<td>2016</td>
<td>1816</td>
<td>21386</td>
</tr>
<tr>
<td>Princes St at Scott Memorial</td>
<td>1195</td>
<td>979</td>
<td>12677</td>
</tr>
<tr>
<td>Princes St W of Frederick St</td>
<td>1264</td>
<td>1003</td>
<td>13409</td>
</tr>
<tr>
<td>Shandwick Place W of Princes St</td>
<td>979</td>
<td>939</td>
<td>10385</td>
</tr>
<tr>
<td>South Gyle Broadway east of Gogar Junction</td>
<td>3389</td>
<td>3448</td>
<td>35951</td>
</tr>
<tr>
<td>A8 Glasgow Road at Royal Highland Showground</td>
<td>4685</td>
<td>4958</td>
<td>49698</td>
</tr>
</tbody>
</table>
Table 5.2 Predicted 2011 Traffic Flows for On-Line Roads in PCUs

<table>
<thead>
<tr>
<th>Link</th>
<th>AM Weekday Peak Hour Flow</th>
<th>PM Weekday Peak Hour Flow</th>
<th>Typical Inter Weekday Hourly Flow</th>
<th>24 hour Weekday Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen St (W of St Andrew St)</td>
<td>2474</td>
<td>2433</td>
<td>2224</td>
<td>26244</td>
</tr>
<tr>
<td>Princes St at Scott Memorial</td>
<td>961</td>
<td>1335</td>
<td>1132</td>
<td>10194</td>
</tr>
<tr>
<td>Princes St W of Frederick St</td>
<td>619</td>
<td>1045</td>
<td>945</td>
<td>6566</td>
</tr>
<tr>
<td>Shandwick Place W of Princes St</td>
<td>1083</td>
<td>1227</td>
<td>931</td>
<td>11488</td>
</tr>
<tr>
<td>Balgreen Road at rail overbridge</td>
<td>1961</td>
<td>2200</td>
<td>1224</td>
<td>20802</td>
</tr>
<tr>
<td>South Gyle Broadway east of Gogar Junction</td>
<td>2996</td>
<td>4574</td>
<td>2989</td>
<td>31782</td>
</tr>
<tr>
<td>Eastfield Road (Edinburgh Airport access road)</td>
<td>3851</td>
<td>3990</td>
<td>3308</td>
<td>40851</td>
</tr>
<tr>
<td>A8 Glasgow Road at Royal Highland Showground</td>
<td>5476</td>
<td>6213</td>
<td>3458</td>
<td>58089</td>
</tr>
<tr>
<td>Harvest Road, Ratho Station</td>
<td>413</td>
<td>398</td>
<td>NA</td>
<td>4381</td>
</tr>
<tr>
<td>Clifton Hall Road, Newbridge/ Old Liston Road, Newbridge</td>
<td>1077</td>
<td>962</td>
<td>463</td>
<td>11425</td>
</tr>
<tr>
<td>Link</td>
<td>AM Weekday Peak Hour Flow</td>
<td>PM Weekday Peak Hour Flow</td>
<td>Typical Inter Peak Weekday Hourly Flow</td>
<td>24 hour Weekday Flow</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------</td>
<td>---------------------------</td>
<td>----------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Queen St (W of Hanover St)</td>
<td>2906</td>
<td>2851</td>
<td>2155</td>
<td>30827</td>
</tr>
<tr>
<td>Princes St at Scott Memorial</td>
<td>1358</td>
<td>1357</td>
<td>795</td>
<td>14406</td>
</tr>
<tr>
<td>Princes St W of Frederick St</td>
<td>952</td>
<td>1092</td>
<td>648</td>
<td>10099</td>
</tr>
<tr>
<td>Shandwick Place W of Princes St</td>
<td>1208</td>
<td>1388</td>
<td>522</td>
<td>12814</td>
</tr>
<tr>
<td>Balgreen Road at rail overbridge</td>
<td>2204</td>
<td>2426</td>
<td>1328</td>
<td>23380</td>
</tr>
<tr>
<td>South Gyle Broadway east of Gogar Junction</td>
<td>3734</td>
<td>6204</td>
<td>3784</td>
<td>39610</td>
</tr>
<tr>
<td>Eastfield Road (Edinburgh Airport access road)</td>
<td>4850</td>
<td>5106</td>
<td>4145</td>
<td>51449</td>
</tr>
<tr>
<td>A8 Glasgow Road at Royal Highland Showground</td>
<td>5781</td>
<td>8179</td>
<td>4538</td>
<td>61325</td>
</tr>
<tr>
<td>Harvest Road, Ratho Station</td>
<td>888</td>
<td>966</td>
<td>130</td>
<td>9420</td>
</tr>
<tr>
<td>Clifton Hall Road, Newbridge/ Old Liston Road, Newbridge</td>
<td>1737</td>
<td>1578</td>
<td>577</td>
<td>18426</td>
</tr>
</tbody>
</table>

The very high traffic flows on the major roads on the western edge of the city are notable. In the city centre, Queen Street is heavily trafficked: Princes Street less so. The importance of Balgreen Road as a north-south route is evident.

**New Town: St Andrew Square**

Princes Street is heavily trafficked being a main east-west route through the city centre. Princes Street carries all traffic in a westbound direction but is restricted to buses and taxis in an eastbound direction during the day. Out of hours servicing traffic is permitted in this direction. Queen Street is a second east-west route along the northern edge of the city centre. St David Street, St Andrew Street and St Andrew Square serve a local role in part because there is no through route for traffic to Dublin Street to the north.

Edinburgh Tram Line 2 starts with a single track loop clockwise around S St David Street, St Andrew Square, N St David Street, Queen Street, N St Andrew Street, St Andrew Square, S St Andrew Street and Princes Street. Key features are:
All are wide streets (typical carriageway widths of 15-20 metres) with some on-street parking (both right angle and parallel and on-street loading (Plate 5.1).

There are parking restrictions on the junctions (Plate 5.1).

St David St is one-way northbound while St Andrew St is one-way southbound. They are not arterial links but important local roads between Princes St, George St and Queen St and carry a number of bus routes.

St Andrew Square is one-way clockwise.

All of the streets north of Princes Street have wide footways (typically 5 metres) with ample capacity for the pedestrian flows using them (Plate 5.2). However pedestrian activity increases towards Princes St (Plate 5.3).

Princes Street carries more pedestrians on its north side which has a continuous shopping frontage.

There is a strong pedestrian flow across Princes Street at this point between the shopping frontage on the north side and Waverley Bridge, Princes Mall and Waverley Station.

There is a rear service lane (Meuse Lane) serving Princes Street and St Andrew Square but it is understood that the larger stores prefer to service out of hours direct from Princes Street.

There is a rear service lane (North St Andrew Lane) serving some properties on Queen St and St Andrew Square.

There is some rear servicing on St Andrew Street and St David Street.

This area is part of Edinburgh New Town Conservation Area and is regarded as sensitive from an environmental viewpoint.

The width of the streets in this area creates a perceived risk for pedestrians crossing the road. With relatively high volumes of vehicular traffic, particularly on Queen Street, and pedestrians, the exposure of this area to accidents would be high.

**New Town: Princes Street**

Princes Street currently carries all traffic in a westbound direction but is restricted to buses and taxis in an eastbound direction during the day. Out of hours servicing traffic is permitted in this direction.

Edinburgh Tram Line 2 would operate two-way along the centre of Princes Street sharing road space with buses. Princes Street would be limited to buses only under current Central Edinburgh Transport proposals. The number of lanes for other traffic would reduce to one in each direction. Edinburgh Tram Line 2 would operate two-way through the junction of South Charlotte Street and Lothian Road along the centre of Princes Street. The number of lanes for other traffic would generally reduce to one in each direction except between South Charlotte Street and Lothian Road where there are two lanes in each direction to accommodate turning movements. Key features are:

- Princes Street is a wide streets (typical carriageway width 18 metres) with no on-street parking or loading (Plate 5.4) and carrying traffic in both directions.
• Princes Street is heavily trafficked being a main east-west route through the city centre. There are significant junctions with The Mound, Frederick Street, South Charlotte Street and Lothian Road.

• There is no on-street servicing during the day but properties on the north side of the street are served by a rear access lane (Plate 5.5). Out of hours servicing takes place particularly for the larger stores.

• Most of the bus services that pass through the City Centre use Princes Street at some point on their route. Many of these buses also stop on Princes Street.

• Castle Street and Hanover Street north of Princes Street are closed to vehicles at Princes Street. These streets are used for servicing of properties in the area.

• Princes Street carries more pedestrians on its north side, which has a continuous shopping frontage. Footway width is typically 6 metres on the north side of Princes Street and 4 metres on the south side. There are alternative parallel pedestrian routes through West Princes Street Gardens to the south and Rose Street to the north. The latter which is pedestrianised.

• There is a strong pedestrian flow across Princes Street at The Mound between the shopping frontage on the north side and the Mound, which leads to the old Town, and the Royal Scottish Academy, Scottish National Gallery and West Princes Street Gardens.

• There is a strong pedestrian flow across Princes Street between the Newtown and Lothian Road, one of the main office concentrations in the city centre;

• It appears that most of the properties around the junctions can be serviced without using Princes Street.

This area is part of Edinburgh New Town Conservation Area and is regarded as sensitive from an environmental viewpoint.

With high volumes of vehicular traffic and pedestrians the exposure of this area to accidents would be relatively high. It is understood that there have been a number of pedestrian accidents, including fatalities, on Princes Street over recent years. The Council imposed a 20mph limit to try to address this but it is understood that accidents involving pedestrians are still relatively common.

**New Town: West End (junction of Lothian Road and Shandwick Place) - Haymarket**

On Shandwick Place and West Maitland Street the route would be conventional on-street running along the centre of the road with accessible tram line. At Haymarket Station the line passes through a relatively complex junction between West Maitland Street, Grosvenor Street, Haymarket Terrace, Dairy Street and Morrison Street before joining Haymarket Terrace. On Haymarket Terrace the centre line of the road is followed before moving off-street to the south of, and parallel to, Haymarket Terrace where a stop is proposed.

Key features are:

• The properties on the both sides of Shandwick Place between Queensferry Street and Canning Street depend on servicing from Shandwick Place (Plate 5.6).
There are bus lanes on both sides of Shandwick Place and West Maitland Street between Queensferry Street and Canning Street depend on servicing from Shandwick Place (Plate 5.7). Shandwick Place and West Maitland Street carry large numbers of buses to and from the west of the city centre.

There is a moderate pedestrian flow on Shandwick Place which reduces to the west on West Maitland Street. Footway width is typically 3-4 metres on the north side of Shandwick Place and 2-3 metres on the south side.

There is a significant pedestrian presence at the junction of West Maitland Street, Grosvenor Road, Haymarket Terrace, Dairy Road and Morrison Street; in part this appears to be passengers disembarking at Haymarket Station (Plate 5.8).

The number of parked cycles at Haymarket Station suggests significant cycle/rail interchange (Plate 5.9).

The formal pedestrian crossing facilities on Haymarket Terrace are limited to the major junction with Dairy Place and a Pelican crossing west of Devon Place. A significant number of pedestrians cross Haymarket Terrace at informal crossing points between these.

The level of traffic conflict in this area suggests a relatively high exposure to accidents particularly in the vicinity of the Haymarket Railway Station where pedestrian activity is observed to be high.

**Haymarket - Roseburn**

The line cuts through an area of modern office development to the north of the railway line served by Devon Place and runs parallel to the railway before swinging north to join the former rail line now used as a cycle track and footpath at Roseburn.

Key features are:

- Devon Place, a quiet cul-de-sac serving the office development (Plate 5.10).

- A through pedestrian and cycle route to Roseburn, a key access point to the Edinburgh cycle and path network.

- Balbirnie Place, a residential cul-de-sac lying to the north of the route with some off-street parking that may be associated with the office development to the east rather than the residential uses (Plate 5.11).

This area is likely to have low exposure to accidents.

**Roseburn – Murrayfield**

The line crosses Russell Road on an over bridge and runs on rail land to the north of the Haymarket railway depot. The only identifiable interaction with the street on this section is at Roseburn Street opposite Murrayfield Station. The tram, stop would provide access to Roseburn Street and a new pedestrian crossing facility is shown.

Key features are:

- On-street parking apparently associated with businesses in the area (Plate 5.12).
On match days at Murrayfield Stadium the streets in this area are generally full of pedestrians with very restricted vehicular access allowed.

On non-match days this street is quiet with low vehicular flows and few pedestrians.

This area is likely to have low exposure to accidents.

**Murrayfield - Carrick Knowe**

The line crosses Roseburn Street on an over bridge and runs on the rail embankment to the north of the Edinburgh to Glasgow main line. The footpaths at Water of Leith are crossed on over bridges. Balgreen Road is crossed a-grade.

Key features are:

- At Water of Leith two footpaths pass under the line (Plate 5.13).
- Balgreen Road is the only road crossing of the railway in this area.
- There is access to a cycleway and footpath west of Balgreen Road and north of the railway (Plate 5.14).
- The section along the south side of Carrick Knowe Golf Course does not affect any traffic routes.

This area is likely to have low exposure to accidents except where Balgreen Road crosses the main line railway between Edinburgh and Glasgow. There are restricted sight lines in this area and a number of pedestrian and cycle routes converge including Pansy Walk and a route towards Carrick Knowe Golf Course.

**Carrick Knowe - Bankhead Drive (new Railway st at Hermiston Gait)**

The line crosses the railway line on an over bridge and runs across an area of open land between the Edinburgh to Glasgow main line and Stenhouse Drive, Broomhouse Drive and Bankhead Drive. Saughton Road and Broomhouse Road are crossed on over bridges.

Key features are:

- The crossing of the footpath leading to the pedestrian bridge at Carrick Knowe (Plate 5.15).
- The area through which the tram passes is open to access by pedestrians who may use it to access land uses along the railway, for example the allotment gardens. Such uses are confined to the area along Saughton Mains Street to the north of Stenhouse Drive (Plate 5.16).

This area is likely to have low exposure to accidents.

**Edinburgh Park - Gogar Roundabout**

The line crosses the railway line on an over bridge and runs across an area of open land currently under development as an extension of Edinburgh Park. It continues through the existing office development at Edinburgh Park.

Key features are:

- A number of crossings of pedestrian routes within the landscaped area along Loch Ross within the Edinburgh Park office development area (Plate 5.17).
• An at-grade crossing of Lochside Avenue, a local road serving some of the offices on the west side of Edinburgh Park.

• The tram crosses an open area of land to the south west of South Gyle Broadway used to access the Gyle shopping centre by pedestrians.

• The tram line crosses the north eastern corner of The Gyle shopping centre severing some car parking from the shops, notably the Safeway store that anchors the north end of the centre. This area is well used by supermarket shoppers with trolleys (Plate 5.19).

• The tram line crosses the goods vehicle access into the Safeway supermarket service area (Plate 5.20).

• The tram line crosses a pedestrian/cycle access between The Gyle and Glasgow Road.

• The tram line will pass under the A8 Glasgow Road, a major radial road from the city.

Internally The Gyle shopping centre is likely to have low exposure to accidents. There is some concern in regard to the informal crossing of South Gyle Broadway by pedestrians going between the north end of the Edinburgh Park development and The Gyle. This road is very busy throughout the day and observed traffic speeds are relatively high.

**Gogar Roundabout – Airport terminal**

This section runs parallel to the A8 Glasgow Road before veering north across open farmland to the Ingliston Park and Ride Stop and eventually Edinburgh Airport Terminal.

Key features are:

• Crossings of relatively little used pedestrian routes to the north of Gogar Roundabout.

• Crossings of two relatively little used farm access roads to the north of the A8 Glasgow Road (Plate 5.21).

• The crossing of the access road and pedestrian route adjoining the Hilton Hotel and serving ancillary airport land uses along Gogar Bridge Road (Plate 5.22).

• The access roads to the taxi pick up point and bus stop area at the airport (Plate 5.23).

• The terminus within the Edinburgh Airport bus terminal area (Plate 5.24).

The roads in the immediate vicinity of the tram alignment are likely to have low exposure to accidents.

**Ingliston Park and Ride to Newbridge**

The Newbridge Branch leaves the Airport Branch immediately to the west of the Ingliston Park and Ride Stop and terminates at Newbridge.

Key features are:

• The crossing of Eastfield Road, the main access road leading from the A8 Glasgow Road to Edinburgh Airport. This road is heavily trafficked.
The crossing of Ingliston Road, the main access road leading from the A8 Glasgow Road to the Royal Highland Showground and a secondary access to Edinburgh Airport. This road will be heavily trafficked when major events are taking place at the showground.

The use of the central reservation of the A8 Glasgow Road adjoining the Royal Highland Showground.

The crossing of a lightly used existing footpath and cycle route to the west of Ratho Station. This used by local residents and by people staying at the nearby hotel to access bus stops on Glasgow Road and facilities in Ratho Station.

On street running on Harvest Drive and the Newbridge Road Industrial Estate access road, both of which appear to be relatively lightly trafficked roads. There are few pedestrians present.

A crossing of the A89 Edinburgh Road to the west of its junction with the M8.

There are at-grade crossings of Eastfield Road leading to Edinburgh Airport and the A8 Glasgow Road. Both of these are heavily trafficked with a high exposure to accidents. It is understood that the A8 Glasgow Road has a relatively poor accident rate. There are a number of junctions with minor roads which may contribute to this.

**Proposed Changes**

The following changes are proposed to be constructed or put in place prior to the implementation of Edinburgh Tram Line 2:

- Restrictions on Princes Street that would have the effect of preventing all traffic except buses travelling in either direction.
- WEBS would provide a bus way along much of the route on the line of the tram. This would include construction of over bridges at Broomhouse Road and Saughton Road.

### 5.4 CONSTRUCTION EFFECTS

#### 5.4.1 Potential Impacts

**General**

The principal traffic and transport impacts during the construction of Edinburgh Tram Line 2 would be the following:

- Permanent or Temporary Landtake.
- Street Closures.
- Closure of Other Land or Routes.
- Construction Traffic.

In addition to the works on the tram line itself, a number of potential sites have been identified for construction compounds. These are listed Section 2.5. The principal concern with these compounds is access thereto. For all of the compounds to the west of Carrick Knowe (the area adjacent to the Royal Air Cadets Hall off Stenhouse Drive) good access can be made available and the likely level of traffic, at worst some 200 vehicles per day at each site, is not likely to make a significant difference to flows in the area. Further east towards the city centre,
there may be slightly greater concern. However the impact of street closures in this area is likely to be of much greater concern.

Street closures would be required both for the construction of the tram line itself and for any diversion of public utilities that may be necessary to enable the tram line to be constructed.

Public utilities buried in the street can be anticipated for all on-street sections of the route particularly within the city centre. These utilities would include water mains, gas mains, electricity supply mains, foul sewers, surface water drainage, cable television and telecommunications. Without detailed knowledge of the impact of the tram on these utilities it is not possible to indicate the extent of any disruption to traffic as a result of their diversion. The assumptions have therefore been made that:

- there are extensive buried services and utilities under all on-street sections of Tram Line 2; and
- the construction works associated with their diversion would disrupt all modes of traffic.

Temporary Landtake

The tram line would take land from existing uses on a temporary basis. The extent of landtake has not been precisely identified. Landtake from roads is dealt with separately with street closures.

Temporary Street Closures including Temporary Landtake from Roads

Where the tram line is constructed on-street, part or all of the streets affected would be closed for temporary periods during construction that may vary from a few hours to many months. The longer closures would typically be in the form of lane closures for periods of 3 to 6 months.

Temporary street closures would reduce the road space available for existing road users including pedestrians, cyclists, private cars, goods vehicles and public transport vehicles. This may reduce capacity for:

- Traffic of all types.
- Parked vehicles including vehicles servicing property.

Temporary street closure may also cause community severance by preventing certain movements or requiring traffic to divert around longer routes. Temporary street closures would be particularly significant where they affect the passing trade of a particular business.

Temporary street closures would be required for the on-street sections of route in the city centre. Outside the city centre the tram crosses a number of streets but there is little on street running except at the Newbridge end of the line.

Street closures may take the form of closure of one lane with signal controls to allow traffic to flow in each direction in turn. For roads that are operating well within their capacity

If construction activity is confined to the hours 0700 to 1900 to minimise disturbance to people lining nearby, this will reduce the scope for street closures to take place at night to reduce the impact on traffic.

Temporary Closure of Other Land or Routes

Where the tram line is constructed off-street, existing land uses may be temporarily severed preventing movement between adjoining land and footpaths and cycle
routes may be temporarily or permanently severed thus forcing pedestrians and cyclists to divert to other routes. Railway routes may also be affected where over bridges have to be built.

There are a number of places where the tram line crosses existing land uses, for example the Edinburgh Park employment area and The Gyle shopping centre, and pedestrian and cycle routes, for example the bridge over the Edinburgh to Glasgow main line railway north of Stenhouse Drive.

Construction Traffic

The construction of the tram line would result in movements of construction traffic as surplus material is taken away and construction materials including track, overhead wires and aggregates brought in. The scale of these movements would be significant only where there are large quantities of excavated material to be taken off-site and where incoming materials, such as bridge segments, are delivered as exceptionally wide or long loads. It is assumed that much of the construction traffic will be along the trace of Tram Line 1 rather than direct to the nearest public highway.

It has been suggested that the peak flows of light vehicles used by personnel engaged in construction will be at construction compound sites. It is not at present practicable to make a detailed prediction of the likely level of such movements but, at worst, they are likely to be of the order of 100 vehicles present on site at some time during the day making some 200 trips into or out of the site.

The only location where there is anticipated to be any major export of surplus material is at the tram depot site to the north of the Gogar Roundabout. Elsewhere it is assumed that export of surplus material would not significantly change traffic flows on major roads. However there may be issues where construction is close to residential or other sensitive development and access is via streets serving that development.

New Town: St Andrew Square

Construction of the single track loop clockwise around S St David Street, St Andrew Square, N St David Street, Queen Street, N St Andrew Street, St Andrew Square, S St Andrew Street and Princes Street is assumed to require closure of parts of these streets for periods of up to six months during construction:

The following potential impacts of temporary closure have been identified:

- Closure of one or more lanes on Queen Street would result in increased delays for all vehicles using this route. Queen Street runs parallel to Princes Street and operates to some extent as an alternative east west route. Delays may be exacerbated if there are similar lane closures occur on both streets at the same time.

- At the junctions between Queen Street and North St David Street and North St Andrew Street / Dublin Street, pedestrian crossing may be disrupted. This is likely to be a greater concern at North St Andrew Street / Dublin Street which provides a through pedestrian, but not vehicular route, to the north.

- Closure of one on more lanes on N and S St David Street, St Andrew Square and N and S St Andrew Street would disrupt vehicle parking on those streets and may reduce the facility with which pedestrians can cross. These streets link between Princes Street and Queen Street and carry some bus routes. Depending on the extent of lane closures there should be sufficient capacity to ensure that vehicular traffic congestion is at a low level. Lane closures could improve the situation for pedestrians by reducing the width of the carriageway and hence making crossing easier.
• Closure of one or more lanes on Princes Street would result in increased delays for all vehicles using this route. As the main east-west route through the city centre this is potentially disruptive. Queen Street runs parallel to Princes Street and operates to some extent as an alternative east west route. Delays may be exacerbated if there are similar lane closures occur on both streets at the same time. Out of hours servicing of the properties, mainly shops, on the north side of the street may be disrupted.

• At the junctions between Queen Street and Waverley Bridge, North St David Street and North St Andrew Street / Dublin Street, pedestrian crossing may be disrupted. Queen Street is a busy shopping street and, with Waverley Street Station and Princes Mall on the south side of Princes Street, there is a high flow of pedestrians crossing. Disruption of this flow needs to be minimised during construction.

These impacts are considered to be adverse and of minor to moderate significance.

New Town: Princes Street

Edinburgh Tram Line 2 would operate two-way along the centre of Princes Street. The number of lanes for other traffic would reduce to one in each direction. Edinburgh Tram Line 2 would operate two-way through the junction of South Charlotte Street and Lothian Road along the centre of Princes Street. The number of lanes for other traffic would generally reduce to one in each direction except between South Charlotte Street and Lothian Road where there are two lanes in each direction to accommodate turning movements.

The following potential impacts of temporary closure have been identified:

• Closure of one or more lanes on Princes Street would result in increased delays for all vehicles using this route. As a main east-west route through the city centre this is potentially disruptive. Queen Street runs parallel to Princes Street and operates to some extent as an alternative east west route. Delays may be exacerbated if there are similar lane closures occur on both streets at the same time. Out of hours servicing of the properties, mainly shops, on the north side of the street may be disrupted.

• At the junctions between Queen Street and The Mound, Frederick Street, South Charlotte Street and Lothian Road, pedestrian crossing may be disrupted. Queen Street is a busy shopping street and, with Princes Gardens, The Mound and the art galleries (Scottish Royal Academy and the National Gallery of Scotland on the south side of Princes Street, there is a high flow of pedestrians crossing. Disruption of this flow needs to be minimised during construction.

These impacts are considered to be adverse and of minor to moderate significance.

New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket

On Shandwick Place and West Maitland Street the route would be conventional on-street running along the centre of the road with accessible tram line. At Haymarket Station the line passes through a relatively complex junction between West Maitland Street, Grosvenor Street, Haymarket Terrace, Dairy Street and Morrison Street before joining Haymarket Terrace. On Haymarket Terrace the centre line of the road is followed before moving off-street to the south of, and parallel to, Haymarket Terrace where a stop is proposed.
The following potential impacts of temporary closure have been identified:

- Closure of one or more lanes on Shandwick Place and West Maitland Street would result in increased delays for all vehicles using this route. As a main east-west route through the city centre this is potentially very disruptive.

- Pedestrian crossing along Shandwick Place and West Maitland Street may be disrupted if long sections of the street are closed at the same time.

- On street servicing of the retail and commercial premises at the west end of Shandwick Place may be disrupted during construction.

- Pedestrian crossing of the streets outside Haymarket Station may be disrupted by closures.

These impacts are considered to be adverse and of minor significance.

**Haymarket - Roseburn**

The line cuts through an area of modern office development to the north of the railway line served by Devon Place and runs parallel to the railway before swinging north to join the former rail line now used as a cycle track and footpath at Roseburn.

The following potential impacts of temporary closure have been identified:

- The tram line crosses the footway on the south side of Haymarket Terrace and temporary closure would be needed. This is potentially disruptive given the need to maintain pedestrian access along the south side of Haymarket Place and to the office developments at Haymarket Yards. Although this footway does not carry a heavy pedestrian flow on a normal weekday it is heavily used on match days at Murrayfield Stadium, as it is the most direct route from Haymarket Station to the stadium.

- The tram line crosses Haymarket Yards and temporary closure would be needed. This is potentially disruptive given the need to maintain access to the office developments at Haymarket Yards.

- Servicing of the office developments at Haymarket Yards may be disrupted during construction.

- The pedestrian and cycle route through the office developments at Haymarket Yards continues on to the residential development at Balbirnie Place and connects to the Edinburgh cycle and path network leading to the north from Russell Road. Unless an alternative route can be provided, this would cause inconvenience to users wanting to gain access to the network and to Russell Road.

These impacts are considered to be adverse and of minor to moderate significance.

**Roseburn – Murrayfield**

The line crosses Russell Road on an over bridge and runs on rail land to the north of the Haymarket railway depot. Roseburn Street and the vehicular accesses to Murrayfield Stadium and the Rail Depot are crossed on an over bridge. The only identifiable interaction with the street on this section is at Roseburn Street opposite Murrayfield Station. The Murrayfield tram stop would provide access to Roseburn Street and a new pedestrian crossing facility is shown.

The following potential impacts of temporary closure have been identified:
Russell Road provides access to the Edinburgh cycle and path network leading to the north and may be closed for a period during construction of the Russell Road overbridges and the connecting chord to Edinburgh Tram Line 1. Unless an alternative route can be provided, this would cause inconvenience to users wanting to gain access to the network from Russell Road.

The construction of the bridge over Roseburn Street and the rail depot access may require the partial closure of Roseburn Street. This may particularly affect the footway on the south side of the street and the vehicular accesses to Murrayfield Stadium and the Rail Depot. There may also be an effective loss of on-street parking during construction which would impact on businesses in the area.

These impacts are considered to be adverse and of minor to moderate significance.

**Murrayfield - Carrick Knowe**

The line runs on the rail embankment to the north of the Edinburgh to Glasgow main line. The footpaths at Water of Leith and Balgreen Road are crossed on over bridges.

The following potential impacts of temporary closure have been identified:

- The construction of the bridges over Water of Leith and the adjoining footpaths may require the temporary closure of the footpaths. This would result in inconvenience to pedestrians. On match days at Murrayfield Stadium these routes are heavily used.

- The construction of the at-grade crossing of Balgreen Road and the adjoining Balgreen Road tram stop and railway access may require the partial closure of Balgreen Road. This is one of the few routes across the railway in this area and may be very disruptive to the local community and all road users.

These impacts are considered to be adverse and of minor to moderate significance.

**Carrick Knowe - Bankhead Drive (New Railway Station at Hermiston Gait)**

The line crosses the railway line on an over bridge and runs across an area of open land between the Edinburgh to Glasgow main line and Stenhouse Drive, Broomhouse Drive and Bankhead Drive. Saughton Road and Broomhouse Road are crossed on over bridges. It is understood that the new structures crossing Saughton Road and Broomhouse Road would be built by WEBS and would be in place prior to the start of construction of the tram line.

The following potential impacts of temporary closure have been identified:

- Construction of the bridge over the railway may require temporary closure of the line or of one or more of the individual tracks. This may result in delays to rail users, both passenger and freight.

- The construction of the bridge over the railway at Carrick Knowe Avenue may require the closure of the adjoining bridge carrying the footpath and cycle track. This would result in severe inconvenience to pedestrians and cyclists. Pedestrians from the residential area north of the railway use this route to access the bus stops on Stenhouse Drive.

- The construction of the tram line through the open area between Stenhouse Drive and Saughton Mains Street may prevent access across
this area for a temporary period. This may slightly affect access to the land uses along Saughton Mains Street.

- On completion of the new railway station at Hermiston Gait, it is assumed that there would be a pedestrian access from the station to Bankhead Drive. This would be closed temporarily to allow construction of the tram line and tram stop.

These impacts are considered to be adverse and of minor to moderate significance.

**Edinburgh Park - Gogar Roundabout**

The line crosses the railway line on an over bridge and runs across an area of open land currently under development as an extension of Edinburgh Park. It continues through the existing office development at Edinburgh Park.

The following potential impacts of temporary closure have been identified:

- Construction of the bridge over the railway may require temporary closure of the line or of one or more of the individual tracks. This may result in delays to rail users, both passenger and freight.

- The pedestrian routes within the landscaped area along Loch Ross within the Edinburgh Park office development may be temporarily closed to allow construction of the tram line.

- Lochside Avenue, a local road serving some of the offices on the west side of Edinburgh Park may be temporarily closed to allow construction of the tram line inconveniencing those requiring access, principally vehicular, to the offices.

- The open area of land to the south west of South Gyle Broadway used to access the Gyle shopping centre by pedestrians from Edinburgh Park may be closed for a temporary period inconveniencing pedestrians.

- The tram line crosses the north eastern corner of The Gyle shopping centre severing some car parking from the shops, notably the Safeway store that anchors the north end of the centre. Temporary closure would be required inconveniencing all users of the car park.

- The tram line crosses the goods vehicle access into the Safeway supermarket service area. Temporary closure may be required with inconvenience to vehicles delivering to the supermarket.

- The tram line crosses a pedestrian/cycle access between The Gyle and Glasgow Road. Temporary closure may be required with inconvenience to pedestrians and cyclists.

- The tram line would pass under Glasgow Road, a major radial road from the city. Temporary closure may be required with inconvenience to all road users. This is a heavily trafficked road.

These impacts are considered to be adverse and of minor to moderate significance.

**Gogar Roundabout – Airport Terminal**

This section runs parallel to the A8 Glasgow Road before veering north across open farmland to the Ingliston Park and Ride Stop and eventually Edinburgh Airport Terminal. There is on-street running on Burnside Road, a road currently used by taxis to approach the terminal building.

The following potential impacts of temporary closure have been identified:
Temporary closure or diversion at the crossings of two relatively little used farm access roads to the north of the A8 Glasgow Road. This may inconvenience users slightly but it would be essential to maintain an alternative access route at all times for all property.

Temporary closure or diversion at the crossing of the access road and pedestrian route adjoining the Hilton Hotel and serving ancillary airport land uses along Gogar Bridge Road. This may inconvenience users slightly but it would be essential to maintain an alternative access route at all times for all property.

Temporary closure or diversion of the access roads to the taxi pick-up point and bus stop area at the airport. This may inconvenience users slightly but it would be essential to maintain an alternative access route at all times for all property.

These temporary impacts are considered to be adverse and of minor significance.

The construction of the depot at Gogar Roundabout is estimated to generate 90,000 cubic metres of surplus inert spoil that would need to be taken off-site. On the assumption that:

- the density of the material is 2 tonnes per cubic metre;
- movement is by four axle rigid tipper lorries carrying 20 tonnes per outward trip;
- the spoil removal is over 45 working days;

This would require 9,000 return trips or 200 return trips per working day. As direct access is available to high standards roads these impacts are considered to be not significant to adverse and of minor significance.

**Ingliston Park and Ride to Newbridge**

This section crosses the Eastfield Road access to Edinburgh Airport Terminal and open farmland to Ingliston Road. West of Ingliston Road it runs in the central reservation of the A8 Glasgow Road before veering south across open farmland to Ratho Station. The remainder of the route is mainly on existing roads through Newbridge.

The following potential impacts of temporary closure during construction have been identified:

Temporary closure or diversion at the crossing of Eastfield Road. This would inconvenience users, mainly of motor vehicles including buses and taxis, going to and from the Airport. It would be essential to maintain an alternative access route at all times to the Airport.

Temporary closure or diversion at the crossing of Ingliston Road. This would inconvenience users, mainly of motor vehicles, going to and from the Showground. It would be essential to maintain an alternative access route at all times to the Showground.

Temporary closure or diversion at the crossings of the A8 Glasgow Road and where the line runs in the central reservation of the A8 Glasgow Road. This would inconvenience users, mainly of motor vehicles. It would be essential to maintain at least one lane of traffic in each direction at all times. The A8 at this point is very busy and is understood to have a poor accident record. If lane closures on the A8 are required for healthy and
safety reasons during construction of the central reservation section heavy traffic congestion can be expected particularly in the peak hours.

- Closure of the footpath crossing the railway at Ratho Station. This would add some 100 metres to length of trips and, because it would involve the use of Harvest Road, would be less pleasant for users.

- Temporary closure or diversion would be required on Harvest Drive and the Newbridge Road Industrial Estate access road. This would inconvenience users, mainly of motor vehicles. It would be essential to maintain access to property at all times.

These temporary impacts are considered to be adverse and of minor significance.

5.4.2 Mitigation

General

Generic mitigation would be applied along the whole of the route during construction. This mitigation is summarised by impact type below. Where specific mitigation is required this is described separately for each section.

Temporary Landtake

At this stage temporary landtake has not been defined in detail. Where it appears that landtake is required mitigation is described on a section-by-section basis.

Temporary Street Closures including Temporary Landtake from Roads

Where temporary street closures are required these would be mitigated by:

- Minimising the duration of the closure.

- Avoiding severance by either providing routes for pedestrians and cyclists across closed sections of street at regular intervals or by limiting closures to short sections of street.

- Diverting vehicular traffic away from the construction areas particularly within the city centre.

Specifically, the closure of long sections of street (exceeding 50 metres) for periods exceeding one week would be avoided particularly at junctions where there is substantial crossing by pedestrians and cyclists. The need to maintain access by emergency vehicles and to avoid disruption of bus services and taxi operations will be taken into account.

Temporary Closure of Other Land or Routes

Severance of existing land uses would be avoided by providing sufficient routes between the areas affected, for example ensuring that the service access to the Safeway supermarket at The Gyle remains operational at all times and providing sufficient routes across the landscaped area at Edinburgh Park to ensure that pedestrian movement around the development is not unduly disrupted.

Where existing cycle tracks and footpaths are affected by temporary closures, alternative routes would be maintained as close as practicable to the original alignment. Cycle diversions of 200 metres and pedestrian diversions of 50 metres are regarded as the upper limit of acceptability.
Construction Traffic

An EMS (see Chapter 3) would be adopted, and would consider:

- The delivery of materials and the removal of surplus material at peak periods for vehicular and pedestrian traffic to avoid disruption of other road users;
- The delivery of special loads, such as bridge sections at night, to avoid disruption of other road users;
- The need for sheeting of loads and wheel and body cleaning where there is a risk if construction traffic carrying or dispersing fugitive material, principally mud and dust, onto the public road;
- The routing of traffic to and from the construction areas;
- The need for adequate vehicle parking in the vicinity of construction compounds to avoid on-street parking, particularly in residential areas.

New Town: St Andrew Square

Street closures in this area would be designed and programmed to minimise the loss of overall road capacity, for example by avoiding the closure of two parallel streets simultaneously. Street closure would be designed and programmed to ensure that any existing out of hours servicing of property can be continued throughout construction.

At the junctions between Queen Street and Waverley Bridge, North St David Street and North St Andrew Street / Dublin Street, sufficient pedestrian crossing facilities must be maintained at all times.

New Town: Princes Street

Street closures on Princes Street would, as far as possible, be designed and programmed to avoid disrupting pedestrian movement across the street particularly the junctions between Queen Street and The Mound, Frederick Street, South Charlotte Street and Lothian Road. Street closure would be designed and programmed to ensure that any existing out of hours servicing of property can be continued throughout construction.

New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket

At the west end of Shandwick Place street closure would be designed and programmed to ensure that the existing servicing of property can be continued throughout construction.

Street closures on Shandwick Place, West Maitland Street and outside Haymarket Station would be designed and programmed to maintain pedestrian movement across those streets at frequent intervals.

Haymarket - Roseburn

The construction of this section would be designed and programmed to ensure that:

- A pedestrian route along the south side of Haymarket Terrace would be maintained at all times.
- Servicing of the office developments served by Haymarket Yards would be maintained at all times with minimum disruption to users;
• The pedestrian and cycle route through to Roseburn would be maintained at all times.

**Roseburn – Murrayfield**

The construction of this section would be designed and programmed to ensure that:

• The pedestrian and cycle route connection between Russell Street and the Edinburgh cycle and path network leading to the north would be maintained at all times;

• A pedestrian route along the south side of Roseburn Street would be maintained at all times;

• Servicing of the rail depot and Murrayfield Stadium would be maintained at all times with minimum disruption to users.

**Murrayfield - Carrick Knowe**

The construction of this section would be designed and programmed to ensure that:

• Closure of the footpaths adjoining Water of Leith is minimised and does not take place on match days.

• Closure of Balgreen Road is minimised and does not take place on match days or when either of the Water of Leith footpaths are also closed.

The landtake to the north of the railway from the cycle track and footpath would not take place until the alternative route is in place and open.

**Carrick Knowe- Bankhead Drive**

The construction of this section would be designed and programmed to ensure that:

• There would be no closure of the footpath and cycle route crossing the railway south of Carrick Knowe Avenue unless an alternative route is provided that does not involve a significant diversion, i.e. not exceeding 25 metres;

• A pedestrian route is maintained across the open area of land between the allotments and Stenhouse Drive;

• A pedestrian route is maintained across the open area of land between the new Hermiston Gait Station and Bankhouse Drive.

**Edinburgh Park - Gogar Roundabout**

The construction of this section would be designed and programmed to ensure that:

• There would be no disruption of the operation of the main line railway;

• Pedestrian routes are maintained in the landscaped area along Loch Ross within the Edinburgh Park office development;

• A vehicular access is maintained to the offices served by Lochside Avenue;

• A temporary pedestrian route is provided between The Gyle shopping centre and Edinburgh Park;

• Access for shoppers with trolleys is maintained between between the car parking at the west corner of The Gyle shopping centre and the shopping centre proper;
Vehicular access is maintained to the car parking at the west corner of The Gyle shopping centre;

Vehicular access is maintained to the goods vehicle access into the Safeway supermarket service area;

Pedestrian/cycle access between The Gyle and Glasgow Road;

Closure of the A8 Glasgow Road to allow construction of the underpass is limited to evenings and weekends.

**Gogar Roundabout – Airport Terminal**

The construction of this section would be designed and programmed to ensure that:

- Alternative routes are in place prior to any temporary closure at the crossings of the two farm access roads to the north of the A8 Glasgow Road.

- An alternative vehicular access is maintained to serve the airport related activities on Gogar Bridge Road.

- Access is maintained to the taxi pick up point and bus stop area at the airport.

The construction of the depot at Gogar Roundabout is estimated to generate 90,000 cubic metres of surplus inert spoil that would need to be taken off-site. The following measures will be required within the EMS:

- A safe access is provided onto the road.

- Appropriate measures are taken to avoid mud or other detritus being tracked onto the road by vehicle wheels, for example wheel cleaning.

- Appropriate measures are taken to avoid dust being blown from loads, for example load sheeting.

**Ingliston Park and Ride to Newbridge**

The construction of this section would be designed and programmed to ensure that:

- Alternative routes are in place prior to any temporary closure at the crossings of the Edinburgh Airport access road (Eastfield Road), Ingliston Road and the A8 Glasgow Road.

- As far as possible, the footpaths at Ratho Station are maintained at all times or alternatives are made available prior to any closure.

- Alternative routes are in place prior to any temporary closure of roads in Newbridge and access is maintained to all property in Newbridge.

**5.4.3 Residual impacts**

Residual traffic and transport impacts during construction are summarised in Table 5.4.
## Table 5.4 Residual Traffic and Transport Impacts during Construction

<table>
<thead>
<tr>
<th>Impact</th>
<th>Location</th>
<th>Level and Nature of Impact</th>
<th>Receptors</th>
<th>Mitigation required</th>
<th>Probability</th>
<th>Residual Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temporary Street Closures including Landtake from Roads</strong></td>
<td>New Town: St Andrew Square</td>
<td>Local: increased difficulty of crossing during construction</td>
<td>Existing pedestrians, and cyclists</td>
<td>Yes: minimise obstruction of street crossing by construction activity.</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: St Andrew Square</td>
<td>Local: increased congestion</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: avoid closure of Princes Street and Queen Street at same time; divert traffic to other routes.</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: St Andrew Square</td>
<td>Local: difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: St Andrew Square</td>
<td>Local: loss of on-street parking</td>
<td>Existing motor vehicle users</td>
<td>No</td>
<td>Likely</td>
<td>Minor Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: Princes Street</td>
<td>Local: increased difficulty of crossing during construction</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: minimise obstruction of street crossing by construction activity</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: Princes Street</td>
<td>Local: increased congestion</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: divert traffic to other routes.</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: Princes Street</td>
<td>Local: difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket</td>
<td>Local: increased difficulty of crossing during construction</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: minimise obstruction of street crossing by construction activity</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
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</tr>
<tr>
<td>New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket</td>
<td>Local: increased congestion</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: divert traffic to other routes.</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket</td>
<td>Local: difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: disruption of footway</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: minimise obstruction of footway by construction activity</td>
<td>Likely</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: disruption of access to land uses</td>
<td>Existing users of Haymarket Yards</td>
<td>Yes: minimise closure of Haymarket Yards and maintain access</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Russell Road</td>
<td>Local: closure of Russell Road</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: minimise length of closure and programme to avoid disruption (match days)</td>
<td>Likely</td>
<td>Not Significant to Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn Street</td>
<td>Local: closure of footway</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: minimise obstruction of footway by construction activity</td>
<td>Likely</td>
<td>Not Significant to Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn Street</td>
<td>Local: loss of on-street parking</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>No</td>
<td>Likely</td>
<td>Not Significant to Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Murrayfield-Carrick Knowe: Balgreen Road</td>
<td>Local: closure of Balgreen Road</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: minimise length of closure and programme to avoid disruption (match days)</td>
<td>Likely</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
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</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: Lochside Road</td>
<td>Local: disruption of movement into office area</td>
<td>Existing occupiers and users of office area west of Loch Ross</td>
<td>Yes: minimise closure and maintain access at all times</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: South Gyle Broadway</td>
<td>Local: disruption of movement along and across South Gyle Broadway</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: minimise lane closures and provide temporary crossing facility</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Temporary Closure of Other Land or Routes</td>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing cyclist and pedestrian users of route from Haymarket to Roseburn</td>
<td>Yes: replace on alternative line</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn</td>
<td>Local and District: disruption of use of cycle track and footpath</td>
<td>Existing users of route to North Edinburgh</td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Likely</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn</td>
<td>Local: disruption of accesses to rail depot and stadium</td>
<td>Existing users of rail depot and the stadium</td>
<td>Yes: maintain alternative access</td>
<td>Likely</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Murrayfield – Carrick Knowe: NW of Balgreen Road</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing users of cycle track NW of Balgreen Road</td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Certain</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Carrick Knowe-Bankhead Drive: S of Carrick Knowe Avenue</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing users of cycle track and footpath</td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Certain</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Carrick Knowe-Bankhead Drive: Hermiston Gait Station</td>
<td>Local and District: disruption of use station access from Hermiston Gait</td>
<td>Potential users of station</td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Certain</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: Landscaped Area along Loch Ross</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrian and cyclist users</td>
<td>Yes: minimise closure and maintain routes during construction</td>
<td>Certain</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
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</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: The Gyle Shopping Centre</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrians, cyclists and vehicle users</td>
<td>Yes: minimise closure and maintain routes during construction</td>
<td>Certain</td>
<td>Minor to Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Gogar Roundabout – Airport Terminal: Airport Terminal</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrians, cyclists and vehicle users</td>
<td>Yes: minimise closure and maintain routes during construction</td>
<td>Certain</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Park and Ride to Newbridge</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrians, cyclists and vehicle users</td>
<td>Yes: minimise closure and maintain routes during construction</td>
<td>Certain</td>
<td>Minor – Moderate Adverse</td>
<td></td>
</tr>
<tr>
<td>Construction Traffic</td>
<td>General</td>
<td>Local</td>
<td>Existing users of the major road network</td>
<td>Yes; appropriate routing and management of construction traffic</td>
<td>Likely</td>
<td>Not significant</td>
</tr>
<tr>
<td>Gogar Roundabout – Airport Terminal</td>
<td>Regional</td>
<td>Existing users of the major road network</td>
<td>Yes; appropriate routing and management of surplus spoil traffic</td>
<td>Likely</td>
<td>Not significant</td>
<td></td>
</tr>
</tbody>
</table>
5.5 PERMANENT AND OPERATIONAL EFFECTS

5.5.1 Potential impacts

**General**

The principal permanent and operational traffic and transport impacts following the construction of Tram Line 2 would be the following:

- Permanent Landtake.
- Permanent Street Closures and Restrictions including Landtake from Roads.
- On-Line Impacts of the Tram in Operation.
- Off-Line Impacts of the Tram in Operation.

**Permanent Landtake:**

The tram line would take land from existing uses and routes on a permanent basis. The extent of landtake has not been precisely identified. Landtake from roads is dealt with separately with street closures.

Where the tram line is constructed off-street, existing land uses may be permanently severed, preventing movement between adjoining land, and footpaths and cycle routes may be permanently severed, thus forcing pedestrians and cyclists to divert to other routes. No railway routes would be affected by permanent closure.

There are a number of places where the tram line crosses existing land uses, for example the Edinburgh Park employment area and The Gyle shopping centre, and pedestrian and cycle routes, for example the bridge over the Edinburgh to Glasgow main line railway north of Broomhouse Drive.

**Permanent Street Closures and Restrictions including Permanent Landtake from Roads**

Where the tram line is constructed on-street, part or all of the streets affected may be closed for certain types of traffic. Where the tram operates on street it is understood that the whole of the route including tram stops would remain accessible on foot. However some areas would no longer be accessible to vehicles.

Street closures would reduce the road space available for existing road users including pedestrians, cyclists, private cars, goods vehicles and public transport vehicles. This may reduce capacity for:

- Traffic of all types.
- Parked vehicles including vehicles servicing property.

These impacts would mainly affect the on-street sections of route in the city centre. Outside the city centre the tram crosses a number of street but, except at the Newbridge end of the line, there is little on street running.

**On-Line Impacts of the Tram in Operation**

Along its alignment the operation of the tram may impact on traffic in the following ways:

- The operation of the tram on-street may directly affect other road users, for example because of the priority given to the tram at signalised junctions.
• The measures associated with the introduction of the tram, for example changes to footways that increase widths in places and reduce them elsewhere, may affect other road users.

Both of the above may affect other road users by increasing or reducing traffic congestion and by making a street easier or more difficult to cross. Where footway widths are increased or additional traffic islands provided there would be benefits for pedestrians in the form of easier street crossing. Where footway widths are reduced there would be adverse effects for pedestrians in the form of more difficult street crossing.

Travel to work by the tram workforce is assumed to be to the Gogar Depot. This is not considered likely to significantly impact on traffic in that area.

Off-Line Impacts of the Tram in Operation

It is anticipated that the additional public transport capacity provided by the tram line would generally reduce traffic travelling on routes that, typically, parallel the tram line. However, locally, the tram line may increase traffic particularly in the vicinity of park-and-ride stops where private vehicles can be parked by tram users.

The transport modelling provides the percentage change in traffic flow between the without tram situation and the with Edinburgh Tram Line 2 situation for 2011 (the year of opening of Edinburgh Tram Line 2). Similar changes have not been calculated for 2026 (15 years after opening) as such changes would be of a similar magnitude. These changes have been examined and the following general conclusions drawn:

• There are a large number of small reductions in traffic (less than 10%) across the city. At a local level these are considered to have no perceptible effect. However at a citywide level these represent a benefit.

• There are a small number of increases in traffic (generally less than 10% but ranging up to 30%) across the city. These are likely to arise as road capacity is freed off by the increased transport capacity provided by the tram. This enables continuing vehicle trips to adopt more convenient, and generally shorter, travel patterns. At a local level these are considered to have at worst minor adverse effects. However at a citywide level the adverse effects are considered not significant as the increases on some roads would be matched by reductions elsewhere.

• On a small number of roads there are larger reductions in traffic but these are often in one direction only and specific to the time of day.

Notable changes are summarised in Table 5.5 below.
Table 5.5 Predicted Changes in Traffic Flow between Without and With Edinburgh Tram Line 2 Situations in 2011

<table>
<thead>
<tr>
<th>Link</th>
<th>Change in AM Weekday Peak Hour Flow</th>
<th>Change in PM Weekday Peak Hour Flow</th>
<th>Change in Typical Inter Peak Weekday Hourly Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shandwick Place W of Princes St eastbound</td>
<td>-30%</td>
<td>-22%</td>
<td>-25%</td>
</tr>
<tr>
<td>Shandwick Place W of Princes St westbound</td>
<td>-1%</td>
<td>-4%</td>
<td>1%</td>
</tr>
<tr>
<td>A8 Haymarket Terrace eastbound</td>
<td>-53%</td>
<td>-47%</td>
<td>-53%</td>
</tr>
<tr>
<td>A8 Haymarket Terrace westbound</td>
<td>-41%</td>
<td>-46%</td>
<td>-30%</td>
</tr>
<tr>
<td>A70 Dalry Road eastbound</td>
<td>-1%</td>
<td>-7%</td>
<td>-10%</td>
</tr>
<tr>
<td>A70 Dalry Road westbound</td>
<td>+40%</td>
<td>+19%</td>
<td>3%</td>
</tr>
<tr>
<td>Balgreen Road at rail overbridge southbound</td>
<td>+8%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Balgreen Road at rail overbridge northbound</td>
<td>+2%</td>
<td>+10%</td>
<td>16%</td>
</tr>
<tr>
<td>South Gyle Access southbound</td>
<td>-36%</td>
<td>+3%</td>
<td>-2%</td>
</tr>
<tr>
<td>South Gyle Access northbound</td>
<td>+8%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>South Gyle Broadway east of Gogar Junction eastbound</td>
<td>+7%</td>
<td>-26%</td>
<td>+17%</td>
</tr>
<tr>
<td>South Gyle Broadway east of Gogar Junction westbound</td>
<td>-22%</td>
<td>8%</td>
<td>-3%</td>
</tr>
<tr>
<td>Eastfield Road (Edinburgh Airport access road) southbound</td>
<td>-2%</td>
<td>-1%</td>
<td>0%</td>
</tr>
<tr>
<td>Eastfield Road (Edinburgh Airport access road) northbound</td>
<td>+2%</td>
<td>-2%</td>
<td>+1%</td>
</tr>
<tr>
<td>A8 Glasgow Road at Royal Highland Showground eastbound</td>
<td>+4%</td>
<td>-6%</td>
<td>+9%</td>
</tr>
<tr>
<td>A8 Glasgow Road at Royal Highland Showground westbound</td>
<td>+7%</td>
<td>0%</td>
<td>+1%</td>
</tr>
</tbody>
</table>

The main discernable patterns in these specific changes are:

- Some large reductions in flows particularly close to the route of the tram (for example on South Gyle Broadway) and on the roads that parallel the tram route as it approaches the city centre (notably the A8 Haymarket Terrace).
- An apparent tendency for traffic on north-south routes to increase.
- On roads west of the main urban area (A8 Glasgow Road and Eastfield Road) percentage changes are less than 10%.

For Haymarket Terrace and West Coates the traffic flow changes are considered potentially a benefit of moderate significance with a reduction, for example, in the morning peak hour from a combined flow of from 1742 to 935 PCUs. The traffic flow changes on all other individual road links are considered to be not significant.
or of minor significance. In aggregate the flow changes are likely to provide regional benefits of moderate to major significance.

**New Town: St Andrew Square**

Line 2 terminates at the single-track loop clockwise around S St David Street, St Andrew Square, N St David Street, Queen Street, N St Andrew Street, St Andrew Square, S St Andrew Street and Princes Street:

The following potential operational impacts of the tram in operation have been identified:

- The permanent loss of a small number of car parking spaces on St David Street N and S and St Andrew St N and S with potential inconvenience to other road uses and occupiers of frontage property.

- Changes to footways that increase widths in places and reduce them elsewhere. The additional traffic island would be a minor benefit to pedestrians particularly on busier streets, for example Queen Street.

- The operation of the tram on-street would add to traffic but this is likely to be balanced by at least a corresponding reduction in other traffic may directly affect other road users.

In overall terms these impacts are considered to be benefits and of minor significance.

There is no permanent closure of streets in this area although at the tram stops on either side of St Andrew Square the platform areas would be limited to pedestrians. This is considered not significant.

**New Town: Princes Street**

Edinburgh Tram Line 2 would operate two-way along the centre of Princes Street. The number of lanes for other traffic would reduce to one in each direction.

Edinburgh Tram Line 2 would operate two-way through the junction of South Charlotte Street and Lothian Road along the centre of Princes Street. The number of lanes for other traffic would generally reduce to one in each direction except between South Charlotte Street and Lothian Road where there are two lanes in each direction to accommodate turning movements. There is some improvement to pedestrian crossing facilities between Lothian Road and South Charlotte Street.

The following potential operational impacts of the tram in operation have been identified:

- Changes to footways that generally increase widths in places and reduce them elsewhere. The additional space would be a moderate benefit to pedestrians on this busy street.

- The operation of the tram on-street would add to traffic but this is expected to be more than by a corresponding reduction in other traffic may directly affect other road users.

- There may be increased difficulty in servicing frontage property.

In overall terms these impacts are considered to be benefits and of moderate significance.

There is no permanent closure of streets in this area although at the tram stops west of The Mound would be limited to pedestrians. This is considered not significant.
Frederick Street is permanently closed at Princes Street. This would benefit pedestrians but there may be some adverse effects on bus passengers. Frederick Street is well used by bus services and these may be displaced with resulting inconvenience to passengers. This is considered not significant.

**New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket**

On Shandwick Place and West Maitland Street the route would be conventional on-street running along the centre of the road with accessible tram line. At Haymarket Station the line passes through a relatively complex junction between West Maitland Street, Grosvenor Street, Haymarket Terrace, Dairy Street and Morrison Street before joining Haymarket Terrace. On Haymarket Terrace the centre line of the road is followed before moving off-street to the south of, and parallel to, Haymarket Terrace where a stop is proposed. No pedestrian crossing facility is provided across West Maitland Street to the east of Grosvenor Street.

The following potential operational impacts of the tram in operation have been identified:

- Changes to footways that increase widths in places and reduce them elsewhere. The additional traffic island would be a minor benefit to pedestrians particularly on busier streets, for example Queen Street.

- The operation of the tram on-street would add to traffic but this is expected to be more than by a corresponding reduction in other traffic may directly affect other road users.

- There may be increased difficulty in servicing frontage property.

In overall terms these impacts are considered to be not significant.

There is no permanent closure of streets in this area although at the tram stop on Shandwick Place would be limited to pedestrians. This is considered not significant.

**Haymarket - Roseburn**

The line cuts through an area of modern office development to the north of the railway line served by Devon Place and runs parallel to the railway before swinging north to join the former rail line now used as a cycle track and footpath at Roseburn.

The following potential operational impacts have been identified:

- The tram line crosses the footway on the south side of Haymarket Terrace and no crossing point is indicated. This is potentially disruptive given the need to maintain pedestrian access along the south side of Haymarket Place and to the office developments at Haymarket Yards. Although this footway does not carry a heavy pedestrian flow on a normal weekday it is heavily used on match days at Murrayfield Stadium as it is the most direct route from Haymarket Station to the stadium.

- The tram line follows Haymarket Yards which is currently a quiet cul-de-sac. Existing vehicular, cycle and pedestrian user are potentially affected.

- The pedestrian and cycle route through the office developments at Haymarket Yards continues on to the residential development at Balbirnie Place and connects to the Edinburgh cycle and path network leading to the
north from Russell Road. Existing cycle and pedestrian user are potentially affected particularly if the tram line crosses the route at-grade.

These impacts are considered to be adverse and of minor significance.

There is permanent landtake on the south side of Haymarket Terrace at adjoining Haymarket Station. This is considered not significant for traffic and transport.

**Roseburn – Murrayfield**

The line crosses Russell Road on an over bridge and runs on rail land to the north of the Haymarket railway depot. Roseburn Street and the vehicular accesses to Murrayfield Stadium and the Rail Depot are crossed on an over bridge. The only identifiable interaction with the street on this section is at Roseburn Street opposite Murrayfield Station. The Murrayfield tram stop would provide access to Roseburn Street and a new pedestrian crossing facility is shown.

The following potential operational impacts have been identified:

- Russell Road provides access to the Edinburgh cycle and path network leading to the north. Any at-grade crossing of the tram line may cause inconvenience to users wanting to gain access to the network from Russell Road.

- The access into the rail depot would require an at-grade crossing of the tram line with some inconvenience to users.

These impacts are considered to be adverse and not significant to of minor significance.

There is permanent landtake to the north of the railway and rail depot. This landtake is considered not significant for traffic and transport.

There is permanent landtake from the access into Murrayfield Stadium. This landtake is considered not significant for traffic and transport.

**Murrayfield - Carrick Knowe**

The line runs on the rail embankment to the north of the Edinburgh to Glasgow main line. The footpaths at Water of Leith are crossed on over bridges. Balgreen Road is crossed at-grade.

The following potential operational impacts have been identified:

- Balgreen Road is a main route for traffic crossing the railway. This includes vehicular traffic, cyclists and pedestrians. There would be some risk to pedestrians as a result of the proximity of the at-grade crossing to the pedestrian underpass under the railway.

- The provision of a footway and cycleway between Balgreen Road and Carrick Knowe Avenue would benefit cyclists and pedestrians.

This impact is considered a benefit of minor to moderate significance.

There is permanent landtake to the north of the railway from the cycle track and footpath leading along the former rail embankment to the north west. While this cycle track and footpath appears to be relatively lightly used it is a useful local amenity. An alternative route is provided that provides a connection to the existing route and a new footway and cycleway running along the south side of Carrick Knowe Golf Course to Carrick Knowe Avenue.
This impact is considered not significant.

**Carrick Knowe - Bankhead Drive (New Railway Station at Hermiston Gait)**

The line crosses the railway line on an over bridge and runs across an area of open land between the Edinburgh to Glasgow main line and Stenhouse Drive, Broomhouse Drive and Bankhead Drive. Saughton Road and Broomhouse Road are crossed on over bridges. It is understood that the new structures crossing Saughton Road and Broomhouse Road would be built by WEBS and would be in place prior to the start of construction of the tram line.

The following potential operational impacts have been identified:

- The foot and cycle route from Stenhouse Road to Carrick Knowe Avenue is crossed at-grade. This would result in some inconvenience to pedestrians and cyclists.

- The construction of the tram line through the open area between Stenhouse Drive and Saughton Mains Street may prevent access across this area. This may slightly affect access to the land uses along Saughton Mains Street.

These impacts are considered to be adverse and of minor significance.

There is permanent landtake to the south of the railway from the area of open land generally between Saughton Mains Road and Stenhouse Road and to the north of Bankhead Road. This land is currently open to pedestrians and is used, for example, by people walking dogs, to access the allotments on foot and as a short cut to bus stops.

This impact is considered to be adverse and of minor significance.

**Edinburgh Park - Gogar Roundabout**

The line crosses the railway line on an over bridge and runs across an area of open land currently under development as an extension of Edinburgh Park. It continues through the existing office development at Edinburgh Park.

The following potential operational impacts have been identified:

- The pedestrian routes within the landscaped area along Loch Ross within the Edinburgh Park office development may be severed by the tram line or be crossed by the tram line at-grade. This would result in some inconvenience to pedestrians and cyclists.

- Lochside Avenue, a local road serving some of the offices on the west side of Edinburgh Park is crossed at-grade. This would inconvenience those requiring access, principally vehicular, to the offices.

- Pedestrian crossing facilities are provided at South Gyle Broadway giving access The Gyle shopping centre from Edinburgh Park. This is a benefit of minor significance.

- The tram line crosses the north eastern corner of The Gyle shopping centre severing some car parking from the shops, notably the Safeway store that anchors the north end of the centre. This would inconvenience all users of the car park.

- The tram line crosses the goods vehicle access into the Safeway supermarket service area. It is assumed that this is at-grade and would inconvenience vehicles delivering to the supermarket.
• The tram line crosses a pedestrian/cycle access between The Gyle and Glasgow Road. It is not clear if an alternative is provided or if at-grade crossings of the path would remain. Permanent closure would inconvenience pedestrians and cyclists. The crossing of the A8 Glasgow Road to the north is through an underpass.

In overall terms these impacts are considered to be adverse and of minor to moderate significance.

There is permanent landtake:

• To the north of the railway from the area of open land currently under development as a further phase of Edinburgh Park; this area is not open to the public and no traffic and transport impacts are expected.

• From the landscaped area along Loch Ross within the Edinburgh Park office development; this area is used by pedestrians and cyclists, for example, to access the offices and for recreation.

• From the open area of land to the south west of South Gyle Broadway within the Edinburgh Park office development; this area is used by pedestrians to access The Gyle shopping centre.

• From The Gyle shopping centre that would potentially adversely affect the operation of the goods vehicle access to the Safeway supermarket and access between the western corner of the car park and the shopping centre proper.

• From the landscaped fringe between The Gyle shopping centre and Glasgow Road that would potentially adversely affect the footpath and cycleway link to Glasgow Road with detriment to its use by pedestrians and cyclists.

These impacts are considered to be adverse and of minor to moderate significance.

Gogar Roundabout – Airport Terminal

This section runs parallel to the A8 Glasgow Road before veering north across open farmland to the Ingliston Park and Ride Stop and eventually Edinburgh Airport Terminal. The Park and Ride at Ingliston would inevitably attract additional vehicle trips although some of these would be trips that would otherwise proceed to the city centre or other locations along the route of the tram. There is on-street running on Burnside Road, a road currently used by taxis to approach the terminal building.

The following potential operational impacts have been identified:

• The at-grade crossings of two farm access roads to the north of the A8 Glasgow Road are relatively little used. There would be minor inconvenience to users through delays when trams are crossing.

• The access to Gogar Bridge Road would be crossed at-grade. This may inconvenience users slightly through delays when trams are crossing.

These operational impacts are considered to be adverse and of minor significance.

There is permanent landtake from:

• Relatively little used pedestrian routes to the north of Gogar Roundabout. This is not considered likely to have adverse impacts on pedestrians provided the alternative route along the edge of the carriageway is maintained.
The bus terminus and taxi area within Edinburgh Airport. The complete reconfiguration of the Airport Interchange is shown. In the absence of a design demonstrating that the interchange can be configured satisfactorily, it is assumed that these impacts would have impacts on users of the interchange.

These landtake impacts are considered to be adverse and of minor to moderate significance.

**Ingliston Park and Ride to Newbridge**

This section crosses the Eastfield Road access to Edinburgh Airport Terminal and open farmland to Ingliston Road. West of Ingliston Road it runs in the central reservation of the A8 Glasgow Road before veering south across open farmland to Ratho Station. The remainder of the route is mainly on or adjoining existing roads through Newbridge.

The following potential operational impacts have been identified:

- The at-grade crossing of Eastfield Road would involve some disruption of traffic to and from the Airport. This is a very busy road and could potentially affect the adjoining junction with the A8 Glasgow Road. There would be inconvenience to users through delays when trams are crossing.

- The at-grade crossing of Ingliston Road would involve some disruption of traffic to and from the Royal Highland Showground. This is a very busy road and could potentially affect the operation of the adjoining junction with the A8 Glasgow Road. There would be inconvenience to users through delays when trams are crossing.

- The at-grade crossing of the A8 Glasgow Road west of the Royal Highland Showground would involve some disruption of traffic. This is a very busy road and there would be inconvenience to users through delays when trams are crossing. There are safety issues in relation to the use of a signalised junction on a relatively high speed dual carriageway road.

- The footpath across the railway at Ratho Station is permanently diverted. This would involve some inconvenience to pedestrian and cyclist users.

- On-street operation on Harvest Road and through Newbridge would involve some disruption of traffic. However these roads are lightly trafficked and the disruption is likely to be limited.

These operational impacts are considered to be adverse and of minor to moderate significance.

There is permanent landtake from:

- The access drive to 4 Glasgow Road at the junction with Ingliston Road, which it is proposed to revise.

- The central reservation of the A8 Glasgow Road, which is likely to have minimal impacts on traffic on this road.

- Accesses into business premises within Newbridge Industrial Estate.

These landtake impacts are considered to be adverse and of not significant to minor significance.
5.5.2 Mitigation

**General**

Generic mitigation would be applied along the whole of the route during construction. This mitigation is summarised by impact type below. Where specific mitigation is required this is described separately for each section.

**Permanent Street Closures including Permanent Landtake from Roads**

Where permanent street closures are required these would be mitigated by providing routes for pedestrians and cyclists across closed sections of street at regular intervals.

Where permanent landtake from roads is required, for example for tram stops, this is generally unavoidable although it may be possible to move the landtake further down the street.

Where street closures reduce the road space available for existing vehicular road users this would typically continue in operation and no mitigation is considered practicable.

**Permanent Closure of Other Land or Routes**

Severance of existing land uses would be avoided by providing sufficient routes between the areas affected, for example ensuring that the service access to the Safeway supermarket at The Gyle remains operational at all times and providing sufficient routes across the landscaped area at Edinburgh Park to ensure that pedestrian movement around the development is not unduly disrupted.

Where existing cycle tracks and footpaths are closed, alternative routes would be maintained as close as practicable to the original alignment. Permanent cycle diversions of 50 metres and pedestrian diversions of 25 metres are regarded as the upper limit of acceptability.

**New Town: St Andrew Square**

At the junctions between Queen Street and Waverley Bridge, North St David Street and North St Andrew Street / Dublin Street, sufficient pedestrian crossing facilities must be provided. Adequate service arrangements would be provided for all frontage property.

**New Town: Princes Street**

On Princes Street the tram line would be designed to allow maximum pedestrian movement across the street particularly the junctions between Queen Street and The Mound, Frederick Street, South Charlotte Street and Lothian Road. Adequate service arrangements would be provided for all frontage property.

**New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket**

At the west end of Shandwick Place the tram line would be designed to ensure that the existing servicing of property can be maintained. Adequate service arrangements would be provided for all frontage property.

**Haymarket - Roseburn**

This section would be designed to ensure that:

- A pedestrian route along the south side of Haymarket Terrace would be maintained.
• There is adequate servicing of the office developments served by Haymarket Yards.
• The pedestrian and cycle route through to Roseburn remains convenient for users.

**Roseburn – Murrayfield**

The construction of this section would be designed and programmed to ensure that:

• The pedestrian and cycle route connection between Russell Street and the Edinburgh cycle and path network leading to the north remains convenient for users.
• A pedestrian route along the south side of Roseburn Street would be maintained.
• Adequate servicing of the rail depot and Murrayfield Stadium would be maintained.

**Murrayfield - Carrick Knowe**

The risk to pedestrians at the at-grade crossing of Line 2 at Balgreen Road can be reduced by appropriate signalisation of a pedestrian phase.

**Carrick Knowe- Bankhead Drive**

The construction of this section would be designed and programmed to ensure that:

• The at-grade tram crossing at the footpath and cycle route crossing the railway south of Carrick Knowe Avenue is of good standard and does not require a significant diversion, i.e. not exceeding 25 metres.
• A pedestrian route is maintained across the open area of land between the allotments and Stenhouse Drive.
• A pedestrian route is maintained across the open area of land between the new Hermiston Gait Station and Bankhouse Drive.

**Edinburgh Park - Gogar Roundabout**

This section would be designed to ensure that:

• Pedestrian routes are maintained in the landscaped area along Loch Ross within the Edinburgh Park office development.
• A vehicular access is maintained to the offices served by Lochside Avenue.
• Access for shoppers with trolleys is maintained between the car parking at the west corner of The Gyle shopping centre and the shopping centre proper.
• Vehicular access is maintained to the car parking at the west corner of The Gyle shopping centre.
• Vehicular access is maintained to the goods vehicle access into the Safeway supermarket service area.
• Pedestrian/cycle access between The Gyle and Glasgow Road is maintained.
**Gogar Roundabout – Airport Terminal**

This section would be designed to ensure that:

- Adequate crossings of the two farm access roads to the north of the A8 Glasgow Road.
- An alternative vehicular access is maintained to serve the airport related activities on Gogar Bridge Road.
- Access is maintained to the taxi pick up point and bus stop area at the airport.

There is permanent landtake from the terminus within the Edinburgh Airport bus terminal area. The complete reconfiguration of the Airport Interchange is shown. The reconfiguration of the bus terminal would take place immediately adjoining the tram stop. The taxi pick-up area would be relocated on adjoining land or at a location that is equally convenient for airport users.

**Ingliston Park and Ride to Newbridge**

This section would be designed to ensure that:

- The at-grade crossing of Eastfield Road does not delay traffic unduly or impact on the operation of the grade-separated junction with the A8.
- The at-grade crossing of Ingliston Road does not delay traffic unduly or impact on the operation of the access to 4 Glasgow Road.
- The at-grade crossing of the A8 Glasgow Road does not delay traffic unduly or pose an undue safety risk.
- The footpath across the railway at Ratho Station is retained and used to provide the access from the south to the Ratho Station stop.
- Provision is made for access into all business premises within Newbridge Industrial Estate.

5.5.3 **Residual impacts**

Residual traffic and transport impacts during construction are summarised in Table 5.6.
Table 5.6 Residual Traffic and Transport Impacts – Permanent and Operational

<table>
<thead>
<tr>
<th>Impact</th>
<th>Location</th>
<th>Level and Nature of Impact</th>
<th>Receptors</th>
<th>Mitigation required</th>
<th>Probability</th>
<th>Residual Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Landtake</td>
<td>Edinburgh Park - Gogar Roundabout: within The Gyle shopping centre</td>
<td>Local: disruption of movement within car park and to service area</td>
<td>Existing occupiers and users of The Gyle shopping centre</td>
<td>Yes: provide crossing points but questionable suitability for trolleys</td>
<td>Certain</td>
<td>Minor to Moderate Adverse</td>
</tr>
<tr>
<td></td>
<td>Gogar Roundabout – Airport Terminal: Airport bus terminal</td>
<td>Local: disruption of use of bus and taxi facilities</td>
<td>Existing users of bus and taxi facilities</td>
<td>Yes: provide equally or more convenient alternative facilities</td>
<td>Certain</td>
<td>Minor Benefit</td>
</tr>
<tr>
<td>Permanent Street Changes including Landtake from Roads</td>
<td>New Town: St Andrew Square</td>
<td>Local: increased or reduced difficulty of crossing</td>
<td>Existing pedestrians, and cyclists</td>
<td>Yes: pedestrian and cycle crossing facilities</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td></td>
<td>New Town: St Andrew Square</td>
<td>Local: increased difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td></td>
<td>New Town: St Andrew Square</td>
<td>Local: loss of on-street parking</td>
<td>Existing motor vehicle users</td>
<td>No</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td></td>
<td>New Town: Princes Street</td>
<td>Local: reduced difficulty of crossing in operation</td>
<td>Existing pedestrians, cyclists</td>
<td>Not applicable</td>
<td>Likely</td>
<td>Moderate Benefit</td>
</tr>
<tr>
<td></td>
<td>New Town: Princes Street</td>
<td>Local: difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td></td>
<td>New Town: West End (Junction of Lothian Road and Shandwick Place) - Haymarket</td>
<td>Local: difficulty in servicing</td>
<td>Existing motor vehicle users and frontage occupiers</td>
<td>Yes: provide alternative servicing</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td></td>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: at-grade crossing of footway and cycleway</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: good standard crossing</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
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</tr>
<tr>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: disruption of access to land uses</td>
<td>Existing users of Haymarket Yards</td>
<td>Yes: provide adequate access</td>
<td>Certain</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn Delta Junction</td>
<td>Local: at-grade crossing of footway and cycleway</td>
<td>Existing pedestrians, cyclists</td>
<td>Yes: good standard crossing</td>
<td>Likely</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn Street</td>
<td>Local: loss of on-street parking</td>
<td>Existing motor vehicle users</td>
<td>No</td>
<td>Likely</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Murrayfield – Carrick Knowe</td>
<td>Risk to pedestrians at at-grade crossing of Balgreen Road</td>
<td>Pedestrians on Balgreen Road</td>
<td>Yes: Pedestrian signals</td>
<td>Certain</td>
<td>Not Significant</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: Lochside Road</td>
<td>Local: disruption of movement into office area</td>
<td>Existing occupiers and users of office area west of Loch Ross</td>
<td>Yes: good standard crossing</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: South Gyle Broadway</td>
<td>Local: disruption of movement along and across South Gyle Broadway</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: good standard crossing</td>
<td>Certain</td>
<td>Minor Benefit</td>
<td></td>
</tr>
<tr>
<td>Ingliston Park and Ride to Newbridge</td>
<td>Local: disruption of movement along Eastfield Road</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: good standard crossing and consideration of impact on A8 Glasgow Road junction</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Ingliston Park and Ride to Newbridge</td>
<td>Local: disruption of movement along Ingliston Road</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: good standard crossing and measures to avoid queueing back to the A8 Glasgow Road junction</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Ingliston Park and Ride to Newbridge</td>
<td>Local: disruption of movement along Glasgow Road</td>
<td>Existing road users including pedestrians, cyclists and motor vehicle users</td>
<td>Yes: good standard crossing and consideration of safety risk of crossing of A8 Glasgow Road</td>
<td>Certain</td>
<td>Minor Adverse</td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
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<tr>
<td>Permanent Closure or Opening Up of Other Land or Routes</td>
<td>Haymarket - Roseburn (Junction with Line 1)</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing cyclist and pedestrian users of route from Haymarket to Roseburn</td>
<td>Yes: replace on alternative line</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn</td>
<td>Local and District: disruption of use of cycle track and footpath</td>
<td>Existing users of route to North Edinburgh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn</td>
<td>Local: disruption of accesses to rail depot and stadium</td>
<td>Existing users of rail depot and the stadium</td>
<td></td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Likely</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Roseburn – Murrayfield: Roseburn</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing users of rail depot and the stadium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murrayfield – Carrick Knowe: NW of Balgreen Road</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing users of cycle track NW of Balgreen Road</td>
<td></td>
<td>Yes: maintain access on alternative line throughout construction</td>
<td>Certain</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Carrick Knowe-Bankhead Drive: S of Carrick Knowe Avenue</td>
<td>Local: disruption of use of cycle track and footpath</td>
<td>Existing users of cycle track and footpath</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrick Knowe-Bankhead Drive: Hermiston Gait Station</td>
<td>Local and District: disruption of use of cycle track and footpath</td>
<td>Potential users of station</td>
<td></td>
<td>Yes: maintain access</td>
<td>Certain</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: Landscaed Area along Loch Ross</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrian and cyclist users</td>
<td></td>
<td>Yes: minimise closure and maintain routes during construction</td>
<td>Certain</td>
<td>Minor Adverse</td>
</tr>
<tr>
<td>Edinburgh Park - Gogar Roundabout: The Gyle Shopping Centre</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrians cyclists and vehicle users</td>
<td></td>
<td>Yes: partial mitigation possible by provision of crossing points</td>
<td>Certain</td>
<td>Minor Adverse</td>
</tr>
<tr>
<td>Gogar Roundabout – Airport Terminal: Airport Terminal</td>
<td>Local: disruption of movement through area</td>
<td>Existing pedestrians cyclists and vehicle users</td>
<td></td>
<td>Yes: design of Airport Terminal Bus, Tram and Taxi Facilities</td>
<td>Certain</td>
<td>Minor Benefit</td>
</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>----------------------------------------------------------</td>
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</tr>
<tr>
<td>Impact</td>
<td>Location</td>
<td>Level and Nature of Impact</td>
<td>Receptors</td>
<td>Mitigation required</td>
<td>Probability</td>
<td>Residual Significance</td>
</tr>
<tr>
<td>Off-Line Impacts of the Tram in Operation</td>
<td>City Wide</td>
<td>District and Regional; reduction of vehicular traffic</td>
<td>All transport users</td>
<td>Not Applicable</td>
<td>Likely</td>
<td>Moderate-Major Benefit</td>
</tr>
</tbody>
</table>

### Summary

During construction no potential effects have been identified that are regarded as greater than adverse and of minor to moderate significance. While there may be inconvenience to existing road users and users of footways and cycle ways during construction any such effects will generally be of short duration. Locally the effects might be very disruptive particularly where mitigation measures are not adequately provided. The most significant of these effects is likely to be during the construction of:

- The on-street sections of route in the city centre and along the central reservation of the A8 Glasgow Road to the west of the city.
- The section through The Gyle shopping centre.
- The section approaching the Airport Terminal including Jubilee Road and Burnside Road.
- The sections that cross heavily trafficked roads including Balgreen Road, South Gyle Broadway, the A8 Glasgow Road (both at The Gyle and west of the Royal Highland Showground) and Eastfield Road.

These effects are considered adverse and of minor to moderate significance.

The following permanent and operational effects are considered of overall significance:

- At a citywide level the Edinburgh Tram Line 2 can be expected to bring significant benefits in the form of a small reduction in overall traffic flows on roads. There are few locations, including South Gyle Broadway and Haymarket Terrace, where these are likely to be significant at a local level – Regional Benefit of Moderate to Major Significance and Local Benefit of Minor Significance.
There are likely to be benefits within the city-centre for pedestrians and cyclists although it is difficult to be precise about these given other traffic measures, for example traffic management, that are also proposed – Local Benefit of Moderate Significance.

There are some adverse effects remaining along the route even after mitigation. The most significant of these is the severance of the western part of The Gyle shopping centre car park from the shopping centre proper and the operation of at-grade crossings on the A8 at the Royal Highland Showground and on Eastfield Road leading to the Airport - Local Adverse Effects of Minor to Moderate Significance.

Improved linkages between residential, employment, commercial and retail areas along the route including improved accessibility to The Gyle and Edinburgh Park by public transport - Local Benefit of Minor to Moderate Significance.

There are some other benefits along the route including a direct pedestrian and cycle route between Edinburgh Park and The Gyle across South Gyle Broadway and the potential for an enhanced terminal for public transport and taxis at the airport - Local Benefit of Minor Significance.
6 Land Use

6.1 INTRODUCTION

This section identifies land use resources within a corridor 200m either side of the Tram Line 2 corridor, including agricultural land use and land ownership information. Temporary (construction) and permanent impacts have been predicted (and where possible quantified) including building demolition, land take, loss of open space and agricultural land. The assessment covers both existing land uses and where information is available, future land uses. Future land uses are identified with reference to major development proposals. This section should be read with reference to Figures 6.1 to 6.10 which provide plans of the main land uses adjacent to the Tram Line 2 corridor.

There are key relationships between this Chapter and other environmental topics assessed in this ES. For example:

- Planning policy including land allocations set out in development plans are reviewed in Chapter 4.
- Impacts on footpaths and cycle ways, have been covered in Chapter 5 (Traffic and Transport).
- Socio economic impacts resulting from Tram Line 2 and the implications for future land use is reviewed in Chapter 12.

6.2 METHODS

The following sections detail the methods employed in the compilation of information used to assess the impacts on land use from the Tram Line 2 scheme. It includes consultations and information sources. The methods, as detailed below, were used to develop the baseline land use situation along the Tram Line 2 route in order to determine and assess the effects of the scheme.

6.2.1 Field Survey

The baseline situation at the time of the assessment has been assumed to prevail at the commencement of construction, except where foreseeable change can be predicted. A general field survey of major land uses relevant to the route corridor has been undertaken. The field survey was limited to a corridor of 200 metres either side of the proposed Edinburgh Tram Line 2 alignment. The field survey describes key existing land uses, highlighting in particular the more sensitive uses and activities such as educational establishments and residential properties close to the route, plus other important activity nodes such as shopping and retail centres and other large scale employment sites.

The Table 6.1 below describes the land use categories used for the baseline assessment and the categorisation of activity types. This categorisation was used during the field survey and forms the basis of land use description along the Tram Line 2 alignment. The land use description should be read in conjunction with Figures 6.1 to 6.10, which visually depict and categorise the land use types from St Andrew Square to the Edinburgh Airport and onto Newbridge.
### Table 6.1 Land Use Descriptions

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Description of land use category (Refer to Figures 6.1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Includes all types of residential properties and their land boundaries. Areas have been classed in this category where the sole purpose is for housing. Includes bungalows, semi-detached, detached, terraced, multi-storey flats and apartments.</td>
</tr>
<tr>
<td>Commercial</td>
<td>This is a broad category encompassing retail, office and business use areas. As noted during the field survey, this category includes, but is not limited to, the following:</td>
</tr>
<tr>
<td></td>
<td>- Shops</td>
</tr>
<tr>
<td></td>
<td>- Public Houses</td>
</tr>
<tr>
<td></td>
<td>- Hotels and associated facilities and grounds</td>
</tr>
<tr>
<td></td>
<td>- Petrol Stations</td>
</tr>
<tr>
<td></td>
<td>- Dog kennels and cattery</td>
</tr>
<tr>
<td></td>
<td>- Wholesale outlets (example Batleys Pet Food store at Ratho Station)</td>
</tr>
<tr>
<td></td>
<td>- Car showrooms and rental vehicle outlets</td>
</tr>
<tr>
<td></td>
<td>- Where Bed and Breakfasts have been readily identifiable, these have been included in this category</td>
</tr>
<tr>
<td></td>
<td>- Banks</td>
</tr>
<tr>
<td></td>
<td>- Government Buildings (including police stations)</td>
</tr>
<tr>
<td></td>
<td>- Food stores and local ‘take away’ shops</td>
</tr>
<tr>
<td>Mixed Use</td>
<td>This category includes those buildings which have a combined use for residential and commercial purposes. For example, this was prevalent along Dalry Road (mix of residential and retail) and the New Town area (mix of residential with offices).</td>
</tr>
<tr>
<td>Industrial</td>
<td>This category broadly noted those areas that were of an industrial nature along Tram Line 2 alignment. As noted during the field survey, this category includes, but is not limited to, the following:</td>
</tr>
<tr>
<td></td>
<td>- Electricity sub stations and compounds</td>
</tr>
<tr>
<td></td>
<td>- Council storage depots</td>
</tr>
<tr>
<td></td>
<td>- Garages</td>
</tr>
<tr>
<td></td>
<td>- Telephone exchanges (example one was noted along Rose Street)</td>
</tr>
<tr>
<td></td>
<td>- Postal sorting offices</td>
</tr>
<tr>
<td></td>
<td>- Waste transfer stations</td>
</tr>
<tr>
<td></td>
<td>- Quarry areas (for example the Tarmac facility at Ratho Station)</td>
</tr>
<tr>
<td></td>
<td>- Refuse tips and associated grounds and facilities</td>
</tr>
<tr>
<td></td>
<td>- Laboratories</td>
</tr>
<tr>
<td>Transport</td>
<td>All areas associated with transport have been included in this category. As noted during the field survey, this category includes, but is not limited to, the following:</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>- Existing railway alignments</td>
</tr>
<tr>
<td></td>
<td>- Engine sheds (for example at Haymarket depot)</td>
</tr>
<tr>
<td></td>
<td>- Existing and under construction railway stations (example Haymarket and Edinburgh Park stations respectively)</td>
</tr>
<tr>
<td></td>
<td>- Infrastructure associated with rail stations, including car parks and station houses</td>
</tr>
<tr>
<td></td>
<td>- Major roads (example the Western Approach Road)</td>
</tr>
<tr>
<td></td>
<td>- Edinburgh (Turnhouse) Airport and associated facilities.</td>
</tr>
</tbody>
</table>
### Land Use Description of land use category (Refer to Figures 6.1-10)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Description</th>
</tr>
</thead>
</table>
| Recreational and Amenity  | Facilities used for recreational purposes and local amenity areas, for outdoor relaxation and enjoyment, have been classed into the category. Note, that this may therefore include those areas which are already designated as significant open space, as defined in the City of Edinburgh Councils’ local plans. As noted during the field survey, this category includes, but is not limited to, the following:  
  - Golf courses and associated club houses  
  - Private garden allotments  
  - Playing fields  
  - Cycle ways  
  - Murrayfield Rugby Stadium  
  - Bowling greens and pavilions  
  - Sports club houses  
  - Local parkland  
  - Designated gardens, including Queen Street and Princes Street Gardens |
| Unoccupied Land           | This category is for those areas that were noted as being unoccupied during the site visit. Please note that this category does NOT indicate that these areas of land are vacant. Indeed, many of the areas are known to be ‘earmarked’ for development. This category may also include areas already designated as significant open space, as defined in the City of Edinburgh Councils’ local plans. For simplification, if land was noted during the field survey as having no readily identifiable and classifiable purpose, it has been classed as ‘unoccupied’ for the purpose of land use classification. |
| Community Use             | Includes buildings and land areas that are used for educational or community purposes, whereby (in most instances) the buildings are open to the general public. As noted during the field survey, this category includes, but is not limited to, the following:  
  - Museums and Art Galleries  
  - Schools (primary, nursery and secondary) and their grounds  
  - Community Halls  
  - Community playgrounds  
  - Churches/ church halls, and graveyards |
| Agriculture               | Arable land that is predominately used, on a year-round basis, for the growing of crops. |
| Watercourses              | Water courses, namely Gogar Burn and the Water of Leith, have been indicated. The banks of the watercourses have also been included in this category. |
| Royal Highland Showground | For ease of identification, the area used for the Royal Highland Showground has been separately categorised. |

Whilst every effort has been made to accurately identify and categorise land use along the tram alignment, there may be discrepancies for some land use areas. For instance, in areas of mixed land use, shops may be included in residential
areas and some commercial premises may have been classed as industrial (particularly if located in a predominately residential or industrial area respectively).

6.2.2 Planning Applications and Developments

Current planning permissions (i.e. those planning permissions granted after October 1998, indicating that those planning permissions would still be valid within a 5 year period) were collected and collated by Dundas and Wilson CS. This information is included in Appendix 6 and has been used in the assessment of impacts on future land use. For clarity, the assessment excluded the following:

- Minor developments (e.g. loft conversions).
- Proposals or planning permissions beyond 200m of the proposed route (except proposals / permissions of significant scale identified in the course of baseline data collection).

In addition to major development proposals, land use allocations identified in CEC development plans were identified.

6.2.3 Describing and Quantifying Land Take

The parliamentary Bill submission includes Parliamentary Plans and Book of Reference. These documents identify all affected parties and define the extent of land which is to be acquired or used for the construction and operation of the Tram Line 2. This work has been undertaken by Land Aspects Ltd. Final route plans identify the centreline of the Works, Limits of Deviation (LODs) and Limits of Land to be Acquired or Used (LLAUs).

At the time of assessment and ES report preparation, areas of land take had not been quantified. The assessment has been limited to a qualitative assessment of land use impacts on those areas of land contained within the LOD and LLAU.

6.2.4 Agriculture

Agricultural land, identified within 200 metres of the proposed tram alignment, has been identified. Land ownership or tenancy details were obtained with the objective of determining who actually farmed and managed the land potentially affected. Individual farmers, who were considered to be impacted by the proposed tram line running across agricultural fields, were contacted. Details of Tram Line 2 scheme were provided and discussions held, with the intention of determining, from an individual farming perspective, the expected impacts resulting from the Edinburgh Tram Line 2. This facilitated the development of specific mitigation measures to alleviate land use impacts relating to farming and agriculture.

6.3 BASELINE SITUATION

This section describes separately the baseline scenario for:

- Land use.
- Major development proposals that may result in significant land use changes.
- The agricultural use of land.

6.3.1 Summary of Land uses

The land use types are varied throughout the entire alignment of the Edinburgh Tram Line 2. For clarification, the alignment has been divided into the sections below. Land uses are shown on Figures 6.1 to 6.10.
City Centre (St Andrew Square to Haymarket)

The dominant land use for this stretch of the tramline is a mix of commercial properties (consisting primarily of shopping areas, occasional hotels, and restaurants), offices and residential. Residential properties are mainly found between Shandwick Place and Haymarket. Overall, this area is an important retail and commercial/business centre for Edinburgh that is also a major tourist attraction.

Haymarket to Russell Road

The route between Haymarket and Russell Road is a mix of transport infrastructure (Haymarket Station and railway land) with commercial and residential properties. Office areas are located just to the south of Haymarket Terrace. Residential properties lie close to route at Balbirnie Place and along Dalry Road. The route would run within land associated with the railway which is in part unoccupied/derelict.

Russell Road to Carrick Knowe

The land use along this stretch of the alignment is highly varied. There are industrial areas off Russell Street, Roseburn Street and Westfield Road. Recreational areas include the Murrayfield Rugby grounds, stadium and clubhouse, the Carrick Knowe Golf Course and allotments. The tram also runs within 200 metres of Bowling Greens located at Roseburn Street, Russell Road and Balgreen Road. The alignment crosses the Water of Leith to the west of the Murrayfield playing fields. There are a number of schools in this area, with a Primary School off Roseburn Street and Balgreen Primary School, both within 800 metres of the proposed alignment. There are many residential properties within this section of the route including at Roseburn Maltings and Baird Drive. Residential property backyard boundaries along Baird Drive are within 10m of the tram alignment. There is little commercial development in this area, with a small business (Speedy Clearances) and Jenners Depository, both located off Balgreen Road.

Carrick Knowe to Bankhead Drive (Edinburgh Park Station)

For this section of the alignment the tram would follow a corridor of land previously reserved for CERT and to be developed, in part, for WEBS. It is acknowledged however that this area is also occasionally used as an informal recreational area. The land use within 200 metres for this stretch of the alignment is varied. To the east, the main land use type is primarily residential up till Broomhouse Road. Government offices are located along Broomhouse Drive. Private gardening allotments are situated just off Stenhouse Drive. Along Bankhead Drive to the Edinburgh Park Station, the land use is mainly industrial, with South Gyle Industrial Estate and Sighthill Industrial Estate to the north and south respectively of the tram alignment. Commercial premises are located at Hermiston Gait. Forrester High School/St Augustine’s are located approximately 600 metres north of the alignment off Broomhouse Road.

Edinburgh Park to Gogar Roundabout

The land use in this area is commercial. The area is a major centre for economic development in Edinburgh, providing large-scale offices for head office operations. The tram route also runs to the South Gyle Shopping Centre, with a stop proposed at the entrance to Safeways. The tram would run through an amenity and Urban Wildlife Site (Gogar Burn Park).

Edinburgh Park has been categorised as commercial although parts of the area have not yet been developed. It is recognised that this area has is assigned for further extensions and development (BUS 1 in the West Edinburgh Local Plan).
**Gogar Roundabout – Ingliston Park and Ride - Edinburgh Airport Terminal**

Land north of the Gogar Roundabout was formerly used for industrial purposes and is now vacant, with high bunds created using spoil material from the construction of the roundabout underpass. From Gogar Roundabout the tram would run through Class 2 agricultural land. The alignment passes in close proximity to residential houses located along the A8 Glasgow Road and just off Gogar Mains Farm Road. From the house at Gogar the tram would run across agricultural land to the proposed Ingliston Park and Ride. The route then enters Edinburgh Airport and passes the Hilton Hotel complex, just off Eastfield Road. Industrial activity was noted near to the long-term carpark facilities of Edinburgh Airport, and is related to the operation and maintenance of the airport. The tram alignment would run parallel with the Gogar Burn in this area for a length of approximately 600 metres.

**Ingliston Park and Ride to Newbridge**

The tram would pass through a mix of land use types for this part of the alignment. At the Ingliston Park and Ride end, Tram Line 2 would be in close proximity (50 metres) to a childcare nursery and residential property located off Ingliston Road. As Tram Line 2 crosses the A8 at Hallywards Road (after running parallel to the Royal Highland Showground boundary) the tram would be in close proximity to the West Ingliston Cottage property, which is a private residence, before crossing agricultural land. The tram would run within 50 metres of residential houses on Hillwood Rise and would be within 20 metres of housing at the end of Station Road and along Harvest Road at Ratho Station. As Tram Line 2 runs along Harvest Road, it is within 70 metres of Hillwood Primary School. Towards Newbridge, Tram Line 2 would travel past industrial and commercial land use types. Commercial premises include a wholesale pet food company and offices at Alexandra Business Park and Queen Anne Park. A mix of light industrial and offices have been recently built at the Newbridge Industrial Estate.

**6.3.2 Summary of Development Proposals**

A summary of the proposed development along Tram Line 2 alignment is detailed in the Table 6.2 below and highlighted on the land Use Figures 6.1 to 6.10. Nomenclature referenced to the Figures has also been tabulated below.

A summary of all planning applications to date, as compiled by Dundas and Wilson CS, is contained in Appendix 6. Major planning applications, which could have implications on the future land use characteristics of the area, have been included in the Table 6.2 below.

In general, development opportunities are centred around the city centre and to the west of Edinburgh. Housing, retail and office developments are proposed for the city centre areas and major office developments are proposed at Edinburgh Park.

Land use changes are expected around Edinburgh Airport, with the conversion of agricultural land to developments that would service the Edinburgh Airport (mainly park and ride car parks and hotels). Land use changes have been noted in the text in Table 6.2 below.
### Table 6.2 – Major Development Proposals Along the Tram Line 2 Route

<table>
<thead>
<tr>
<th>Edinburgh Tram Line 2 Route Section</th>
<th>Development Proposal Details (Refer to Figures 6.1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City Centre (St Andrew Square to Haymarket): Lines 1 and 2</td>
<td>Major development opportunities (as noted in the Central Edinburgh Local Plan) are:</td>
</tr>
<tr>
<td></td>
<td>- D1 - Waverley Station - includes shopping and commercial uses, cultural and tourist facilities, housing (near Canongate) and a bus/rail interchange.</td>
</tr>
<tr>
<td></td>
<td>- D2 - Morrison Street - preferred land uses for Morrison Street include allocations for housing, offices and hotel development.</td>
</tr>
<tr>
<td>Haymarket to Russell Road: Deviation from Lines 1 and 2</td>
<td>Major development being promoted by CEC includes:</td>
</tr>
<tr>
<td></td>
<td>- D3 – Haymarket - proposals for Haymarket include offices, light industrial workshops and residential studios (as noted in the Central Edinburgh Local Plan). This is supported by granted planning applications relating to residential development and Class 4 office developments (CEC Planning Ref: 98/03187/FUL; 99/02850/FUL; 01/04124/ADV).</td>
</tr>
<tr>
<td></td>
<td>Overall, this area is being developed into a central residential area, intermixed with retail and commercial opportunities.</td>
</tr>
<tr>
<td>Russell Road to Carrick Knowe</td>
<td>No major development proposals were noted for this stretch of the tram alignment.</td>
</tr>
</tbody>
</table>
| Carrick Knowe to Bankhead Drive (Edinburgh Park Station) | D4 – the WEBS has been approved with construction proposed December 2003. WEBS comprises of a guided bus way, and is situated in between the Edinburgh/Glasgow heavy rail line and Bankhead Road between South Gyle Access and Stenhouse Drive. This area of land has been reserved by the CEC as a transport corridor and is currently unoccupied. It is along this alignment that the Tram Line 2 would follow and replace WEBS.
<table>
<thead>
<tr>
<th>Edinburgh Tram Line 2 Route Section</th>
<th>Development Proposal Details (Refer to Figures 6.1-10)</th>
</tr>
</thead>
</table>
| Edinburgh Park to Gogar Roundabout | D5 – Construction of the Edinburgh Park Railway Station. Refer to CEC planning application 98/02400/FUL.  
D6 – Development of Edinburgh Park. Planning Application granted to New Edinburgh Ltd (CEC ref: 99/02295/OUT) for the erection of offices and other business use, hotel and supporting facilities (class 1, 2 and 3 retail) with associated road works and car parking. This development consists of enabling works comprising access road, lochan, attenuation pond with associated landscaping for Edinburgh Park, Southern phase (CEC ref: 00/00809/REM). It is recognised that this area is assigned for further extensions and development to the Edinburgh Park (as noted [policy ref: BUS 1] in the West Edinburgh Local Plan). |
| Gogar Roundabout – Ingliston Park and Ride - Edinburgh Airport Terminal | D7 - Construction is currently being completed for the Royal Bank of Scotland Headquarters, located at the former Gogar Burn Hospital site. This is supported by granted planning applications (CEC ref: 02/00768/FUL, 02/00816/FUL, 02/00764/OUT)  
D8 - A Park and Ride facility has been granted off Eastfield Road to the east of the existing Park and Fly facility at Ingliston. The proposed Park and Ride would be integrated with the Edinburgh Tram Line 2, providing a car parking area for commuters into the City of Edinburgh (CEC planning ref: 00/02615/OUT). This would alter the land use of this area from agriculture to transport infrastructure.  
D9 – an outline planning application has been submitted by FSH Airport (Edinburgh) Services Ltd to the CEC for development comprising Class 4 office use, class 7 travel hotel (90 beds) and class 3 restaurant and petrol filling station (CEC planning ref: 01/02936/FUL). This would alter the land use of this area from agricultural to commercial. Planning permission was still pending as of October 2001. In addition, an application has been lodged for a temporary airport related Park and Fly and car rental facilities (CEC planning ref: 02/00070/FUL). Planning permission was still pending as of October 2001.  
D10 – an outline planning application has been submitted by Edinburgh Airport Ltd for the erection of a Budget Hotel (CEC planning ref: 01/01499/OUT). Planning permission was still pending as of October 2001.  
D11 - Further development and enhancement of the Edinburgh (Turnhouse) Airport is possible, and this is recognised in the Rural West Edinburgh Local Plan Policy EDS. |
### Edinburgh Tram Line 2 Route Section

<table>
<thead>
<tr>
<th>Development Proposal Details (Refer to Figures 6.1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingliston Park and Ride to Newbridge</td>
</tr>
<tr>
<td>• D12 – Planning application has been granted (2 October 1998 and varied 28 January 2003) for the construction of car parking and park and ride facilities by New Ingliston Ltd (CEC planning ref: 97/00400/VARY). The development boundary does not extend to the residential house at 4 Ingliston Road.</td>
</tr>
<tr>
<td>• D13 – Planning permission has been granted to the Royal Highland Agricultural Society for the ‘demolition of existing north entrance gate and construction of new north entrance gate facilities’ (CEC planning ref: 00/01497/FUL)</td>
</tr>
<tr>
<td>• D14 - Residential housing proposals at Ratho Station, Hillwood Road, are noted on the Rural West Edinburgh Local Plan (Reference HSG14).</td>
</tr>
<tr>
<td>• D15 – Grampian Country Foods Ltd have lodged a planning application for a business park campus comprising two, three and four storey buildings with associated parking, pursuant to outline planning permission 01/00829/OUT granted 5 June 2003 (CEC planning ref: 03/02606/REM). Includes two access points onto Edinburgh Road. This parcel of land could therefore potentially become a commercial development area.</td>
</tr>
</tbody>
</table>

### Agricultural Land Uses

Land used for agricultural purposes is located in the area of land from Gogar Roundabout to Edinburgh Airport and aside the Ratho Station housing estate area. All the agricultural land affected by the proposals is in owned by either CEC or by other private individuals or organisations and leased to farming companies. All the fields are currently under arable cultivation or under “set aside”.

Land Capability for Agriculture Maps 1:50 000, produced by The Macaulay Institute for Soil Research, were reviewed to determine the class of agricultural land. All agricultural fields, which Tram Line 2 would cut across, are classified as Class 2. This classes the land as high quality and suited to arable cropping and capable of producing a wide range of crops.

The following table describes each affected parcel of land from the east at Gogar Roundabout to the west at Ratho and includes details of ownership, current agricultural use and farming access arrangements onto the fields. Figure 6.11 to 6.13 have the fields and access arrangements numbered on them.
Table 6.3 Summary of Agricultural Land Ownership and Access

<table>
<thead>
<tr>
<th>Area of Land</th>
<th>Ownership</th>
<th>Agricultural Use</th>
<th>Field Description and Nomenclature</th>
<th>Access Description and Nomenclature</th>
</tr>
</thead>
</table>
| North and East of Gogar Roundabout | This ground is owned by Royal Bank of Scotland (Meadowfield Development) and leased on an annual tenancy to Messrs Brewster of Bonnington Mains, Midlothian. | The land is cropped with cereal and potatoes and a portion of set-aside to the west. | • F1 – immediately north of the Gogar Roundabout and bounded by the Fife railway line  
  • F2 – bounded by the A8 to the south, Edinburgh Airport to the north and the Gogar Roundabout to the east  
  • F3 – Bounded by the Gogar Burn to the west, the access road to the Castle Gogar to the north and east and the A8 to the south. | • A1 – access to F3. Gained from the A8 via the access road to Gogar Church  
  • A2 – access to F1 and F2. Gained from the Gogar Roundabout via a gate to the northeast of the roundabout.  
  • A3 – access to F1 and F2 via a bridge over the railway at Meadowfield Farm. However this access is considered too narrow for modern equipment. |
<p>| North of A8 between the Royal Bank of Scotland slip road and the Airport | The New Ingliston Estate own these two fields and lease them to Mr John Peace based in Tranent. | Arable cropping with no livestock and set aside | • F4 and F5 - Two fields situated adjacent to each other and bounded by the A8 to the south, Castle Gogar and Edinburgh Airport to the north and Gogar Burn to the east. | • A4 – gained from the A8 via the main access road to Gogar Mains House and steading. |</p>
<table>
<thead>
<tr>
<th>Area of Land</th>
<th>Ownership</th>
<th>Agricultural Use</th>
<th>Field Description and Nomenclature</th>
<th>Access Description and Nomenclature</th>
</tr>
</thead>
</table>
| East of Eastfield Road to the Edinburgh Airport | New Inglinton Limited owns the fields. They are not currently leased       | Currently cut down to grass. No current agricultural occupation.                  | • F6 – Field bounded by Edinburgh Airport to the north, fields to the east and south and Eastfield Road to the west. The agricultural field to the south however is earmarked for development (Inglinton Park and Ride, refer to Table 6.2, development D8).  
• F7 – is north of F6 and is between the Edinburgh Airport and Eastfield Road | • A5 – access into F6 is off the recently constructed roundabout off Eastfield Road  
• A6 – access into F7 is currently through the existing access arrangements from the farm steadings located on this field. |
| South of Hilton Hotel at Edinburgh Airport | Owned by FHS Airports Ltd, managed by Powell Williams and Partners and leased to a third party | Leased for grazing purposes                                                      | F8 – Field bounded to the north by the Edinburgh Airport Hilton Hotel, Gogar Burn and Edinburgh Airport to the east, fields to the south and Eastfield Road to the west. | • A7– field F8 is accessed from Eastfield Road                                                                 |
| East of Ratho Village               | Farmed by Mr Sandy Allison and rented from the City of Edinburgh Council on a 364-day lease | Arable cropping – no livestock due to risks of vandalism from the neighbouring field. | • F9 – field between Ratho Station Village, the A8 and the Norton Mains farming fields          | • A8 – access from the A8, but this is not normally used because of the conflict between fast-moving traffic using the main road and slow moving agricultural equipment.  
• A9 – access through field F10 via a gate through the eastern end of the dividing hedge between the two fields |
|                                     | Farmed by Mr Sandy Allison and leased on a secure tenancy                  |                                                                                   | F10 – field to the south of F9.                                                                    | • A10 – gained from Norton Mains via a gate in the south-east corner of the field.                 |
6.4 CONSTRUCTION EFFECTS

6.4.1 Potential Impacts

Inherent with construction operations is the requirement for construction compounds and work sites along or close to the route. This is necessary for the storage of plant, materials and locating site offices. The locations of construction compounds have been detailed as part of the parliamentary bill submission, however the precise location and use of sites would be dependant on the contractor’s construction methodology.

Potential impacts on land use are related to the temporary land take associated with the construction works for Tram Line 2. It should be noted that potential impacts have only been assessed for that area of land that is likely to be temporarily utilised for construction purposes. For the purpose of this assessment, it has been assumed that construction works would be limited to the Tram Line 2 corridor and defined construction compounds.

It is likely that the construction program would follow a construction sequence divided into work sections. Work sections have been determined as a means of estimating the duration of construction and the probable locations for the construction compounds. The appointed contractor would determine the exact sequence of works. Furthermore, the nature of design and build schemes means that the contractor is given flexibility within the limits of deviation. The contractor’s construction methodology may also mean that sites identified for construction purposes may not be required. The following work sections have been considered for the outline construction programme (from east to west):

- Roseburn – Russell Road to Roseburn Street.
- Murrayfield – Roseburn Street to Water of Leith.
- Baird Drive.
- Carrick Knowe Golf Course.
- Broomhouse – Stenhouse Drive to Broomhouse Road.
- Sighthill – Bankhead Drive.
- Edinburgh Park.
- Depot Work.
- Gogar Burn – Depot to Eastfield Road.
- Airport – Eastfield Road to the airport.
- Royal Highland Showground – to Ingliston Road, along the A8 Glasgow Road.
- Ratho – from the A8 Glasgow Road to Harvest Road.
- Newbridge – Harvest Road to Newbridge.
Table 6.4 – Schedule of Temporary Land Take and Potential Impacts

<table>
<thead>
<tr>
<th>Land use</th>
<th>Location</th>
<th>Temporary Land Use Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>Industrial estate off Roseburn Street and Russell Road</td>
<td>Temporary land take for construction compound and access to site works from Roseburn Street and Russell Road. This would temporarily impact on the operations undertaken by businesses in this area.</td>
</tr>
<tr>
<td>Recreational/Amenity</td>
<td>Murrayfield playing ground</td>
<td>Temporary land take for construction compound. Temporary impacts on the recreational and amenity of the playing fields, car parking facilities and club house at Murrayfield.</td>
</tr>
<tr>
<td>Commercial</td>
<td>Gyle Shopping Centre, aside The Gyle stop</td>
<td>Impacts from the location of the construction compound in the Gyle Shopping Centre which may require temporary land take. This might reduce car parking capacity and induce temporary customer inconvenience.</td>
</tr>
<tr>
<td>Agriculture*</td>
<td>Gogar Burn, north of the Royal Bank of Scotland Stop</td>
<td>Temporary land take of agricultural land (reference F4 and F3, Figure 6.11 to 6.13). Impingement onto Gogar Burn watercourse and surrounds.</td>
</tr>
<tr>
<td></td>
<td>Ingliston Park and Ride Stop</td>
<td>Temporary land take of agricultural field (reference F6 and F7, Figure 6.11 to 6.13).</td>
</tr>
<tr>
<td>Transport Infrastructure</td>
<td>Airport Stop</td>
<td>Temporary land take for a construction compound area at the airport stop. This might create temporary inconvenience.</td>
</tr>
</tbody>
</table>

*Note, it has been assumed that the Ingliston Park and Ride facility would have already been built and constructed prior to Tram Line 2 construction.

The following potential impacts are related specifically to agricultural areas during construction:

- Impacts on the topsoil structure of agricultural fields used during construction.
- Construction works may damage or disrupt existing under drainage systems.

6.4.2 Mitigation

Land Use Mitigation

In specific relation to the impacts on land use during construction the following mitigation measures would be carried out:

- Construction compound and associated temporary land take have been minimised in areas which are currently utilised for local recreational and amenity purposes. This includes those areas at Carrick Knowe Golf Course and Edinburgh Park.
- Construction compounds have been (for the most part) positioned in locations which are known to be unoccupied or reserved as a transport...
corridor (for instance alongside Bankhead Drive) to minimise impacts on existing land use.

- Recreational and amenity areas (Murrayfield playing fields and Edinburgh Park) would be reinstated.
- Discussions would be undertaken with management at facilities likely to be inconvenienced from the location of construction compounds on or near to premises. Specific mitigation measures aimed at alleviating disruption to commercial or industrial operations would be determined. This is relevant for the industrial estate off Roseburn Street, The Gyle Shopping Centre and Edinburgh Airport.

**Agriculture Mitigation**

- Construction compounds and associated temporary land take have been minimised in areas which are currently utilised for agricultural purposes.
- Compensation should be negotiated where temporary land take is proposed on fields that would have otherwise been utilised for agricultural purposes.
- Where necessary, stripping and storage of top soils to prevent soil structure damage during construction.
- During construction, if agricultural field drains are severed or damaged, then adequate repairs and replacement would be carried out and monitored to prevent soils water logging.
- Wherever possible, access to agricultural fields would be maintained throughout the construction period.
- Reinstatement would be carried out for agricultural fields to ensure and enable continued future farming practices. This would entail a full program of reinstatement to address the potential constructional effects on drainage, deep compaction of sub-soils and topsoil structure. Remediation measures may include the deep ripping of compacted sub-soils, careful cultivation of top soils and the planting of green manure crops to improve top soil structure (through for example the planting of grass leys).

### 6.4.3 Residual Impacts

The implementation of the mitigation measures above relating specifically to land use would ensure that residual impacts from construction, in relation to land take only, are considered to be neutral, as all land would be returned back to its original state.

In relation to the temporary impacts for agriculture, the assessment has assumed that mitigation measures relating to care during construction, maintenance of access and reinstatement has been carried out correctly. Residual impacts from construction, for agricultural areas only, are considered to be neutral, as all land would be returned back to its original state.

### 6.5 PERMANENT AND OPERATIONAL EFFECTS

#### 6.5.1 Potential Impacts

It is considered that the potential permanent impacts on land use from the operation of the Edinburgh Tram Line 2 would be related to the following:

- Impacts on land use resulting from the demolition of buildings.
Impacts on land use due to permanent land take.

Loss of designated open space.

Impacts on the use of land for agricultural purposes.

Tram Line 2 would require the demolition of a number of existing properties, which are currently being used for retail, community, residential and industrial purposes. Properties, which would be required to be demolished, have been summarised in Table 6.5 below.

Land would be required adjacent to the proposed Tram Line 2 alignment for stops, retaining walls, access to the guideway, drainage, junction alterations etc. In addition, the provision of a footpath and cycleway would also require the acquisition of land, much of it adjacent to Tram Line 2 route.

Open space is designated and defined in Local Plans. Loss of designated open space along the alignment would include the southern boundary of Carrick Knowe Golf Course (refer to policy GE9 of the West Edinburgh Local Plan) and Huly Hill along Old Liston Road (refer to policy E52 of the Rural West Edinburgh Local Plan). Both sites would result in minor losses to areas of recreational and amenity value.

Impacts on the agricultural use of land are expected to arise from land segregation, as the Tram Line 2 would dissect fields with potential implications on the viability and capability of small areas of land for future agricultural practices.

6.5.2 Mitigation

Building Acquisition and Demolition

Tram Line 2 alignment would require the demolition of existing buildings, as shown in Table 6.5. However, where possible, the alignment has been designed to minimise building demolitions. Direct applications of this are as follows:

- A small building exists in the Haymarket rail depot, and Tram Line 2 alignment has been adjusted to negate the need to demolish this building.

- Tram Line 2 has been realigned to avoid the existing Ingliston Park and Ride Facility, to enable the continued operations of this facility.

Where the alignment would require building demolition, then compensation relating to acquisition would be negotiated. There is scope for redevelopment in those areas of land remaining from the demolition of buildings.

An alternative to monetary compensation would apply to the Royal Air Cadet Corps hall. A plot of land to the east of the hall has been included within the LLAU, which could give scope to the possible relocation and rebuilding of the hall in this area. Details of this proposal would need to be negotiated and refined with the Royal Air Cadet Corps group utilising this facility, tie and also engineers of Tram Line 2.

Permanent Land Take

Permanent land take has been minimised in areas currently used for recreational and amenity purposes. This applies to the playing fields at Murrayfield and the local amenity area at Edinburgh Park.

It is envisaged that mitigation measures relating to permanent land take would involve:

- Revised access arrangements.

- Replacement and/or relocation of parking spaces.
- Realignment of Murrayfield playing fields, due to the extra track required for stabling.

- Cycleway additions or modifications.

Permanent land take is required for the operation and maintenance of Tram Line 2. Where the alignment would result in loss of land, then compensation relating to the purchasing of land would be negotiated.

**Recreational and Amenity Areas**

With regards to the loss of open space along the southern boundary of Carrick Knowe Golf Course, the CERT alignment has been defined and designated on the West Edinburgh Local Plan (reference TRA1 CERT, policy T6) since the draft was approved for consultative purposes in June 2001. The relevant local planning policy applicable to the designated area of open space at Carrick Knowe Golf Course is policy GE9 –Open Space Protection. Whilst this policy acknowledges and aims to protect areas of open space, which are recognised as areas that provide recreational, amenity or social value, it does make allowances for development in open space whereby the “need for, or benefits to be gained from allowing” the development to proceed would be taken into account. Tram Line 2 follows the CERT alignment, which is supported under policies T5 and T6 of the West Edinburgh Local Plan for the improvement of public transport. It is considered that the Tram Line 2 is compliant with the CEC’s proposals and objectives for the future of public transport, and as such this would justify the loss of open space along Carrick Knowe Golf Course. Mitigation measures relating to compensation for the loss of open space are therefore not considered necessary.

Loss of open space at Huly Hill would arise from land take required for the tram as it runs along Old Liston Road. Huly Hill is designated as an area of Open Space and the policy relating to the protection of open space in the Rural West Edinburgh Local Plan is policy E52. This policy states, “proposed development which would result in the loss of all or part of an area of open space would only be permitted where there is no detrimental impact in terms of recreational, amenity or nature conservation value”. Huly Hill is also the site of a Scheduled Ancient Monument. It is considered that Huly Hill offers an open space of historical and amenity value. The impact on the amenity appeal of Huly Hill has been examined in terms of the effect that the proposed tram alignment would have on the landscape quality, visual attractiveness and sense of place. This has been assessed in the Chapter 8 Landscape and Visual Impacts. The protection of the historic status of the site has been assessed in Chapter 11 of this ES.

**Agricultural Land**

Agricultural land would be purchased. With respect to the ongoing operations of individual farms the main issue is maintaining access, which is required by modern farm machinery. As arable cropping is the predominant activity, access for combines is essential. This requires an approximate minimum height of 4.5m, depending on machinery design. Mitigation proposals would allow for farm machinery (combine) access, enabling the continued use of farming on potentially affected fields. To facilitate the safe crossing of the tram line in agricultural areas, level crossings with warning lights would be built. Access crossings are shown on the Route Alignment Plans submitted with the Parliamentary Bill application.

An area of land on field F6 has been included within the LLAU, to provide compensatory volume for the Gogar Burn flood plain. Specific mitigation measures are not known at this stage of assessment, as this is dependant on the completion of a flood risk assessment of the Gogar Burn and the impact of Tram Line 2.
6.5.3 **Summary of Residual Impacts**

Residual impacts are summarised under three headings: building demolition, land take (other than building demolition) and agriculture. These have been explained and, where possible, quantified separately in the sections below.

**Building Acquisition and Demolition**

The table below is a summary of the buildings that would be required to be demolished or acquired as a result of the Tram Line 2 alignment.

**Table 6.5 Summary of Building Demolitions**

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Specific Location</th>
<th>Proposed Building Demolition or Acquisition Details and Land Use Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>Haymarket Station</td>
<td>The Caledonian Ale House is to be demolished. This is a listed building. The land use in this area would change from commercial to transport infrastructure, as it is the location of the Haymarket Station tram stop.</td>
</tr>
<tr>
<td></td>
<td>Russell Road; Clark Commercials</td>
<td>Small building to be demolished. The company would need to relocate.</td>
</tr>
<tr>
<td></td>
<td>Roseburn Street; National Car Rental</td>
<td>Location of proposed elevated tram stop. Demolition of building and car wash required. The company would need to relocate.</td>
</tr>
<tr>
<td></td>
<td>Balgreen Road; Speedy Clearances</td>
<td>Demolition required for proposed tram alignment. This is a second hand shop. The company would need to relocate.</td>
</tr>
<tr>
<td></td>
<td>Roseburn Street, JB McClean</td>
<td>Building along rear of property would need to be demolished, however entire property would not be demolished.</td>
</tr>
<tr>
<td>Industrial</td>
<td>Russell Road; Haymarket Rail Depot; (Network Rail); Main Entrance</td>
<td>The operations of the depot would be slightly affected through relocation of carparking area.</td>
</tr>
<tr>
<td></td>
<td>Roseburn Street; Viking International</td>
<td>Demolition of two buildings on the property. This is a car parts (tyres, exhausts etc) outlet and supplier. The demolition of these buildings would affect the entire operations undertaken in this building. The company would need to relocate.</td>
</tr>
<tr>
<td></td>
<td>Roseburn Street, Roseburn Garage</td>
<td>Building at rear of property would need to be demolished, however entire property would not be demolished.</td>
</tr>
<tr>
<td>Land Use</td>
<td>Specific Location</td>
<td>Proposed Building Demolition or Acquisition Details and Land Use Impacts</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Roseburn Street, Industrial Units</td>
<td>This block contains a number of units rented to small businesses. Approximately 2 units would need to be demolished. However, there are 15 units on this property and the remaining would not require demolition.</td>
<td></td>
</tr>
<tr>
<td>Community Use</td>
<td>Stenhouse Drive; Royal Air Cadet Corps Building</td>
<td>Demolition required for proposed tram alignment.</td>
</tr>
<tr>
<td>Residential</td>
<td>A8 Glasgow Road; RBOS Headquarters slip road (under construction)</td>
<td>Residential properties are currently located adjacent to the RBOS Headquarters slip road. These would need to be demolished for the proposed Gogar Burn tram stop. However it is understood that these houses would be demolished under the RBOS construction scheme.</td>
</tr>
<tr>
<td></td>
<td>Residential property adjacent to Ingliston West Station on the corner of Ingliston Road and the A8.</td>
<td>At this stage, it is not certain if this property is to be demolished, however proposals are in place for the acquisition of this property because of its close proximity to Line 2. The proposed Tram Line 2 alignment would effect access into this property. Because property demolition is only a proposal at this stage, the residual impacts on this property from permanent land take has also been reviewed in Table 6.6 below.</td>
</tr>
</tbody>
</table>

**Permanent Land Take**

It should be noted that information on land boundaries and ownership details for those areas within the proposed LOD and LLAUs are contained in the Book of Reference and Route Alignment Plans, as part of the parliamentary submission. These documents should be referred to for clarification on land take.

The table below provides a summary of the locations and land use impacts resulting from land take as a result of Tram Line 2 and is based on a review of the LOD and LLAUs. Agricultural land take issues have been discussed and detailed separately in the section below.
Table 6.6 – Summary of Permanent Land Take

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Residual Land Take Impacts</th>
</tr>
</thead>
</table>
| Industrial        | ▪ Haymarket Rail Depot - Land would need to be purchased within Haymarket Depot. Some space would have to be found to relocate the parking bays. Replacement access to the Haymarket Depot off Russell Road, which may alter transportation movements within the compound.  
▪ Land within Roseburn Street Industrial Estate would need to be purchased for the tram alignment. This would be required to enable building demolitions within this industrial estate. |
| Recreational and Amenity | ▪ It is possible that the Heart of Midlothian War Memorial may be relocated as a result redevelopments of Haymarket Junction to accommodate the tram alignment. This is a listed building site.  
▪ Modifications to the existing cycleway off Russell Road and Balbirnie Place would need to be undertaken.  
▪ Possibly some parking areas at the south of Murrayfield Stadium  
▪ Removal of a strip of land that is used informally for recreational purposes, along Stenhouse Drive and currently reserved by CEC under CERT and WEBS transport proposals.  
▪ Strip of land along Murrayfield playing fields – this would reduce the area currently used for sporting purposes and may necessitate realignment of pitches.  
▪ Strip of land alongside entire southern boundary of Carrick Knowe Golf Course – impacts are expected to be minimal due to reservation of this area as a transportation corridor. Carrick Knowe Golf Course have accommodated the CEC transportation proposals already into their golf course design.  
▪ Edinburgh Park alongside Loch Ross. An area which has amenity appeal for workers at Edinburgh Park would be acquired through the location of Edinburgh Park Stop and the footprint of the tram alignment.  
▪ Huly Hill – strip of land following Old Liston Road on the south and eastern boundary of the site. |
| Commercial        | The following may lose parking spaces from the Tram Line 2 footprint and rearrangement of the parking area could be necessary  
▪ The Gyle Shopping Centre  
▪ Edinburgh Airport Hilton Hotel  
▪ Newbridge Industrial Estate, parking area bordering Old Liston Road |
| Transport Infrastructure | ▪ Edinburgh Airport – reconfiguration of airport interchange would be required.  
▪ Ratho Station Stop – possibly land take within an existing area that is currently utilised for purposes associated with the adjacent rail line.  
▪ Park and Fly facility off Eastfield Road |
| Residential       | The following residential properties are not being demolished, however property boundaries are located within the LLAU and LOD:  
▪ Residential property adjacent to Inglinton West Station on the corner of Inglinton Road and the A8. At this stage, it is not certain if this property is to be demolished, however proposals are in place for the acquisition of this residential house, due to its close proximity to Tram Line 2.  
▪ The Castle Gogar Lodge property boundary, situated on corner of Glasgow Road and access road to Castle Gogar, is |
Land Use | Residual Land Take Impacts
--- | ---
 | contained with the LLAU.
 | - Powers would be sought over the north-western corner of the West Ingliston Cottage gardens for the operation of Tram Line 2.
 | - Approximately six houses at the southern end of Station Road, Ratho Station. A retaining wall would be built, replacing and improving the existing retaining wall in place. This new wall is required for structural support of Tram Line 2.

**Agriculture**

The Tram Line 2 alignment would result in areas of land being unsuitable for agricultural use. For the most part this is due to the small area of remaining field, in between the alignment and field boundaries, which renders the possibility for future farming impractical. Land which becomes sterile or is acquired for the operation of the Tram Line 2 has been noted as a Residual Impact (see Table 6.6 below).

For all agricultural land, the common residual impact is the loss of agricultural farming ground required for the operation of the tram line, within the Limits of Deviation (refer to Book of Reference included in the parliamentary Bill submission). Specific residual impacts relating to the farming of individual plots of agricultural land have been summarised in Table 6.6 below. Figure 6.11 to 6.13 depicts the areas and pockets of agricultural land likely to be permanently impacted by the Tram Line 2 alignment, and they have been numbered (RI x) accordingly.

**Table 6.6 – Summary of Loss of Agricultural Land**

<table>
<thead>
<tr>
<th>Field (refer to Figure 6.11 to 6.13)</th>
<th>Residual Impact and Nomenclature</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>RI 1 - Loss of the entire field. The field is proposed to be used as the location for the Tram Line 2 depot and has been included in the LOD.</td>
</tr>
<tr>
<td>F2</td>
<td>RI 2 - Small pocket of agricultural land in the south corner of the field bounded by Tram Line 2 alignment, A8 and the Castle Gogar access road. In addition, an area of this field has been included within the LLAU, as land required for essential mitigation relating to landscaping measures. This may further reduce the agricultural capacity of this field.</td>
</tr>
<tr>
<td>Field (refer to Figure 6.11 to 6.13)</td>
<td>Residual Impact and Nomenclature</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>F3</td>
<td>RI 3 – Strip of agricultural land between the Tram Line 2 alignment and the A8 Glasgow Road is likely to be rendered sterile and not suitable for agricultural purposes. This is due to the segregation of this area of land from the remaining area of field due to the Tram Line 2 alignment. The current access arrangements into the field would be altered so that access can be gained from the road into the field north of the tram alignment. This would be achieved through the installation of a level crossing at the access road. In addition, an area of this field has been included within the LLAU, as land required for essential mitigation relating to landscaping measures. This may further reduce the agricultural capacity of this field.</td>
</tr>
<tr>
<td>F4 and F5</td>
<td>RI 4 – The area of agricultural land north of the tram line is included within the LLAU for Tram Line 2. Mixed woodland screen planting is proposed for this area of land, to screen views from Castle Gogar.</td>
</tr>
<tr>
<td>F5</td>
<td>F5 is still arable, however, the area of the field for farming has been reduced, which would affect the efficiency with which it can be farmed.</td>
</tr>
<tr>
<td>F6</td>
<td>RI 5 – Strip of agricultural land between the Tram Line 2 alignment and the Inglinton Park and Ride, and in between the Tram Line 2 alignment and Eastfield Road to the western field boundary would be unsuitable for further agricultural use as the remaining field area is too small for viable farming use. RI 6 – Area of agricultural land in between the Tram Line 2 alignment and Eastfield Road to the western field boundary would be rendered sterile and not suitable and viable for modern agricultural machinery. Access arrangements into F6 would need to be changed, with entry onto the field likely to be via F7 at a level crossing.</td>
</tr>
<tr>
<td>F7</td>
<td>The Tram Line 2 alignment would effectively divide this field, although a formalised level crossing would be installed to allow the continued access to the field. It was intimated through discussions with the land owners that future farming in this area may be for livestock or horses. The segregation of this field would still permit this type of farming practice. In addition, access arrangements into F7 would need to be changed, with entry onto the field likely to be via F6 at a level crossing.</td>
</tr>
<tr>
<td>F8</td>
<td>The eastern end of this field would be lost due to the acquisition of land required for Tram Line 2 construction and operation.</td>
</tr>
<tr>
<td>Field (refer to Figure 6.11 to 6.13)</td>
<td>Residual Impact and Nomenclature</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>F9</td>
<td>RI 7 – Area of land in between the Tram Line 2 alignment and the eastern field boundary would be lost to agriculture as the remaining field area is too small for viable farming use. In addition, access arrangements into F9 would need to be changed, with entry onto the field likely to be via a level crossing.</td>
</tr>
<tr>
<td>F10</td>
<td>RI 8 – Strip of agricultural land between the Tram Line 2 alignment and the northern field boundary is likely to be rendered sterile and not suitable for agricultural purposes. This is due to the segregation of this area of land from the remaining area of field due to the Tram Line 2 alignment. RI 9 - Western end of agricultural field, in between the Tram Line 2 alignment and the Edinburgh / Glasgow rail line would be unsuitable for further agricultural use as the remaining field area is too small for viable farming use.</td>
</tr>
</tbody>
</table>

**6.6 SUMMARY**

The main impact on land use is the requirement for buildings to be demolished to accommodate Tram Line 2. These include the Caledonian Ale House at Haymarket, industrial and commercial premises off Roseburn Street and Balgreen Road, the Royal Air Cadet hall at Stenhouse Drive. Residual impacts would also occur from permanent land take including the acquisition of a house off Ingliston Road and encroachment of Tram Line 2 into residential property boundaries. Land take required for construction compounds would have a temporary impact on land use, however residual impacts from construction are considered to be neutral, as all land would be returned back to its original state.

The Tram Line 2 alignment would travel across 10 fields, which are currently used for arable cultivation or under “set aside”. All fields are classified as Class 2 agricultural land i.e. high quality. There would be a slight impact for individual farms, because the area of land take is small in terms of the scale of the farming operations. However, Tram Line 2 is predicted to have a negative impact because of the combined effect of Class 2 agricultural land.
7 Geology, Soils and Contamination

7.1 INTRODUCTION

This section deals with environmental issues associated with ground conditions relating to the Tram Line 2 development. For the purposes of this ES, ground conditions are taken to comprise geology, soils and hydrogeology as well as ground contamination and waste management related issues.

The current ground conditions within the proposed route corridor are described below and likely effects of the Tram Line 2 development on potentially sensitive receptors assessed. These impacts have been divided into two categories:

- Short-term construction impacts, and
- Permanent and operational impacts.

The potential impacts and mitigation measures proposed for each parameter are described below for each segment of the Tram Line 2 scheme. Residual impacts, that are likely to remain after mitigation measures have been put in place, have been identified and assessed.

Note that some of the conditions and effects described, particularly with regard to contamination and hydrogeology, may interact with other parameters such as surface water (dealt with in Chapter 10). Such interactions are described where appropriate.

7.2 METHODS

7.2.1 Assessment Scope

This section of the ES considers potential impacts on ground conditions associated with the LOD and LLAU (i.e. the ‘limits’) of the Tram Line 2 project, including the track alignment, associated infrastructure, stations and depots, etc (see Section 3.5). In addition, construction effects including establishment of Contractors’ compounds, etc. have been considered. As stated above, the topics covered in this section comprise:

- Geology and soils
- Hydrogeology
- Contamination, and
- Waste Management

The assessment considers the impacts directly associated with the construction phase of Tram Line 2 and related infrastructure. In addition, the assessment considers impacts of the development associated with the permanent infrastructure and operational activities of Tram Line 2.

7.2.2 Baseline Methods

Information was collected by undertaking a Desk Top Study (see references) combined with a walkover survey to visually inspect the route corridor.

Note that no fieldwork was carried out to confirm the findings of the desk study. However as part of the commissioning of the scheme, a detailed and extensive intrusive ground investigation would be undertaken (mainly for geotechnical purposes). This investigation would include, where applicable, an assessment of the soil and groundwater conditions at locations of known or suspected ground contamination.
Geological and soils information was determined from geological maps published by the British Geological Survey (BGS). In addition, where available, borehole records held in the BGS library were consulted. Information on the presence of Sites of Special Scientific Interest (SSSI) and Regionally Important Geological Sites (RIGS) was sought from SNH.

Information on hydrogeology was collected from maps published by the BGS. In addition, consultations with SEPA were undertaken to identify known water abstractions, the presence of any Groundwater Source Protection Zones and groundwater quality.

In order to identify potentially contaminated sites on or close to the route, historical Ordnance Survey maps held by the National Library of Scotland were consulted. In addition, information was sought from the City of Edinburgh Council Planning Department and SEPA on potentially contaminated sites and mineral resources. SEPA was also consulted regarding holders of Waste Management Licences and existing and former waste management sites in the route corridor. The waste management implications of removing and disposing of areas of potentially contaminated soil within the limits have been considered.

### 7.2.3 Assessment Methods

Once the information was collected it was necessary to assess the impact of the proposed development on each of the parameters in a consistent way. This section sets out how these impacts have been assessed for each of the soil condition parameters.

The assessment takes into account guidance set out in Part 10, Water Quality and Drainage, and Part 11, Geology and Soils, of DMRB Volume 11: Environmental Assessment.

#### Geology and Soils

The main issues for impacts on geology and soils include damage to areas designated for their geological interest or zones where the development may affect active or potential mineral extraction activities. In addition, potential issues associated with loss or damage to soils have been considered. Assessment of the impact of the scheme on geology and soils is based on the criteria shown in Table 7.1 below.

**Table 7.1 Criteria for Assessing Impact on Geology and Soils**

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
</table>
| **Major**         | An internationally or nationally designated site, such as an SSSI, designated or proposed on the basis of geological interest, that is located within or immediately adjacent to the scheme limits and that would be damaged or destroyed by the proposed development. Also a significant area of high quality or rare soil type that would be destroyed or damaged by the development.  
A significant or active mineral resource, such as an open-cast mine or quarry, that lies within the limits that would be sterilised by the proposed development. |
| **Moderate**      | A locally designated or proposed site of geological interest, such as RIGS, that is located within or adjacent to the scheme limits and that would be damaged or destroyed by the proposed development. Any area of high quality or rare soil type that would be destroyed or damaged by the development.  
An identified but unexploited mineral resource that would be sterilised by the development. |
Impact Assessment | Definition
---|---
Minor | A designated site of geological interest, such as a SSSI or RIGS, located within or adjacent to the scheme limits, that would not be damaged or destroyed by the proposed development. Also damage to soils within the limits. Any other prominent but undesignated geological feature that would be destroyed or damaged by the proposed development. In addition, a potential mineral resource or poor quality soils close to the limits that may be affected by the development.
Negligible | Any other site of geological interest that is in the vicinity of the limits but would not be affected by the development. Also any mineral resource in the vicinity of the limits that would not be affected by the development.

**Hydrogeology**

Aquifers are likely to be the main groundwater receptor for any pollutants emanating from the Line 2 development, either during construction or operation. Groundwater may be shallow, being present in permeable superficial geological deposits, such as sands and gravels, and/or located in deeper rock formations. Aquifers that are a source of public water supply are particularly sensitive to pollution incidents. The significance of potential impacts on the hydrogeological resources that may be affected by the development is based on the criteria shown below in Table 7.2.

**Table 7.2 Criteria for Assessing Impact on Groundwater**

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Where construction and/or operation of Line 2 would result in polluting, damage or destruction of an aquifer that is within a Groundwater Source Protection Zone (GSPZ) and/or is used for public water supply.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Where construction and/or operation of Line 2 would result in polluting, damage or destruction of any aquifer that is not used for public water supply and/or is not in a GSPZ.</td>
</tr>
<tr>
<td>Minor</td>
<td>Where construction and/or operation of Line 2 may result in polluting, damage or destruction of any aquifer that is not used for public water supply or is not in a GSPZ and/or where impermeable deposits overlie the aquifer.</td>
</tr>
<tr>
<td>Negligible</td>
<td>Where construction and operation of the scheme would not result in pollution of groundwater and/or where there is no significant groundwater resource in the vicinity of the development.</td>
</tr>
</tbody>
</table>

**Contaminated Land**

The contaminated land risk assessment has been undertaken in accordance with the guidance contained within CLR 6 (see References at the end of this document).

The impact assessment uses a risk-based approach following the source-pathway-receptor methodology promoted by SEPA, which considers the nature of the potentially contaminated site in relation to the proximity of any sensitive receptors such as controlled waters or residential developments. The identification of potentially contaminated land has been based on review of historical land uses and is in accordance with the definition given in the Environmental Protection Act 1990.

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1 Section 78A(2) of the Environmental Protection Act 1990 (as amended): ‘any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that – (a) significant harm is being caused or there is a significant possibility of such harm being caused; or (b) pollution of controlled waters is being, or is likely to be, caused.’
The assessment has identified those sites that present the greatest potential risk of an adverse environmental impact. The potential impact is based on the criteria presented in Table 7.3. Where sites have been categorised as ‘major’ risk sites, recommendations have been presented for ground investigations or for remedial and/or mitigation measures as part of the scheme development.

Table 7.3 Criteria for Assessing Impact of Contaminated Land

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major</strong></td>
<td>An area within the limits where potentially contaminated sites are likely from historic or current land-use, or available site investigation data and where impacts that result from the disturbance of the ground would affect the surrounding built and natural environment during construction and operation of the scheme. Extensive mitigation measures would need to be taken to avoid adverse environmental or health and safety implications.</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>A site within or adjacent to the scheme limits, for which a contaminating potential has been indicated from historic or current land-use or site investigation data. Impacts that affect the surrounding natural environment would be prevalent during construction, but are unlikely to affect the operation of the scheme or require long-term mitigation measures to be incorporated into the design.</td>
</tr>
<tr>
<td><strong>Minor</strong></td>
<td>A site within or adjacent to the works for which a contaminating potential is a possibility, but where it is considered very unlikely that any contamination would affect the environment surrounding the scheme during construction or operation. No mitigation measures would be proposed at this stage, but careful observation would be required during construction and action.</td>
</tr>
<tr>
<td><strong>Negligible</strong></td>
<td>A potentially contaminated site in the study area that is sufficiently distant from the scheme that it would not affect, or be affected by, the construction or operation of the scheme.</td>
</tr>
</tbody>
</table>

**Waste Management**

There are two classes of waste management issues associated with the development of Tram Line 2. These include:

- The presence of licensed waste management sites within or in the vicinity of the limits;
- Issues associated with disposal of waste material as part of the construction and operation of Tram Line 2.
### Table 7.4 Criteria for Assessing Impact from Waste Management Issues

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major</strong></td>
<td>Where a site licensed under the Waste Management Licensing Regulations 1994 (as amended) is present within or close to the limits of Line 2. Also where disposal of Hazardous Waste, or large quantities of Non-Hazardous Waste, would be required as a consequence of construction and/or operation of the development.</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Where a closed waste management site, that may or may not have surrendered its Waste Management Licence, is present within or close to the limits and/or where disposal of Non-Hazardous Waste, or large quantities of Inert Waste, would be required as a consequence of construction and/or operation of the development.</td>
</tr>
<tr>
<td><strong>Minor</strong></td>
<td>Where there are closed and unlicensed waste management sites and/or unlicensed sites within or adjacent to the limits. This would include areas of fly-tipping within the limits. Also, where there would be a requirement to dispose of Inert Waste as a consequence of construction and/or operation of the development.</td>
</tr>
<tr>
<td><strong>Negligible</strong></td>
<td>Where there are no waste management sites within or close to the limits and/or where minimal waste disposal would be required as a consequence of construction and/or operation of development.</td>
</tr>
</tbody>
</table>

### 7.3 EXISTING CONDITIONS

#### 7.3.1 General

For convenience the Tram Line 2 route has been divided into the following five segments from east to west:

- City Centre (St Andrew Square – Haymarket).
- Haymarket – Bankhead Drive (Edinburgh Park Station).
- Edinburgh Park – Gogar Roundabout.
- Gogar Roundabout – Edinburgh Airport Terminal.
- Ingliston Park & Ride – Newbridge.

The following sections describe the details of ground conditions present in each segment of the Tram Line 2 route.

#### 7.3.2 Geology

The geology of the Tram Line 2 route has been determined from published BGS 1:10,000 scale maps NT17SW, NT17SE and NT27SW. In addition, borehole records from previous site investigations from the vicinity of the route have been consulted.

**City Centre (St Andrew Square – Haymarket)**

*Drift*

Superficial deposits in this section comprise mainly Glacial Till, overlain locally with Lacustrine deposits associated with the former Nor Loch. The Loch was located immediately south of Princes Street, prior to being drained in the early 19th century to form Princes Street Gardens and the railway line to Waverley Station. These Lacustrine deposits are likely to comprise an unstratified sequence of silty Clays, Sands and Silts with bands of Peat and Gravel.

Much development has occurred in the area of the proposed tramline route and it is likely that Made Ground is present, particularly on the Mound, and in the vicinity of...
Waverley and Haymarket railway stations and various railway embankments to Roseburn.

Solid
Superficial Deposits rest upon rock strata belonging to the Lower Oil Shale Group, an interbedded sequence of Sandstone, Siltstone and Mudstone. Although seams of Oil Shale are present within the Lower Oil Shale Group no Oil Shales are present in this section of the route. The route runs close to the major volcanic dolerite intrusion of the Castle Rock. The Castle Rock is designated as a SSSI on geological grounds.

Mineral Resources
There are no active or proposed mineral extraction activities in this area.

Undermining
There is no evidence of undermining in this area. However, there are a number of railway tunnels in the vicinity including an abandoned tunnel running north from Waverley Station beneath Princes Street and St Andrew Square, as well as the main line tunnel for the Edinburgh to Glasgow line between St Cuthbert’s church and Haymarket.

Haymarket – Bankhead Drive (Edinburgh Park Station)

Drift
Between Balgreen and Bankhead Drive superficial deposits comprise Glacial Till. Hummocky glacial deposits consisting of low oval shaped mounds of glacial Sands and Gravels overlie these deposits extending between Balgreen and Forrester High School.

Lacustrine deposits associated with Corstorphine Loch are recorded to extend eastwards to Roseburn and are likely to comprise an unstratified sequence of silty Clays, Sands and Silts with bands of Peat and Gravel. These deposits are crossed by a thick band of alluvial deposits associated with the Water of Leith. The Alluvial deposits comprise Sands and Gravels with bands of Silt and Clay. Thin bands of Peat may also be present within the Alluvium. Glacial Till is expected to underlie both the Lacustrine and Alluvial deposits.

Much development has occurred in the area of the proposed tramline route and it is likely that Made Ground is present, particularly associated with railway embankments.

Solid
Superficial Deposits rest upon rock strata belonging to the Lower Oil Shale Group, an interbedded sequence of Sandstone, Siltstone and Mudstone. Although seams of Oil Shale are present within the Lower Oil Shale Group there are no Oil Shales present in this section of the route. The Ravelston Sandstone is recorded to outcrop near Bankhead Drive and extends eastwards to Broomhouse Drive where it rests upon an un-named fault, which runs from north to south. The Ravelston Sandstone comprises a fine-grained, hard rock, which has been worked extensively in other areas as a building stone.

Mineral Resources
There are no active or proposed mineral extraction activities in this area.

Undermining
There is no evidence of undermining in this area.
Edinburgh Park – Gogar Roundabout

Drift
Superficial deposits vary along this section of the proposed route. Due to the construction of the Gogar Roundabout, Edinburgh Park and South Gyle Shopping Centre the area has been extensively landscaped.

At the Gogar Roundabout the superficial deposits comprise Glacial Till. The A8 Glasgow Road, in its run up to the Gogar Roundabout has been constructed on an embankment, which lies upon glacial Sands and Gravel. These glacial deposits fall away steeply to the south and the Glacial Till is overlain by Lacustrine deposits associated with the former Gogar Loch. These deposits are likely to comprise an unstratified sequence of silty Clay, Silt and Sand with likely bands of Peat. The deposits are likely to be soft in consistency and may be waterlogged. These deposits peter out towards the main Edinburgh to Glasgow railway line to the south.

Solid
Superficial deposits rest upon rock strata belonging to the Lower Oil Shale Group of the Carboniferous System. These strata are recorded to comprise an interbedded sequence of Sandstone, Siltstone and Mudstone. Although seams of Oil Shale are present within the Lower Oil Shale Group they are not expected within this area.

The Middleton Hall Fault is recorded to the north of the Gogar Roundabout, running from west to east; the fault downthrows the strata to the north. An intrusion of Quartz dolerite is recorded to outcrop at Maybury, north of the fault line.

The Ravelston Sandstone is recorded to outcrop at Hermiston Gait and extends to Broomhouse Drive where it rests upon an un-named fault, which runs from north to south. The Ravelston Sandstone comprises a fine-grained, hard rock, which has been worked extensively in other areas as a building stone.

Mineral Resources
There are no active or proposed mineral extraction activities in this area.

Undermining
There is no evidence of undermining in this area.

Gogar Roundabout – Edinburgh Airport Terminal

Drift
Published geological information indicates that the site is underlain by Glacial Deposits comprising generally of Glacial Till, which may be overlain in parts by moundy Sands and Gravels, also of glacial origin.

It is assumed that the course of the Gogar Burn would have altered over time and as such weak Alluvial soils may overlie the Glacial Deposits within the vicinity of the burn.

At Edinburgh Airport, Lacustrine deposits, thought to be associated with the River Almond, are recorded. The area around Edinburgh Airport has been extensively landscaped to form the airport terminal areas and aprons and is recorded as being 'flat' on the geological sheet. Superficial deposits may be overlain by pockets of Made Ground due to previous developments within the area.

The thickness of the superficial deposits in this area is not known, however, they are likely to vary across the length of the proposed route and are generally expected to be greater than 10.00 metres thick.

Solid
Superficial deposits generally rest upon rock strata belonging to the Upper Oil Shale Group of the Lower Carboniferous System and comprise an interbedded sequence of Sandstone, Siltstone and Mudstone with subordinate seams of Oil Shale.
The Middleton Fault runs west to east towards Edinburgh, down-throwing the strata to the north. To the south of the fault line the Lower Oil Shale Group, which is similar in stratification to the Upper Oil Shale Group, is recorded to outcrop at rockhead.

**Mineral Resources**

The Rural West Edinburgh Local Plan does not indicate any active or proposed mineral extraction activities in this area.

**Undermining**

There is no evidence of undermining in this area.

**Ingliston Park & Ride – Newbridge**

**Drift**

Published geological information indicates that these are is underlain by Morainic Glacial Deposits comprising generally of Glacial Till, which may be overlain in parts by moundy Sands and Gravels. Pockets of Made Ground originating from previous developments within the area, including the construction of the Newbridge Roundabout, may overlie the superficial deposits. The thickness of the superficial deposits in this area is not known.

**Solid**

Superficial deposits generally rest upon rock strata belonging to the Upper Oil Shale Group of the Lower Carboniferous System and comprise an interbedded sequence of Sandstone, Siltstone and Mudstone with subordinate seams of Oil Shale.

A major fault, the Middleton Hall Fault, outcrops through the Newbridge area and the centre of Ratho Station, running west to east, extending towards Edinburgh, downthrowing the strata to the north. To the south of the fault line the Lower Oil Shale Group, which is similar in stratification to the Upper Oil Shale Group, is recorded to outcrop at rockhead.

The village of Ratho Station lies upon a Quartz Dolerite intrusion. The intrusion comprises a black, fine-grained igneous rock, which is locally known as ‘whin’. A number of quarries were located immediately to the south of Harvest Road (Ratho Station) and it is thought that ‘whinstone’ (quartz dolerite) was quarried. In this area bedrock may be present at or close to ground surface.

**Mineral Resources**

The Rural West Edinburgh Local Plan does not indicate any active or proposed mineral extraction activities within the limits. However, an active whinstone quarry (Hillwood Quarry) is present approximately 100 metres south of the proposed route near Ratho Station.

**Undermining**

Whilst seams of Oil Shale have been recorded within the rock strata underlying this section of the tramline no evidence of mining activity having taken place in this area that could affect the proposed development has been identified.

7.3.3 Hydrogeology

The 1:625,000 scale Groundwater Vulnerability Map of Scotland indicates that the underlying bedrock generally comprises rocks of moderate to weak permeability and that hydrogeological conditions are similar throughout the proposed route. Bedrock is fractured or potentially fractured and does not have a high permeability, or other formations of variable permeability. Although these formations seldom produce large quantities of water for abstraction, they are important for local supplies and in supplying base flow to rivers.

The superficial drift deposits vary in thickness and can be substantial in parts. They are often variable in composition changing from low permeability clays to
highly permeable sands and gravels over short distances both laterally and vertically. The majority of superficial deposits in the area comprise Glacial Tills overlain in various places by Alluvial, Lacustrine (some of which may be waterlogged) and Moraine deposits.

Shallow groundwater may be present within the superficial deposits both within the sand and gravel deposits and overlying the low permeability clays.

**Groundwater Abstractions**

Superficial aquifers in this area are not well developed. In addition, there are no official records regarding groundwater (or surface water) abstractions in Scotland, although this would become a requirement in Scotland under the Water Government and Water Services (Scotland) Act 2003, which translates the Water Framework Directive into Scottish legislation. SEPA will be responsible for the management of river catchment areas and this will include preparing an inventory of groundwater and surface water abstractions for the first time in Scotland.

**Groundwater Flow**

Groundwater flow in the vicinity of the Tram Line 2 route is not known. However, it is likely that close to watercourses such as the Water of Leith and the Gogar Burn superficial groundwater flow would be towards these watercourses. At Newbridge, groundwater shallow groundwater flow is likely to be in the direction of the River Almond (i.e. north and westwards).

**Groundwater Quality**

The groundwater quality in the area is not known. Groundwater quality is likely to vary depending on potential sources of pollution in the area, including industrial estates, the airport, petrol stations, and areas of made ground, etc. Groundwater Source Protections Zones do not yet exist in Scotland and although there are two Nitrate Vulnerable Zones in Scotland, the nearest one is in Fife.

### 7.3.4 Contaminated Land

The potential presence of contaminated land within or close to the limits has been ascertained from reviewing historical maps, consulting CEC and from walkovers of the route at various times. A list of historical maps consulted is included in Table 7.11 in Appendix 7. Detailed descriptions of historical development along the proposed route are set out in the Desk Top Study.

Baseline information on potential contaminated land within the limits is discussed below. Areas of contaminated land outwith the scheme limits are presented in Tables 7.12 and 7.16 found in Appendix 7. In addition, identified locations of contaminated land are shown on Figures 4.1 – 4.10.

#### City Centre (St Andrew Square – Haymarket)

Although this stretch of the proposed scheme has been developed since the mid-18th century when the New Town was built, there are no areas within the limits that have been identified as comprising potentially contaminated land. Potential areas of contaminated land that are close to the limits include existing and former railway land and are shown in Figures 4.1 – 4.10 and listed in Table 7.12 in Appendix 7.

#### Haymarket – Bankhead Drive (Edinburgh Park Station)

The following potential areas of contaminated land have been identified within the limits for this section of the proposed Tram Line 2 route.
### Table 7.5 Potentially Contaminated Land within Scheme Limits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ref.</th>
<th>Location</th>
<th>Potential Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Railway Sidings and Depot including Coal Storage Areas</td>
<td>28</td>
<td>Former Haymarket sidings and depot</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash.</td>
</tr>
<tr>
<td>Made ground forming part of railway embankment</td>
<td>27</td>
<td>Former railway line at the delta junction with Line 1 at Roseburn.</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash.</td>
</tr>
<tr>
<td>Existing Railway and Railway Sidings (Roseburn Depot)</td>
<td>33</td>
<td>Railway depot</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash.</td>
</tr>
<tr>
<td>Existing Railway embankment between Roseburn and Bankhead Drive</td>
<td>10</td>
<td>Immediately adjacent to tramline in this section</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash. Also fly-tipped waste, abandoned cars, etc., near Bankhead Drive.</td>
</tr>
<tr>
<td>Former railway track-bed</td>
<td>26</td>
<td>Former Corstorphine branch to west of Baird Drive</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash.</td>
</tr>
</tbody>
</table>

In addition, potential areas of contamination adjacent or close to the proposed route have been identified. These are shown in Table 7.13 in Appendix 7 Figures 4.1 – 4.10.

**Edinburgh Park – Gogar Roundabout**

The following comprises the potential contaminated land present within the limits of the proposed route.

### Table 7.6 Potentially Contaminated Land within Scheme Limits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ref.</th>
<th>Location</th>
<th>Potential Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Railway embankment</td>
<td>10</td>
<td>Immediately adjacent to tramline in this section</td>
<td>Heavy metals, creosote, diesel and oil spills, chlorinated and other hydrocarbon solvents, pesticides, asbestos, coal and ash.</td>
</tr>
</tbody>
</table>

The tram route crosses the existing Edinburgh to Glasgow railway line at Hermiston Gait and runs north into Edinburgh Park at this point. Other industrial uses close to the route through Edinburgh Park are shown in Table 7.14 in Appendix 7 and on Figures 4.1 – 4.10.

**Gogar Roundabout – Edinburgh Airport Terminal**

The following table shows the areas of potentially contaminated land that fall within the tram route’s limits.
Table 7.7 Potentially Contaminated Land within Scheme Limits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ref.</th>
<th>Location</th>
<th>Potential Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory or works</td>
<td>19</td>
<td>To north of Gogar Roundabout, on site of propose Gogar Depot</td>
<td>Works undertaken at the factories are not known; however potential contaminants could include: Heavy metals Organic solvents chlorides, fluorides, sulphides, sulphates acids / alkalis cyanide, nitrate, nitrite, PAH &amp; phenols. Also fly tipped waste.</td>
</tr>
<tr>
<td>Made Ground</td>
<td>13</td>
<td>Eastern slope of Gogar Burn</td>
<td>Heavy metals, solvents, Landfill gas (methane, carbon dioxide) sulphate, sulphide and hydrogen sulphide asbestos</td>
</tr>
<tr>
<td>Smithy</td>
<td>14</td>
<td>Gogar</td>
<td>Heavy metals, Heavy fuel oils, lubricating oils</td>
</tr>
<tr>
<td>Former Landfill</td>
<td>16</td>
<td>Immediately north of Gogar settlement</td>
<td>Site investigation shows made ground to a depth of a least 16m BLG comprising ash, rubble and clay. Could contain heavy metals, solvents, landfill gas (methane, carbon dioxide) sulphate, sulphide and hydrogen sulphide asbestos</td>
</tr>
</tbody>
</table>

Other potential contaminated land in the vicinity is shown in Table 7.15 in Appendix 7 and Figures 4.1 – 4.10.

**Ingliston Park & Ride – Newbridge**

The eastern half of this section runs mainly through undeveloped land. However, the western end has had a longer history of development. Details of potentially contaminating uses within the limits are identified below.

Table 7.8 Potentially Contaminated Land within the Scheme Limits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ref.</th>
<th>Location</th>
<th>Potential Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dismantled Railway</td>
<td>9</td>
<td>Former Ratho Station and branch line</td>
<td>Heavy metals, Creosote, Diesel and oil spillage, Chlorinated and other hydrocarbon solvents, Pesticides, Asbestos. Also fly tipped waste.</td>
</tr>
</tbody>
</table>

Other instances of potentially contaminated land are present in the vicinity of the limits, particularly around Newbridge. These are detailed in Table 7.16 in Appendix 7.

### 7.3.4 Waste Management

#### Licensed Waste Management Sites

The locations of sites with Waste Management Licences in the vicinity of the limits are shown on Figures 4.1 – 4.10 and detailed in the table below. None are located within the Tram Line 2 limits.
### Table 7.9 Licensed Waste Management Sites near the Scheme Limits

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Ref.</th>
<th>Licence No.</th>
<th>Waste Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrapyard</td>
<td>Claylands, Newbridge, Immediately south of the limits at Newbridge.</td>
<td>A</td>
<td>WML/E/130 (69/93)</td>
<td>Polymeric Materials and Precursors Fuel/oil/Greases Difficult Wastes Metal Scrap/Machinery/Equipment</td>
</tr>
<tr>
<td>Transfer Station</td>
<td>Cultins Road, Sighthill Industrial Estate</td>
<td>B</td>
<td>WML/E/110 (19/86)</td>
<td>Flammable Waste Commercial Demolition/Construction Household/Domestic</td>
</tr>
<tr>
<td>Scrapyard</td>
<td>Humbie Garage, Saughton Mains Road</td>
<td>C</td>
<td>WML/E/118 (70/93)</td>
<td>Polymeric Materials and Precursors Fuel/oil/Greases Difficult Wastes Metal Scrap/Machinery/Equipment</td>
</tr>
<tr>
<td>Scrapyard</td>
<td>Saughton Mains Road</td>
<td>D</td>
<td>WML/E/116 (66/93)</td>
<td>Polymeric Materials and Precursors Difficult Wastes Metal Scrap/Machinery/Equipment Liquid Wastes Miscellaneous</td>
</tr>
</tbody>
</table>

There are no licensed or formally licensed waste management sites actually within the limits. However, there is an area near Gogar that is thought to have been used as a landfill prior to introduction of the waste management licensing regime (see Figures 4.1 – 4.10). This site appears to have been used for demolition waste from around 1900 to the 1950s. It is likely that areas of fill would lie directly within the limits.

**Waste Disposal Issues**

Waste management issues would be associated with areas of potentially contaminated land that fall within the limits and from which material may need to be disposed of during construction of the Tram Line 2 route and associated infrastructure. In addition, fly-tipped waste deposited on certain areas of the limits would have to be disposed of during construction of the scheme. Under the current licensing regime waste falls into three categories comprising:

- Hazardous Waste
- Non-Hazardous Waste, and
- Inert Waste

Material categorised as waste must be disposed of to a licensed waste management facility. However, the Waste Management Regulations do not allow for co-disposal of waste, i.e. Hazardous Waste cannot be disposed of together with a different waste, e.g. Inert Waste, etc. In addition, different costs and taxes are associated with the different categories of waste. Therefore it is important to accurately identify the type of waste produced by the proposed works so that it can be disposed of correctly.

Areas of potentially contaminated land are discussed in the previous section. The likely category of waste that may be generated from each of these areas during construction is summarised in Table 7.10 below.
Table 7.10 Potential Sources of Waste within the Scheme Limits

<table>
<thead>
<tr>
<th>Activity</th>
<th>Ref.</th>
<th>Location</th>
<th>Potential Waste Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Railway Sidings and Depot including</td>
<td>28</td>
<td>Haymarket sidings and depot</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td>Coal Storage Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made ground forming part of a disused railway</td>
<td>27</td>
<td>Former railway line at the delta junction</td>
<td>Inert Waste</td>
</tr>
<tr>
<td>embankment</td>
<td></td>
<td>with Line 1 at Roseburn.</td>
<td></td>
</tr>
<tr>
<td>Railway and Railway Siding</td>
<td>33</td>
<td>(Roseburn Depot)</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td>Existing Railway embankment between Roseburn</td>
<td>10</td>
<td>Immediately adjacent to tramline in this</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td>and Bankhead Drive</td>
<td></td>
<td>section</td>
<td></td>
</tr>
<tr>
<td>Factory or works</td>
<td>19</td>
<td>To north of Gogar Roundabout, on site of</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td></td>
<td></td>
<td>propose Gogar Depot</td>
<td></td>
</tr>
<tr>
<td>Made Ground</td>
<td>13</td>
<td>Eastern slope of Gogar Burn</td>
<td>Inert Waste</td>
</tr>
<tr>
<td>Smithy</td>
<td>14</td>
<td>Gogar</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td>Former Landfill</td>
<td>16</td>
<td>Immediately north of Gogar settlement</td>
<td>Non-Hazardous Waste</td>
</tr>
<tr>
<td>Dismantled Railway</td>
<td>9</td>
<td>Former Ratho Station and branch line</td>
<td>Non-Hazardous Waste</td>
</tr>
</tbody>
</table>

7.4 CONSTRUCTION EFFECTS

7.4.1 Potential Impacts

Potential impacts associated with the construction phase of the Tram Line 2 scheme have been assessed and are discussed in the following sections.

Geology and Soils

Although there are no designated geological sites within the scheme’s limits, a geological SSSI is located close to the Princes Street section of the route, comprising the Castle Rock SSSI dolerite formation. Although very unlikely it is possible that this could be damaged during construction of Tram Line 2.

There are currently no mineral extraction activities being undertaken within or close to the scheme’s limits and therefore construction activities are unlikely to impede any such operations. In addition, there no areas of significant mineral resource have been identified that would be affected by construction works.

For most of the area between limits there are no significant soils that would be affected by the development. However, in the green belt areas west of the Gogar Roundabout damage to soils may occur, particularly where construction compounds would be sited on agricultural land, such as in the Gogar and Ratho areas.

Hydrogeology

There is a risk to groundwater from construction activities. This includes run-off or accidental spillage from construction sites, which may comprise hydrocarbons, hydraulic fluids, solvents, or other substances that could enter a local aquifer, particularly where the overlying drift comprises more permeable Alluvial or Lacustrine sands and gravels. In addition, drilling and piling operations during
construction could open up preferential pathways into deeper strata that may contain aquifers.

**Contaminated Land**

During construction activities, disturbance of contaminated land within the limits could pose a risk to construction workers and local residents through direct contact with contaminants or generation of dust/aerosols, etc. that may be inhaled or may be deposited in gardens or houses. Contaminated run-off and dust from construction areas also pose a risk to environmental receptors, such as surface waters or other sensitive habitats. Contaminated land may also pose a risk to construction materials, through direct contact with aggressive soil conditions or other types of physico-chemical degradation.

**Waste Management**

During construction there would be the requirement to dispose of material from within the limits as required by the detailed design. It is possible that some of this material would come from areas that are potentially contaminated. Particular issues would include known areas of made ground such as railway embankments at Roseburn, former railway or industrial and the area of former landfill at Gogar, in addition to fly-tipped waste within the limits. In general, waste material is likely to comprise Inert and Non-Hazardous waste, although there is the possibility of encountering material that could be classed as Hazardous Waste, for example drums of chemicals or paint, etc. Appropriate handling and disposal of this waste would be required.

In addition, construction activities themselves would generate waste. Most of this would be Inert Waste, however, Hazardous Waste including waste oils, solvents, etc., may also be generated. These wastes would have to be disposed of appropriately following the necessary regulations in order to avoid impacts on the environment. In addition, disposal of waste to sites that do not have a current and appropriate Waste Management Licence would be prohibited.

Note that there are no licensed waste management sites within the limits of Tram Line 2 and therefore no impacts on such sites are anticipated.

**7.4.2 Mitigation**

Mitigation of construction impacts would depend on development and adherence to an effective Environmental Management System that would ensure good practice and emphasise environmental protection. The plan would be useful for mitigating potential construction effects including impacts on surface waters, noise and air quality. The elements of an Environmental Management System are described in section 10.4.2 below.

The Environmental Management System would be developed prior to commencement of site works and would be mandatory. It would ensure that construction activities took place in accordance with all relevant legislation for the protection of surface and groundwater, codes of good practice as well as best practice guidance for works on or near water, such as Pollution Prevention Guidelines prepared by SEPA (see section 10.4.2). In addition, SEPA has specified that the appointed Contractor would be required to submit a method statement for preventing pollution during the construction phase.

**Geology and Soils**

No mitigation measures would be required with regard to protection of the Castle Rock SSSI as this is some distance from the limits and is unlikely to be affected by construction works. There are no other designated geological sites with the scheme’s limits so no further mitigation would be required. In addition, it is unlikely that construction of the scheme would impact on any mineral resources and therefore no mitigation is required.
However, mitigation in terms of damage to soils during construction would be required within the limits, particularly with regard to construction compounds situated within prime agricultural west of the Gogar Roundabout. Mitigation would include ensuring that soils are adequately protected and/or temporarily removed during construction works, then restored/replaced after construction works have been completed.

**Hydrogeology**

Mitigation of hydrogeological risk during construction would comprise ensuring effective environmental management of construction activities. For example, this would ensure that run-off from construction areas would be contained/controlled and that adequate bunding and storage arrangements be put in place to prevent spills of fuel, etc., escaping and potentially entering groundwater. De-water activities would be managed in such way as to prevent impacts on local shallow aquifers. Piling/drilling operations would be required in some areas; however, it is unlikely that such activities would pose a risk to deeper aquifers in these areas from generation of preferential flow paths, although groundwater in superficial strata may be affected.

**Contaminated Land**

Areas of potentially contaminated land within the limits have been identified from historical plans and site walkovers and the potential risks associated with these sites have been identified and assessed.

Currently there is insufficient detailed information on the ground conditions for certain parts for the Tram Line 2 route where excavations are planned. For those areas, an intrusive ground investigation would be carried out in advance of construction to confirm the ground conditions and hence facilitate appropriate site controls and waste management. In the event that contaminated ground is identified, a risk assessment would be carried out and an appropriate remediation scheme agreed with SEPA.

During construction any materials encountered that may be contaminated would be tested for potential chemical contaminants associated with known past uses of the site. In addition, all standard health and safely measures would be followed to ensure the minimum contact between site workers and members of the public and potential contaminants.

Measures would be put in place to ensure that run-off from sites is prevented and that dust and aerosol generation is minimised. Areas of significant contaminated that may impact on construction materials would be removed or isolated to avoid contact with any sensitive materials.

**Waste Management**

Material to be disposed of would be assessed and where required tested to confirm its chemical characteristics so that it can be categorised as Inert, Non-Hazardous or Hazardous Waste as appropriate.

Measures would be put in place to ensure that as much of the excavated material as possible generated through construction is re-used on others areas of the development. Where possible, alternative uses for extracted material would be sought, e.g. as fill for other construction projects within Edinburgh. Where material has to be disposed of this would be carried out in accordance with the appropriate Waste Regulations and Duty of Care.

As part of the Environmental Management System for construction sites, waste minimisation measures would be put in place. Where waste material would be generated this would handled and disposed of according to current Waste Management legislation.
7.4.3 Residual impacts

Residual impacts associated with the construction phase, comprising those impacts that are likely to remain after mitigation measures have been put in place, are discussed and assessed below.

**Geology and Soils**

There would be no residual impacts on designated geological sites within or close to the limits. The impact is therefore Negligible.

Damage to soils during construction, particularly where contactor compounds are situated, is probably unavoidable. In areas east of the Gogar Roundabout, the only open areas that would be damaged are areas of amenity grassland and the significance of impacts on soils would be Negligible. However, soils to the west of the Gogar Roundabout within the green belt would be of higher quality and therefore damage to these soils during construction work would be more significant. However, the area of soil that would be damaged during construction is relatively small and therefore the impact is assessed as Minor.

There are no significant mineral resources that would be affected by the construction works. Impacts are therefore assessed as Negligible.

**Hydrogeology**

Shallow aquifers within superficial deposits are likely to be the most at risk from impacts associated with construction of Tram Line 2. However, most drift deposits beneath the Tram Line 2 limits comprise relatively impermeable boulder clays with areas of more permeable materials consisting of sands and gravels from ancient lake and Glacial deposits as well as Alluvial deposits from existing watercourses.

Superficial groundwater in deposits close to watercourses is likely to be in hydraulic continuity with them. Tram Line 2 crosses some of these areas of more permeable deposits, for example the former Corstorphine and Gogar Lochs as well as Alluvial deposits associated with the Water of Leith and the Gogar Burn.

The Groundwater Vulnerability Map of Scotland indicates that the underlying Oil Shale is of moderate permeability and that these formations seldom produce large quantities of water for abstraction. We have no information on abstractions from the aquifers in the vicinity of the Tram Line 2 scheme; however, it is known that public water supply for Edinburgh is not sourced from the underlying aquifer and that the aquifers are not designated as GSPZs or as a Nitrate Protection Zone. This would reduce the significance of any ingress of contaminants from the construction works. In addition, bedrock is overlain by relatively impermeable boulder clay that would protect the aquifer from introduction of contaminants.

As discussed in the mitigation section, environmental management during construction would prevent run-off and accidental spills entering and contaminating groundwater. The potential impact on groundwater within bedrock is assessed as Negligible whilst the potential impact on shallow groundwater is assessed as Minor.

**Contaminated Land**

Areas of potentially contaminated land have been identified from historical plans and from consultation with CEC. Using the source-pathway-receptor model a number of potential issues were identified. There is a variety of potentially contaminated land within or close to the limits. The main types of contaminated land that would be disturbed by the construction of Tram Line 2 are listed below:

- Former or existing railway land, particularly at Haymarket, Roseburn, Murrayfield, Baird Drive and west of Balgreen Road, plus Gogar Roundabout and Ratho Station.
- Former factory adjacent to Gogarburn Roundabout (Depot Site)
- Site of former smithy at Gogar
- Former unlicensed landfill adjacent to the Gogar Burn
- Made ground on eastern bank of the Gogar Burn

The principle receptors for contaminated land during construction works are as follows:
- Site workers
- Members of the public
- Groundwater (discussed above)
- Surface waters
- Construction materials

Potential pathways will include:
- Direct contact
- Ingestion
- Inhalation
- Surface run-off
- Migration via Groundwater

The risk to each of these receptors would depend on the type and quantity of chemical contamination present as well proposed works to take place in that area of contamination.

However, it is likely that the level of contamination present in each of these areas would not be significant because the areas involved are not extensive and the uses themselves are not likely to have generated large quantities of contaminated material.

Nevertheless, appropriate risk assessment of potential risks from contamination would be necessary to inform the site Environmental Management System and development of appropriate mitigation measures. With these mitigation measures in place this would ensure that contact between potential contaminants and any of these receptors is minimised and the risk reduced to acceptable levels. The overall impact is assessed as being Minor.

**Waste Management**

Wherever chemically suitable, excavated materials would be reused on site in the formation of embankments, screening and landscaping bunds. It is likely that ground investigation together with soils testing would be necessary in both the fill source and fill placement areas to ensure satisfactory management of the excavated materials. However, there would be the requirement to dispose of excess or contaminated material, which cannot be used on the construction of Tram Line 2.

In addition, the construction process would generate other waste, although the majority of this would be classed as Inert Waste. Assuming that the proposed
mitigation measures are put in place and that waste is identified and handled appropriately, according to Waste Management Regulations, it is likely that the potential impact in terms of waste management during construction would be Minor.

7.5 PERMANENT AND OPERATIONAL EFFECTS

This section assesses the potential permanent and operation impacts of the proposed scheme.

7.5.1 Potential Impacts

**Geology and Soils**

No permanent or operational effects on designated geological sites are predicted as none are present within or close to the scheme's limits.

There are currently no mineral extraction activities being undertaken within or close to the scheme's limits. Geological maps indicate that there are no significant geological deposits within or close to the scheme's limits that would be sterilised by development of the scheme. In addition, the Rural West Edinburgh Local Plan does not identify any proposed mineral extraction activities in areas that would be affected by the Tram Line 2 development.

Permanent loss of soils would occur in some areas, particularly in green belt areas west of the Gogar Roundabout. This is unavoidable as part of the tram route crosses Grade 2 agricultural land.

**Hydrogeology**

During operation of the scheme there may be a risk to groundwater. This includes run-off or accidental spillage from the tram route and depots, comprising hydrocarbons, herbicides and other substances that could enter a local aquifer.

In addition, the design of drainage for the scheme would determine risks to groundwater, for example, if there is extensive use of soakaways or other similar measures.

**Contaminated Land**

During the lifetime of the development, there may be a risk from contaminated land to the permanent infrastructure of the scheme. Aggressive ground conditions that remain once the system has been built could degrade buried structures, e.g. high sulphate conditions could attack buried concrete structures.

In addition, in certain areas, such as the former landfill at Gogar and other areas of made ground, there may be a risk of landfill gas, comprising methane, carbon dioxide, etc., that could enter buildings, manholes and service ducts posing a risk of asphyxiation and/or explosion to employees. There is also the risk that landfill gas originating from with the scheme limits could migrate off site, via service runs, etc., to infiltrate adjacent properties or structures, with the attendant risk to members of the public.

Operation of the tram, particularly activities at depots, etc., could create contamination of land that was not previously contaminated, through spills of hydrocarbons or other chemicals. If land is severely contaminated, there may be a requirement under section 78 of the Environmental Protection Act (1990) as amended for this contamination to be remediated.

**Waste Management**

During operation of Tram Line 2 there would be waste management issues associated with waste oils and other materials, generally originating from
maintenance and repair activities on vehicles and infrastructure. There would also be the requirement to dispose of litter from trams and also from trackside litter collections, fly tipping, etc. Waste material is likely to comprise Inert and Non-Hazardous waste, although there is the possibility of encountering material that could be classed as Hazardous Waste, such as paint or chemicals. Appropriate handling and disposal of this waste would be required.

7.5.2 Mitigation

Geology and Soils

No permanent or operational effects on designated geological sites are predicted as none are present within or close to the scheme limits, therefore no mitigation measures are required.

As stated above permanent loss of soils would occur in some areas but damage to soils is unlikely during operation of Tram Line 2, therefore no mitigation measures are required.

Hydrogeology

Tram Line 2 would operate with an Environmental Management System that should prevent spillage of materials to ground that may contaminated groundwater. The design of drainage for the scheme should channel any potentially contaminated run-off to interceptors and sewers rather than allowing contaminated water to simply soak into the ground.

Contaminated Land

Mitigation in terms of contaminated land would be similar to that required for hydrogeology, i.e. prevention and/or containment of spills so that land within the scheme, particularly at depots, is not contaminated by operational activities.

Design of infrastructure would take into account potentially contaminated land so that structures would be protected from aggressive ground conditions and/or gas protection measures put in place to prevent ingress/migration of landfill gas if present. Monitoring and or venting of gas may be required.

Waste Management

Mitigation measure for waste management during operation would include development of management systems with the objective of minimising waste.

7.5.3 Residual impacts

Geology and Soils

No residual impacts on geology are predicted. The impact during operation of the scheme is therefore assessed as Negligible.

Impacts on soils would be permanent and negative; however, the area of soils that would be lost is relatively small and therefore the impact is assessed as Minor.

Hydrogeology

Assuming that adequate and well designed drainage is put in place that would collect and/or treat any contaminated run off and/or spills and that an effective management system and training is implemented to prevent inappropriate disposal or spills, potential impacts to groundwater from the proposed scheme would be Negligible.
Contaminated Land

Prior to and during construction of the scheme contaminated land would be identified and appropriate mitigation measures taken to prevent impacts on infrastructure, personnel and the public during operation of the scheme. However, some residual impacts are likely to remain after mitigation.

The main risk is contamination of previously uncontaminated land within the Tram Line 2 limits, particularly at the Gogar Depot site but also any area of track built on previously undeveloped land. Good design of infrastructure and effective environmental management of operations would prevent contamination occurring. However, there is still a risk of this occurring and therefore the residual impact has been assessed as Minor.

A residual risk to Tram Line 2 is that development of the route would mean that potentially contaminated land, such as former railway land or the areas of made ground at Gogar, would be taken into ownership. Such ownership may entail potential future liabilities, remediation costs, etc. The impact of this issue has been assessed as Minor.

Waste Management

The operation of Tram Line 2 would necessarily generate waste, from repair and maintenance activities as well as litter collection activities. Effective environmental management and waste minimisation can achieve mitigation, however, waste would still be generated. The impact has been assessed as Minor as large quantities of waste are not anticipated during operations.

7.6 SUMMARY OF RESIDUAL IMPACTS

Based on the currently available information on the ground conditions along the route, the following residual impacts from the construction and operational phases are predicted.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Details</th>
<th>Construction Impact</th>
<th>Operational Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology</td>
<td>Designated sites</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Mineral Reserves</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Undermining</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Agricultural Soils</td>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Hydrogeology</td>
<td>Shallow Aquifers</td>
<td>Minor</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Deep Aquifers</td>
<td>Negligible</td>
<td>Negligible</td>
</tr>
<tr>
<td>Contaminated land</td>
<td>Historical Uses</td>
<td>Minor</td>
<td>Minor</td>
</tr>
<tr>
<td></td>
<td>Operational Issues</td>
<td>N/A</td>
<td>Minor</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Waste Materials</td>
<td>Minor</td>
<td>Minor</td>
</tr>
</tbody>
</table>
8 Landscape and Visual Impacts

Landscape and visual assessments are separate though linked procedures and are dealt with separately within each of the sections of this Chapter.

LANDSCAPE

8.1 LANDSCAPE INTRODUCTION

This section presents the assessment of the impacts of the preferred route on the landscape resource of the study area, and considers the changes in the fabric, character and quality of the landscape, which are likely to occur as a result of the implementation of the proposals. It is primarily concerned with:

- Direct impacts on specific landscape features and elements.
- More subtle effects on the overall pattern of elements which together determine the landscape character and regional/local distinctiveness.
- Impacts upon acknowledged special interests or values such as designated landscapes, conservation sites and cultural associations.

As the route runs within the built-up area of the city as well as urban fringe and rural areas, the issues referred to as landscape inherently include townscape as well.

The potential to mitigate adverse impacts has been taken into account in the assessment and the residual impacts identified. It is for this reason that mitigation measures are reviewed in the text prior to the description of residual impacts.

8.2 LANDSCAPE METHODS

The landscape assessment was undertaken in accordance with DMRB (Volume 11, Section 3, Part 5) with reference to the following documents:

- Landscape & Visual Assessment Supplementary Guidance (LVASG)(Scottish Executive, 2002).
- Planning Advice Note (PAN) 58, Environmental Impact Assessment (Scottish Executive 1999).
- The Lothians Landscape Character Assessment dated 1998 (Scottish Natural Heritage Review Number 91).

The four main steps in the landscape assessment process were:

- description;
- classification; and
- evaluation; leading to
- impact assessment.
Landscape assessment consists initially of the collection of baseline data relating to the components, character and scenic quality of the landscape, and an assessment of the sensitivity of the landscape to change. In undertaking the assessment, consideration is given to the following:

- experience of the landscape is not only visual, but involves all five senses;
- data relating to the components of the landscape, its character and quality would include reference to baseline information presented in separate related sections (e.g. Ecology and Nature Conservation, Cultural Heritage);
- the value placed on an area is dependant not only on its inherent scenic quality but on its situation, rarity and usage;
- historical and cultural associations may contribute to the value placed on a landscape not generally considered to be of visual or other importance; and
- landscapes which although not of a quality to warrant national or regional designation may be of great local value.

Data collection was by way of familiarisation (principally by foot and car from the surrounding roads), desk study and field survey. Since landscape and visual impact assessments (Section 8.8) are closely related, the data collected have been used for both as appropriate.

### 8.2.1 Desk Study

Structure and Local Development Plans were consulted to establish the presence of areas of statutory designation and protection, and current 1:25,000 and 1:10,000 scale and historical Ordnance Survey maps were examined to identify trends in landscape change.

Data relating to archaeology, ecology, buildings and settlements were examined to provide a thorough appreciation of conservation interest. Other human interests were established by analysing data relating to recreation, public rights of way and Zones of Visual Influence (ZVI's).

Consultations were undertaken with City of Edinburgh Council (CEC) and Scottish Natural Heritage (SNH) to supplement the desk study data collection.

Information of relevance to the proposed development was extracted from the above sources and the following specific topics were further explored to enable draft, broadly homogeneous units of consistent and recognisable character and quality (Landscape Character Areas, or LCA’s) to be identified:

- the pattern and scale of landform, land cover and built development;
- special values including national and local landscape designations, Conservation Areas and historical and cultural associations; and
- specific potential receptors of landscape and visual impact, including important parts of the landscape, residents, visitors, travellers and other groups of viewers.

Zones of Visual Influence (ZVI's) encompassing the area within 2km of the proposed route were generated manually by way of field survey, due to the complex nature of visibility within a city and used to identify the area from which the tram alignment may be visible (refer to Section 8.8: Visual Impacts and Figure 8.4). The study area was then selected as 1km either side of the centreline of the tram tracks. Although the overhead line system (OHL) may be visible beyond this distance, it is considered that any potential landscape impacts outside this corridor would not to be significant.
The visibility of the proposals (as recorded in the ZVI) can also influence the value of the landscape through which the proposals would pass. In simple terms, the greater the number of people who have a view of a publicly appreciated and well-used landscape, the higher is its potential landscape value.

8.2.2 Field Survey

Public use of open spaces, roads and footpaths was observed during the course of the landscape and visual assessment survey. This has a direct bearing on landscape as a human resource and is taken into account in the evaluation process. Further information relating to public use of the environment is provided in Chapter 5.

8.2.3 Assessment of Impacts

In order to assess the significance of landscape impacts, the sensitivity of receptors and the likely magnitude of change were considered, as outlined below.

**Sensitivity of Receptors**

Evaluation of the sensitivity to change combines a review of ‘value’ of the main elements, which together comprise each character area together with their ‘susceptibility’ to change of the type proposed. This evaluation is presented in tabular format, in Appendix 8.

Landscape quality may not always coincide with the LCA classification but contributes towards the assessment of both value and susceptibility and hence landscape sensitivity. The assessment of landscape quality concerns the public perception of aesthetic and visual attractiveness of the landscape, and considers the following:

- visual factors (proportion, scale, enclosure, texture, colour, views);
- pattern and composition of features;
- purity of character; and
- degree of tranquillity.

“Value” as defined by LVASG is “the importance ascribed to the landscape by public perception, value to the community or professional judgement.” In this study, informal public use of open spaces, roads and footpaths as observed during the course of the landscape and visual assessment survey together with professional judgement on landscape quality (see above) was used to ascertain the value of the landscape and whether this was considered to be of local, regional or national importance.

“Susceptibility”, as defined by LVASG, is “the ability to accommodate changes arising from the proposal without adverse effect.” This in turn is equivalent to “vulnerability to degradation”, described in DMRB as the capacity of the landscape to accept change of the type and scale proposed...through the introduction of new features or the loss of existing components.” In order to arrive at this evaluation, using professional judgement, the following aspects were considered:

- landscape character and context;
- landscape quality;
- current and future likely landscape trends;
the nature and extent of landscape components and their importance and positive or negative contribution to the landscape character area within which they are situated and also to the wider landscape;

rarity.

The criteria used to evaluate the overall landscape sensitivity is outlined in Table 8.1.

Table 8.1 Landscape Sensitivity Criteria

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Landscape or landscape elements of particular distinctive character, highly valued and considered susceptible to relatively small changes.</td>
</tr>
<tr>
<td>Medium</td>
<td>A landscape of moderately valued characteristics considered reasonably tolerant of change.</td>
</tr>
<tr>
<td>Low</td>
<td>A landscape of generally low valued characteristics considered potentially tolerant of substantial change.</td>
</tr>
</tbody>
</table>

Magnitude of Change

An evaluation of the magnitude of the proposed changes on the elements of the landscape through which the tram route passes, was carried out through a review of the nature and scale of the change, together with its duration and degree of permanence, using the criteria outlined in Table 8.2. Note that each magnitude band can incorporate a range of change in landscape characteristics, from negligible at the lower end to very high at the top end. For convenience in the tabulation of this evaluation, however, only the three values are listed.

Table 8.2 Landscape Magnitude of Change Criteria

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Notable change in landscape characteristics over an extensive area ranging to very intensive change over a more limited area.</td>
</tr>
<tr>
<td>Medium</td>
<td>Minor changes in landscape characteristics over a wide area ranging to notable changes in a more limited area.</td>
</tr>
<tr>
<td>Low</td>
<td>Minor to virtually imperceptible change in any area or landscape components.</td>
</tr>
</tbody>
</table>

Significance of Impact

Landscape impacts change over time as mitigation, such as planting and restoration of habitat types included as part of the proposals establish and mature, and as existing landscapes external to the development evolves. The assessment acknowledges change and impacts were assessed during construction, for winter year of opening and summer fifteen years after opening.

An initial indication of impact significance (adverse or beneficial) was gained by combining sensitivity and magnitude in accordance with the matrix provided in Table 8.3 however, it should be noted that this provides an initial framework to aid consistency of reporting and provides an indication of the likely impact arising from the assessment of magnitude and sensitivity. Given that the criteria low/medium/high represent levels on a continuum or continuous gradation, professional judgement and awareness of the relative balance of importance between sensitivity and magnitude was also required.

The matrix provided in Table 8.3 has been adapted from LVASG to accommodate a seven point scale to enable a consistent use of impact significance criteria with the Edinburgh Tram Line 1 Landscape and Visual Assessment. Impact ratings adopted
comprise Substantial, Moderate, Slight or Negligible and adverse or beneficial. A rating of negligible has been applied where there is no discernible impact.

Impacts of Moderate and above are considered significant, as this is the level at which the changes to the landscape would be clearly perceived.

Table 8.3 Impact Significance Criteria for Landscape

<table>
<thead>
<tr>
<th>Magnitude Sensitivity</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Substantial</td>
<td>Substantial</td>
<td>Moderate</td>
</tr>
<tr>
<td>Medium</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Slight</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>Slight</td>
<td>Slight</td>
</tr>
</tbody>
</table>

8.2.4 Assumptions Made for the Assessment

Chapter 2 describes the construction methodology and project components. A number of assumptions have been made however, during the both the landscape and visual assessment process about the various scheme components, and these are outlined below:

Route Alignment

- The alignment which the assessment has been based upon is shown on Final Route Alignment Plans prepared as part of the Parliamentary Bill submission, including the possible location of 19 tram stops (between St Andrew Square to the terminus at Newbridge) (see Figure 2.1) This exemplar engineering design, for the purposes of this ES, forms the basis upon which both the assessment and the indicative landscape mitigation is founded.

- Tram stops would be 30-40m long, and would be lit during the hours of darkness.

- There would be one main depot located to the north of Gogar roundabout, the extent of which is identified on Figure 2.2. The depot would be lit at night at a level similar to the buildings, approximately 2.5m above adjacent ground levels.

- The 8 substations, located on Figure 2.1 would each be approximately 8m x 16m and 3.5m high with vehicle access.

- There would be no lighting along the alignment other than at tram stops or at locations where existing street lighting would be replaced.

Vehicle design is described in Section 2.4. It has been assumed that tram vehicles would have headlights and internal illumination during the hours of darkness.

Track:

- It has been assumed that this would be twin-track light rapid transit trackbed, paved in a variety of materials according to situation.

Overhead Line Equipment (OLE)

- It has been assumed that the pole height for sections of off-street running would be 5m and for shared running, 7m;

- Information on the detailed position of poles is not available until a more detailed design has been undertaken. However it has been assumed that
for a radius around 25m, the distance between poles would be less than 10m and on straight sections of line would be up to a maximum span of 60m.

• The OLE proposed for all but the section of alignment from the delta junction at Roseburn to St Andrew Square would be a catenary system with a central pole and single track cantilever, with conductor wires.

• Building fixings would be utilised where feasible.

• Where possible poles would have more than one function, such as combining street lighting, thereby reducing the vertical clutter in the streetscape and more open landscape.

• All visible parts of the OLE would be simply and elegantly designed and detailed, in line with the Design Manual and as far as possible reduced to minimum dimensions.

• The layout of the poles and support wires would be designed to fit the pattern of the townscape and reflect the structure of the wider landscape.

• There would be associated signalling equipment and signs.

Construction is described in Section 2.5.

• Construction compounds are listed in Section 2.5.3 and would be used for storage of plant and materials and for site offices. They would be lit at night.

• Construction works would involve the use of low mobile cranes. Such works would be similar to road construction works in nature and extent, with linear safety fencing temporarily blocking local views and with temporary traffic controls. Some activities, such as the erection of the poles, would be of such short duration that impacts associated with them would be negligible. Ingliston Road would be temporarily closed during construction and traffic diverted.

• Public utility diversions would be necessary. This has been taken into account in the assessment of construction impacts within the LOD.

• Night working would be illuminated, but only carried out at structures. It is assumed that there would however be no light working and thereby illumination at the following structures: Russell Road overbridge, Roseburn Street bridge, along Baird Drive, Water of Leith bridge, or Carrick Knowe rail crossing.

Predicted Future Impacts

• It has been assumed that the Park and Ride (P&R) at Ingliston is a firm proposal by ‘others’, due to be built in the near future and therefore has been treated as if it is in existence. The extent of the P&R is identified on Figure 6.8 (Development D8 and described in Chapter 6 Land Use) and has been assumed that it would be lit during the hours of darkness and that some shelter/collection structures would be constructed.

• It has been assumed that the tram would replace WEBS running on the same alignment although the assessment and mitigation proposals assume that there would be no landscape proposals implemented through WEBS.

• Royal Bank of Scotland World Headquarters at Gogar Burn including the access bridge over the A8, is a firm proposal which is currently under construction and therefore has been treated as if it is in existence.
• Edinburgh Park undeveloped section. Since the exact form of the proposed commercial/business development is not yet known, the tram proposal has been assessed on a ‘stand-alone’ basis.

8.3 LANDSCAPE BASELINE SITUATION

8.3.1 Regional Context

The study area forms part of the broad Lothians lowland plain. The Lothians region is a distinct geographic and landscape region, which lies between the Southern Uplands and the Firth of Forth. The southern horizon consists of the Moorfoot and Lammermuir Hills, with the sharp northern brow of the Pentland Hills advancing towards the edge of Edinburgh. The city is closely bounded by the Firth of Forth to the north and the Pentland Hills to the south.

The city of Edinburgh is a major regional centre and the capital of Scotland. Edinburgh acts as the centre for communications, employment, shopping and services for the region.

The proposed tram route travels from Edinburgh’s city centre, stretching westward through urban and urban fringe areas into a more rural landscape terminating at Newbridge. The study area is situated within the local authority area of the City of Edinburgh. The route however travels through areas covered by three local plans; Central Edinburgh, West Edinburgh and Rural West Edinburgh.

Central Edinburgh comprises of Edinburgh’s city centre and its surrounding older residential neighbourhoods. The local plan boundaries correspond closely with the limits of the city’s growth reached in 1914.

West Edinburgh forms a broad arc running from Cramond and Granton Waterfront in the north through to the northern slopes of the Pentland Hills in the South. It extends from the edge of the inner city suburbs in the East to the city bypass in the West. Much of this area is made up of suburban residential communities but also includes major business and industrial estates, major shopping facilities and significant areas of greenspace.

Rural West Edinburgh is characterised by large amounts of open countryside within which lie many small towns and villages. The open land is predominantly productive farmland and most is protected by Green Belt and Countryside policies. Much of the countryside is an attractive landscape of varied character ranging from the heather moorland of the Pentland Hills to the designed parklands such as Dalmeny and Cammo. The Green Belt and Countryside policies provide an attractive western edge to the city and play a strategic role in supporting Edinburgh’s compact city form.

8.3.2 Landscape and Other Statutory Designations

273 archaeological and heritage sites have been identified within the assessment corridor (Figures 11.1/1-10). Chapter 11 and Appendices 1-3 provide detailed information on the character and baseline condition of each site.

The 273 sites comprise:

• 3 Scheduled Ancient Monuments.
• 36 other sites and areas of archaeological interest.
• 173 Listed Buildings.
• 54 other sites of architectural interest.
• 3 Outstanding Conservation Areas.
3 Inventory status Historic Gardens and Designed Landscapes.

1 World Heritage Site.

The section of the route between St. Andrew Square and the west end of Princes Street falls lies entirely within the designated area of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape and the New Town Outstanding Conservation Area. Most of the streets within this route section, with the exception of the west side of North St David Street and the east side of North St Andrew Street, are lined by Listed Buildings.

Princes Street and Princes Street Gardens lie entirely within the designated areas of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape and the New Town Outstanding Conservation Area. There are a considerable number of Listed Buildings beside Princes Street and other items of street furniture have been recorded. The south side of Princes Street, between Lothian Road and Waverley Bridge, is defined by Princes Street Gardens. These gardens are the largest open element of the New Town Gardens Designed Landscape, as listed in the *Inventory of Gardens and Designed Landscapes in Scotland* and form the setting for a considerable number of statues, memorials and other civic monuments, most of which are Listed Buildings.

The tram would then run from Princes Street on-street along Shandwick Place and West Maitland Street, and across Haymarket junction to Haymarket Terrace. This route section lies entirely within or on the boundaries of the designated areas of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape and the New Town and West End Outstanding Conservation Areas. There are a considerable number of Listed Buildings along the whole route section.

Between Roseburn and Gogar, several sites of cultural heritage interest and part of the “B” listed Jenners Depository lie within proposed development locations, including the (unlisted) remains of a designed landscape surrounding the former Old Saughton House. Also, the former Gogar Loch once lay around the area now occupied by The Gyle shopping centre.

The section of route from Gogar roundabout to Newbridge would run to the north of an Area of Great Landscape Value (AGLV) at Gogar Burn, although the A8 corridor would separate the designated site from the proposed tram alignment. There are four Historic Gardens and Designed Landscapes within the wider study area of this section, as identified in *An Inventory of Gardens and Designed Landscapes in Scotland*. Newliston House lies to the north west of Newbridge, Cammo to the north of the Gogar Roundabout, and Milburn Tower to the south of the A8. However, all of these sites would be at least 500m from the tram alignment and in many cases are buffered by vegetation, landform, road corridors or other developments. A relict designed landscape has also been identified around Castle Gogar although it is undesignated. In this area there are also:

4 Scheduled Ancient Monuments (SAMs); barrow and standing stones at Huly Hill, prehistoric fort, palisaded enclosure and field system at Gogar and two prehistoric standing stones at Easter Norton and Lochend Farm, Newbridge. The standing stones stand well clear of the proposed tram line, whereas the proposed route would pass close to the east of the Gogar fort and would run along existing roads at Huly Hill.

3 category “A” Listed buildings (Castle Gogar, Ingliston House and walls and Ingliston House Stables):.

3 Category “B” Listed buildings; Ingliston House Lodge, Gogar Parish Church and Castle Gogar Lodge.

The proposed route would run on existing roads adjacent to Norton House Hotel North Lodge, and Middle Norton Cottages (all category C(s)).
There is also the remains of a medieval village adjacent to Gogar Church, as yet undesignated, but potentially of regional or national importance.

There are no other statutory or other landscape designations within the immediate tram corridor, although a number of designations exist within the wider study area. Those features most likely to be impacted by the proposals are described in more detail in Chapter 11. Locations of designated sites of landscape and cultural heritage interest are identified on Figures 4.1 to 4.10.

The section of tram corridor from Gogar roundabout to the west of the airport and south of Ratho station falls within Green Belt designated land of which the local landscape character under local plan policy is to be protected, maintained and enhanced.

Within the study area and adjacent to the tram corridor are various areas of open space identified and protected under local plan policy. Princes Street Gardens and Calton Hill are both listed in the local plan as “Open Spaces of Outstanding Landscape Quality”. To the north of the delta junction at Roseburn in the north east of the study area, Donaldson’s School is similarly identified, although it would be largely buffered from the proposals by other buildings. Several areas of Significant Open Space lie adjacent, or in close proximity to, the tram proposals which include the area around Huly Hill at Newbridge (the proposed route would run adjacent to a large section of the area), Sighthill Public park, (although this is separated from the proposed route by a road), open space between the railway corridor and Stenhouse Drive, which the proposals would run immediately parallel to and Carrick Knowe Golf Course where the route would run along the southern boundary.

Other areas of Significant Open Space within the study area but removed from the route proposals and generally buffered by housing and other development, are the recreation ground at Lochend, an area of land next to the school at Lochend, a small park in Ratho Station, an area in West Craigs along Maybury Road, Gyle Public Park, Parkhead Park, St Margaret’s Parks, Union Park and Saughton Public Park.

Edinburgh City Council has a programme identifying Heritage Trees of significance of which trees at Gogarburn, Cammo Estate and Norton House Hotel in the study area have been identified. Cammo Estate is some distance from the tram proposals, although the alignment would run to the immediate north of the Heritage Tree at Gogarburn and within 250m of Norton House Hotel.

Tree Preservation Orders (TPO) are in place for trees to the south of Ratho Station, on the Cammo Estate and in the former Gogarburn Hospital site. The tram alignment would run to the immediate south of the TPO area at Ratho Station, although an area of hardstanding would separate the two.

The landscape and cultural heritage sensitivities indicated by these designations have been taken into account in the assessment. Their locations are identified on Figures 4.1 to 4.10.

8.3.3 SNH Landscape Character Assessment

Scottish Natural Heritage, in conjunction with partner Councils, has undertaken detailed review and classification of the various landscape areas and types of Scotland. The western section of the study area, from Gogar roundabout west, is covered by the Lothians Landscape Character Assessment, dated 1998 (Review Number 91). Chapter 3 of the Lothians Landscape Character Assessment divides the Lothians into seven broad landscape character types within which a further twenty six detailed Landscape Character Areas are identified. The document provides a description of each of the Landscape Character Areas, their positive and negative attributes and key strategic aims and guidelines for each. The one Landscape Character Area included within the study areas is as follows:
**Lower Almond Farmlands**

This Character Area forms part of the broad Lothians lowland plain. The Lower Almond Farmlands are visually important in providing the setting of the city from the western aspect. It is typified by a matrix of high quality, predominately arable farmland, with medium to large scale fields, divided into a field pattern delineated by hedgerows, fences and occasional stone walls. The area is rich in policy woodlands and shelterbelts with designed landscapes which make a significant contribution to the character of the landscape. The area is scattered with small villages, farmsteads, cottages and other dwellings, many of which have become absorbed within more recent development. The landscape to the west of Edinburgh is dominated by the Airport, Royal Highland Showground, Gogar Hospital development site, nearby industrial estates and commercial centres, the A8 and M9 motorway and several other major roads which sever and further lessen the integrity of the farmland and landscape. Further disruption is added by the numerous pylon lines and several visually prominent bings and quarries. The predominately rural character of this area is under threat from continual industrial, residential and transport development pressures which are slowly increasing the fragmentation of the landscape.

The positive attributes include:

- rural matrix of predominately arable farmland;
- subtle topographic and woodland features;
- surviving strong field enclosure elements.

The negative attributes include:

- multiple urban expansion pressures, leading to significant cumulative impacts;
- continuing road corridor extension pressures;
- prominent quarrying and landfill impacts.

It identifies the key strategic aim of this character area is to prevent further fragmentation of the predominately rural character and suggests guidelines for carrying out this aim, such as reinstating and restoring existing characteristic field enclosure patterns where damaged and reinforcing and strengthening patterns by requiring additional planting associated with new development proposals.

### 8.3.4 Historical Account

The historic mapping of the area provides a better understanding of the landscape of the area by providing the historic context within which the landscape has developed. The following description provides a summary of the details, which are contained in Appendix 8.

**St. Andrew Square-Princes Street- Haymarket**

Comprises a planned urban concept of international significance. The First New Town, built to James Craig’s 1767 plan, has experienced significant redevelopment, while the Second, Third and Fourth New Towns, which were laid out on estates to the north, east and west retain most of their original buildings. The importance of the area lies in the formal plan layout of buildings, streets, mews and gardens, and in the quality of the buildings themselves. As a result of the Parliamentary Act of 1816, the south side of Princes street has very few buildings above ground level; those present including the Scott Monument, built 1840-4, the Royal Scottish Academy, St John's Church and the Balmoral Hotel (formerly the North British Hotel). The south side of Princes Street, between Lothian Road and Waverley Bridge, is defined by Princes Street Gardens. These 12.8 hectare gardens are the
largest open element of the New Town Gardens Designed Landscape and were laid out in the early 19th century, but have been considerably modified since. East Queen Street Gardens was the first along Queen Street to be laid out as a communal pleasure garden, in 1814, but the original design has also been substantially altered.

**Haymarket – Dalry – Gorgie – Saughton – Broomhouse – Corstorphine – Gyle - Gogar (inside City Bypass)**

Before 1850 the main village in the area was Corstorphine, which had a school and a church. It was surrounded by farmland, with which were individual farmhouses and estate houses such as South Gyle, Old Saughton House, Gorgie and Dalry. Coltbridge was also a well-established village at a bridge over the Water of Leith, and had a school and post office. To the west of Coltbridge in an area called Murrayfield were several scattered lodge houses, and to the east of Coltbridge on the road into Edinburgh was Haymarket Station, which at this stage was on the very edge of the city. Several mills had become established along the Water of Leith, the largest being Gorgie Mills.

Between 1850 and the First World War, Edinburgh expanded by at least a mile to the north and west of Haymarket. The village of Coltbridge was swallowed up by mainly residential development and was renamed Roseburn. A polo ground was created to the west of Roseburn, and the Murrayfield area was also encroached upon by low-density mainly two-storey residential development, until it almost joined Roseburn and Corstorphine.

The estates and farmland at Dalry were swallowed by a mixture of residential and industrial development, along with a football ground at the former police depot at Tynecastle. To the southwest however, other than the industrial developments along the water of Leith, the areas of Gorgie, Saughton, Sighthill and Gyle remained rural.

In the inter-war years, Edinburgh expanded further still, with low-density residential developments at Saughtonhall, Stenhouse and Sighthill. Corstorphine also grew more in this period. Areas of open space were preserved as public parks and a golf course was created at Carrick Knowe. A football ground and playing field were built on the polo ground at Roseburn, later to become the Murrayfield Rugby Football Ground.

Since World War 2, the present day Edinburgh expanded further still and significant changes in the transport network have occurred, reflecting the demise of the urban railways and an increased dependence on roads. The Edinburgh City Bypass was constructed, with its associated interchanges, including a major roundabout at Gogar to the east of the airport. The Western Approach Road was constructed on sections of the closed Wester Dalry branch of the Caledonian Railway.

New higher density residential areas emerged in West Craigs, North Gyle, South Gyle, Sighthill, Broomhouse and Saughton. Associated with these were schools and parks, for example St Augustine’s High School and Sighthill Public Park.

Large areas of agricultural land were also developed in South Gyle and Sighthill, becoming the retail, business and industrial premises of Edinburgh Park, South Gyle and Sighthill Industrial Estate. Another section of the Gogar Burn was culverted and straightened to accommodate the Edinburgh Park development. Generally development has been contained within the Edinburgh City Bypass – outwith the bypass the primary land use has remained agricultural, even though the character is more urban fringe.

**Gogar – Edinburgh Airport – Newbridge (outside City Bypass)**

Before 1850 this area was mainly farmland, with scattered farm buildings and estate houses and grounds such as Ingliston, Gogarburn, Gogarpark, Norton House and Hanley. There were no villages or hamlets other than a small group of houses at
Newbridge, otherwise properties were scattered. The Edinburgh to Glasgow road ran east to west through the area, along with the Union Canal and Edinburgh and Glasgow Railway to the south of the road. A station was located at Ratho, but there was no other development associated with this.

Between 1850 and the First World War the area changed very little. The main changes have occurred since that time, with the predominantly rural character giving way to urban fringe. The construction of Edinburgh airport resulted in the loss of large areas of agricultural land and the impact of Ingliston Showground on the wooded parkland around Ingliston House was also significant. Other important changes were the construction of the M8/M9 motorways close to Ratho Station (and more recently the M8 extension to the by-pass at Hermiston Gait) and the expansion of Newbridge, Lochend and Ratho Station. Residential and industrial development have grown considerably, largely as a result of the proximity of these settlements to the M9 and the airport. The Huly Hill standing stones and tumulus at Newbridge were retained however, with development taking place around them.

8.3.5 Geology and Soils

The study area falls within the Scottish geological structural division of Midland Valley. The Midland Valley has the structure of an ancient rift valley in which strata between the Highland and Southern Upland Boundary faults have subsided relative to those on either side.

The soils in the area consist of a complex pattern of different associations. The majority of the study area traverses urban areas with no soil classification. Other sections of the study area traverse the soil associations of Rowanhill / Giffnock / Winton, Darvel and Alluvial. Rowanhill / Giffnock / Winton is derived from drifts of material eroded from the underlying carboniferous sandstones, shales and limestones. Darvel Association is derived from fluvioglacial sands and gravels.

8.3.6 Landform and Drainage

The proposed route corridor is primarily lowland, generally around 50m AOD (Figure 8.1). The Southern and Eastern sections (urban areas of Edinburgh) are in the catchment of the Water of Leith whilst the north and western parts of the route (around Newbridge, Edinburgh Airport and Gogar) are in the catchment of the River Almond.

Many small tributaries of the Water of Leith have been culverted within the denser urban fabric.

In the urban area, whilst much of the topography is masked by development, prominent hills such as Corstorphine Hill have remained undeveloped and contribute much to the landscape and biodiversity of the city. The topography of the more rural western sections of the study area is gently rolling and open, rising gently to the south and undulating to the north. This relatively flat landscape is occasionally interrupted by ‘igneous intrusions’, which form small hills such as Lennie Hill.

8.3.7 Settlement Context

Edinburgh has a long settlement history dating back to the dark ages. During the 14th century Edinburgh became wealthy through trade and grew in size and importance, becoming the capital of Scotland in the mid 15th century.

Today the city of Edinburgh is a major national and regional centre. The east of the study area is concentrated in the old City core, the older inner suburbs of Edinburgh and continues west through mainly residential districts of Haymarket and Murrayfield. The proposed route would pass the major sporting facility of Murrayfield Stadium and surrounding residential areas before reaching the large business and light industrial centre of Edinburgh Park and the Gyle shopping Centre. Continuing West, the route would enter the semi-rural areas of West
Edinburgh before approaching Edinburgh International Airport and the Royal Highland Showground, then on to the settlements of Ratho Station and Newbridge.

The residential and urban areas of west and central Edinburgh are contained by the A720 City Bypass. Development in central Edinburgh was dictated in the early post war decades by city-wide Development Plans prepared in 1957 and 1965.

Surrounding the central area are the city’s older 19th century housing areas, typified by tenement flats and lower density villa suburbs. Much of the inner suburbs were built to high standards of amenity and quality and these have stood the test of time. West Edinburgh includes large areas of post war housing as well as smaller pockets of single-storey cottages and key buildings of historical and architectural value.

A number of key development sites exist along the proposed route, including Sighthill/South Gyle, Edinburgh Park, The Gyle Centre, Gogarburn, Edinburgh Airport, the Royal Highland Showground and Newbridge. Within Sighthill and South Gyle older business and industrial units are being more intensively redeveloped for modern business use. Edinburgh Park currently supports 6000 jobs. Subject to planning approval, the site could expand to support a further 12000 jobs. The Gyle Centre is currently expanding to around 36,000 square metres of retail development and supports 2,200 jobs and has strong linkages with surrounding business and residential communities.

Planning permission has recently been granted for the redevelopment of the Gogarburn Hospital site for the global headquarters for the Royal Bank of Scotland. Over 3000 jobs are expected to be located on site.

Edinburgh Airport is experiencing rapid year on year passenger growth. Over 3500 people are currently employed at the Airport. The Royal Highland and Agricultural Society of Scotland is progressing with redevelopment and modernisation of the Showground area. The Showground attracts around 1.2 million visitors each year, the majority of which attend the Royal Highland Show, which is held in June each year.

Newbridge and Ratho Station are small closely linked villages centred on the busy traffic interchange where the M8, M9, A8 and A89 converge. The villages are physically separated by the M8 and Lochend Industrial Estate. Many of Rural West Edinburgh’s jobs are provided at the Newbridge and Lochend industrial estates. Proximity to the road transport network has resulted in the area becoming an important location for storage and distribution warehousing.

It is estimated that the Lothians would experience the biggest population growth in Scotland, rising by around 50,000 between 2001 to 2015.

**8.3.8 Vegetation**

The study area is effectively divided in half in terms of vegetation characteristics; the section east of the Gogar roundabout is typically urban in character whilst the area between the Gogar roundabout and Newbridge is largely rural but interspersed by settlements and development at Newbridge, Ratho Station, the airport and showground.

From Roseburn in the city centre west to Gogar roundabout vegetation is urban in character typified by managed grass verges, open recreational space and structure and specimen landscape planting. Private garden planting contributes locally to the city’s vegetation diversity with public gardens of the New Town and cemeteries such as at Dalry further enhancing it. Allotments at Stenhouse Drive and adjacent to Carrick Knowe golf course create a contrasting vegetation pattern against the expanses of open grass and playing fields. Occasional scattered specimen trees, remnant shelter belts and structure planting are evident and often associated with large areas of green open space.
Woodland and structure planting is generally limited to the active and disused railway corridors and rail junctions and the Water of Leith, which provide significant pockets and corridors of planting. Scrub vegetation is often established along swathes of un-maintained grass and pockets of un-developed land. Corstorphine Hill to the north of the study area and Craiglockhart Hill to the south provide significant blocks of planting within these urban sections of the study area.

From Gogar roundabout west the vegetation pattern is predominately of arable farmland delineated by hedgerows and shelterbelt planting and interspersed with mature policy woodland. The Edinburgh to Falkirk railway line and the Gogar Burn run through corridors of woodland vegetation, whilst the area around the airport is more urban in character, with managed grass verges and structure planting.

Around the villages of Newbridge and Ratho Station the rural pattern is disrupted by industrial and residential properties and areas of scrub vegetation around Newbridge Industrial Estate. The broad bands of woodland and grass around Huly Hill provide an unusual pattern of vegetation amidst the industrial and residential areas. The large area of woodland around the disused quarry south of Harvest Road in Ratho Station also provides a strong feature amongst the industrial buildings.

8.3.9 Nature Conservation

There are no national nature conservation designations in the study area, although a number of local designations exist. These include various Sites of Importance for Nature Conservation (SINC), Urban Wildlife Sites (UWS), wildlife corridors and areas of long established woodland. Further details of the ecology and nature conservation characteristics of the study area are given in Chapter 9.

8.4 LANDSCAPE CHARACTER AREA (LCA) DESCRIPTIONS

The Character Areas fall into four categories, which in broad terms, radiate outwards from the city centre:

- A: Historic City Core;
- B: Urban and Suburban Residential with Urban Green Space;
- C: Landscape dominated by large-scale business and office-related developments;
- D: Urban Fringe Character Greenbelt dominated by infrastructure.

These in turn can be sub-divided into a number of smaller recognisable character areas.

LCA boundaries are illustrated in Figure 8.2 and a description of different components in each LCA and a summary table for each is provided below, with a review of the positive and negative attributes, an assessment of public perception, visibility and use, landscape sensitivity and likely landscape trends if the proposed scheme did not proceed (“do minimum scenario”).

8.4.1 A: Historic City Core

Edinburgh’s historic core is long established as one of UK’s national cultural assets and is the most highly valued of Scottish townscape. It contains one of the largest areas of Georgian architecture in Europe and almost the entire city centre is inscribed on the UNESCO register of World Heritage Sites due to its unique architectural heritage and distinctive townscape. Conservation areas cover about one third of the city and there is a general agreement that its special urban qualities have to be safeguarded and protected.
**Sub Character A1: New Town: St Andrew Square**

St Andrew Square, a formal tree-lined square bounded with railings, marks the end point of George Street, the principal axis of the New Town and is a key element in the formal layout of this part of the World Heritage site. It is a formal square bounded with a low wall and railings. Four storey Georgian frontages line the north side, whilst there is a diverse mix of building styles on the other three sides. New sandstone clad modern buildings, including the new bus station, have been recently completed on the west. There is an openness to the east side of the square because of the way the imposing Royal Bank head office is set back.

The extent and maturity of the planting in the square allow few views of the whole space and the eye tends to be drawn along streets. The square is primarily in office use, with some retail, most notably the new Harvey Nichols. Although it links to all the main shopping areas of the city centre, the layout of these is such that the pedestrian traffic is comparatively light although this may change if the new shopping street link to the St James Centre proves successful.

The roads have an asphalt carriageway and the footways are generally paved with concrete flags. Caithness slabs have been used to repave the footways in front of Harvey Nichols and the new bus station. Most of the street furniture is of simple utilitarian design with the exception of the fine cast iron railings to the square and along the front of the original facades.

**Sub Character A2: New Town: Princes Street**

A long straight street, the southern edge of the first New Town, Princes Street has a very distinctive one-sided character, with only three major buildings, all of high quality, on the south side but a continuous façade three to six storeys high on the north side broken only by the cross-streets. The architectural style and quality of the north side is extremely varied, an eclectic mix of shop and some hotel fronts of almost every era: from a few Georgian remnants, through exuberant Victoriana to brutalist 1970’s major store developments and 1990’s post-modernism. The defining point of the street is its magnificent setting, open to the south with views across Princes Street Gardens (which form a component of this character area) to the Castle and the old town. There are also important views along the street towards the follies on Calton Hill (which also forms a component of this character area) and also from the cross streets towards the old town and the castle.

Along the south side of the street there is a decorative cast iron railing incorporating low streetlights and a solid row of traditional memorial park benches donated over the years. The wide pavement of the north side has been improved recently with the introduction of clean-lined modern bus shelters and litterbins. Street lighting is mainly provided by building mounted spotlights.

The road has an asphalt carriageway with a mixture of concrete and granite kerbs, laid to give a broad kerb. The wide northern footway is paved with high quality ground finish paving slabs and the narrow central reserve is setted. The south
footway generally has basic concrete slabs except around Waverley Bridge where it has been upgraded to York-stone and granite.

Edinburgh’s principal shopping street, and also containing hotels and offices, Princes Street is very busy. On Saturday afternoons the broad northern footway can be almost full. It is a main public transport corridor, with buses not only serving the street but also transiting the city. Waverley Station lies just south of the east end, at low level, poorly connected for pedestrians.

Sub Character A3: New Town: West End

The West End, from just east of Haymarket to the end of Princes Street, is an architecturally coherent, symmetrical, and generally high quality extension of the New Town, and part of the World Heritage site. Three to four storey classical sandstone tenements with front basements line most of the street, with shop-fronts projecting forward to the pavement line at both the Princes Street and Haymarket ends. Midway along the street, formal crescents step back to create a central oval open space, with street trees continuing the line of the building frontages. The Princes Street end is an extension of the town centre retail area; the centre section is in office and residential use, with local retail adding to the mix close to Haymarket. It is a major traffic thoroughfare to the city centre; with the Haymarket end effectively an extension of the Haymarket transport interchange.

Sub Character A4: Haymarket

Haymarket is a mixed residential, retail and office area around the city’s second station. It is a major transport interchange and a busy traffic junction with high vehicular and pedestrian flows.

The station is particularly busy at rush-hour, with commuters from the west and Fife. Haymarket Terrace and Dalry Road are the main traffic routes from the west into the city.
The street pattern is complicated and building lines do not always follow the street pattern, creating somewhat incoherent spaces with little sense of containment. The large car park adjacent to the station adds to the fragmented appearance.

There is a wide diversity of architectural styles: modern office blocks and car parking around the station and alongside the railway; modern terraced housing where Haymarket merges into the back of Roseburn; Victorian tenements, with continuous shop fronts on the north side of Haymarket Terrace.

Haymarket Station, with its classical frontage, is aligned on the axis of West Maitland Street and terminates, albeit weakly, an important vista from the West End.

Haymarket goods yard (Dalry Road/Morrison Street corner) is the last major empty site in the city and is currently the subject of development proposals.

**Sub-Character A5: Balbirnie Place**

Modern terraced housing overlooking a strip of recently-planted woodland screen planting and behind this, at a lower level, the poor scenic quality associated with the main Glasgow-Edinburgh railway corridor.

### Table 8.4 Landscape Character Summary for Area A

<table>
<thead>
<tr>
<th>Landscape Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Character</strong></td>
<td>Historic and attractive townscape of international renown (A1, A2, A3); Princes Street Gardens and the Castle/ High Street form a dramatic backdrop to Princes Street (A2); Dramatic axis of Princes Street looking towards Calton Hill (A2); Classic architectural “set pieces” of St. Andrew Square(A1) and Shandwick Place/ Atholl Crescent (A3)</td>
</tr>
<tr>
<td><strong>Negative Character</strong></td>
<td>Constant, heavy traffic; especially buses Street clutter from signs, bus shelters and other uncoordinated street furniture; “one-sided” nature of Princes Street (A2)</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>High(A1, A2, A3) Medium (A4) Low (A5)</td>
</tr>
<tr>
<td><strong>Quality</strong></td>
<td>Highest Quality(A1, A2) Very attractive (A3) Good (A4) Ordinary/Poor (A5)</td>
</tr>
<tr>
<td>Landscape Attributes</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Likely landscape trends</td>
<td>Princes Street (A2) and Haymarket (A4) may eventually be partially pedestrianised. Cars are likely to be banned from Princes Street (A2)</td>
</tr>
<tr>
<td>Likely landscape trends ('do minimum')</td>
<td>As above.</td>
</tr>
<tr>
<td>Public Perception, Visibility &amp; Use</td>
<td>Perceived as an internationally celebrated streetscape and a destination in its own right. Generally; Chaotic and crowded spaces over large areas and associated with busy road network</td>
</tr>
</tbody>
</table>

8.4.2 B: Urban and Suburban Residential with Urban Green Space

The character area comprises of residential areas on the western edges of Edinburgh: High Density Post war housing areas of Saughton, Stenhouse, Broomhouse and Sighthill (Sub-Character Area B1); the Villa suburbs of Carrick Knowe, Saughtonhall and South Gyle (Sub-Character Area B2) and of Murrayfield (Sub Character Area B5); the traditional and prestigious housing of Coates (Sub-Character Area B3); the terraces in the West End of the city (Sub Character B4); inner city tenement housing (Sub Character B6); Mixed housing types (Sub Character Area B7); low density cottage style housing (Sub Character B8) ; high rise buildings at Sighthill (Sub Character B9) and the village areas of Ratho and Newbridge (Sub Character area B10). Amenity and open spaces range from the rugby ground at Murrayfield, the golf course at Carrick Knowe, to the parks of Saughton and Sighthill (Sub Character area B11).the linear green spaces follow the Water of Leith, the Union Canal and the old railway line, now a cycle path, (Sub Character area B12.)

Sub Character B1: High Density Housing Suburbs

These postwar housing areas extend along the southern edge of the main railway line from Saughton Park to Sighthill. The generally three storey buildings have simple frontages and communal garden and car parking areas. There are few hedges or fences and this has resulted in some areas being stark in appearance. A few shops are located along the main access routes.

The railway line forms a Northern boundary to these areas and restricts the view from street level. Corstorphine Hill can be seen on the skyline whilst to the South the sharp form of the Pentland Hills frames the view.

Sub Character Area B2: Villa Suburbs

These areas of post war housing are located to the North of the main railway line and encompasses Carrick Knowe golf course and Murrayfield Rugby ground. The
housing comprises semi detached villas with garden surrounds accessed by a local network of small and often tree lined streets.

Views south are generally contained by the railway line and Corstorphine Hill provides a green and rising backcloth to the north.

Sub Character B3: Low Density Town Housing

The housing within the conservation area of Coates comprises traditional, mainly blonde sandstone detached properties within large gardens. The gardens are generally bounded by high walling and the wide streets are lined with mature trees and have associated mature parkland and public garden areas.

The impressive structure of Donaldsons School now under conversion to housing lies within this area. It is identified as an Open Space of Outstanding Local Quality and Townscape Significance.

Sub Character B4: Terraced Town Housing

This area is located in the West End of the city centre and comprises mainly three storey terraced traditional town houses constructed in blonde sandstone often with ornate window detailing and providing an attractive roofscape of ornate chimneys. The frontage areas are small and are usually enclosed by low stone walls and a few shrubs or hedges. Car parking is generally by residential permit only outside dwellings and there are occasional mature street trees and well stocked public garden areas.

Views are generally contained within the residential area and there are few long range views.
Sub Character B5: Terraced Suburban Housing

This housing area is located in the area of Murrayfield and Roseburn. The housing is a mix of new and traditional two, three and four storey terraced dwellings. Newer dwellings are built to a traditional design and complement the older traditional sandstone properties and the existing road layout. The properties generally have medium sized frontage gardens and are often bounded by walls, fences and shrubs. Parking is generally on street although newer properties tend to have parking areas within the development.

Views are generally contained within the residential area and there are few long range views.

Sub Character B6: High density tenement style housing

This area is located in the inner city area of Dalry and Gorgie to the south of Haymarket and comprises four storey tenement blocks with communal closes accessed directly from the street. New build flats fringe the southern section of the railway corridor from Haymarket to Murrayfield. The tenement blocks have shops at ground level on the main access routes through the area. On street car parking and a pattern of road calming is typical of the streets which run at right angles to the main access routes. There are few trees or public areas.

Views are generally contained within the residential area and there are few long range views.
Sub Character B7: Mixed residential building styles with light industrial/retail developments.

This area provides a link between Gorgie and Saughton and is a discordant mix of housing types: A high rise horseshoe shaped housing block contrasts with the two storey semi detached houses and bungalows and three storey tenement blocks and light industry and retail development. The main access routes are wide and there are few trees or public spaces although the western boundary of the Sub character area is defined by Saughton Park.

There are views to Corstorphine Hill to the north and occasional views to the Pentland Hills.

Sub Character B8: Low Density Cottage Style Housing

This area is located south of West Coates road and comprises a series of rows of traditional terraced cottages in blonde sandstone with dormer windows and small front gardens defined by walls and railings. It blends into areas of more modern infill housing. The modern office developments of Sub Character areas A4 tower over the area.

There are few general views although there are occasional limited views to the heavy industrial area Sub Character area C2.
Sub Character B9: High rise residential buildings

This area is located in Sighthill on high ground to the south of the main railway line. The three high rise towers and the large building which houses Stevenson College are prominent and overlooks Sighthill Public Park and the surrounding area. Communal spaces surround the buildings, which also have associated parking areas.

Sub Character B10: Urban fringe residential area juxtaposed against light industrial warehouse units.

The village of Ratho Station located to the west of the Study area comprises a mix of essentially post war terraced and semi detached dwellings with small gardens and on street parking. Light industrial warehouses and newer housing developments flank the small compact area of housing. There are few trees within the housing areas although the railway corridor is well vegetated.

The railway line contains views south with occasional views north to the road network and the showground and airport.

The village of Newbridge has an older core surrounded by more modern houses and like Ratho, is intervisible with adjacent light industrial areas.
Sub Character Area B11: Amenity and Open Space

Formally managed open spaces with mown grass, semi mature and mature tree and shrub planting.

Carrick Knowe Golf Course and Saughton Park are significant open spaces. Murrayfield Rugby Ground is an international sporting facility and a distinctive feature in the landscape of the area. The stadium structure can be viewed from a wide area.

Sighthill Park also obtains views over a wide area.

The linear green corridor, which runs to the north of Stenhouse Drive and Broomhouse Drive, has manicured grass and occasional mature trees. To the west the grass is rougher and there are areas of rubbish and fly tipping.

Visually these areas link with Corstorphine Hill which rises in the north to a height of 162 m AOD.

The southern boundary of Carrick Knowe Golf Course and Murrayfield Rugby ground is with the main railway line to the west which restrict some views to the housing areas to the south and to the sharp brow of the Pentland Hills which rise to 493m AOD.

Sub Character Area B12: Linear Green Space

This area forms a green link through the Study area and follows a North East/ North West alignment as it follows the course of the Water of Leith, a North South alignment as it follows the line of the former railway and the Union Canal runs through the south east corner of the study area.

Along these relatively narrow corridors areas of rough scrub and trees have grown up. Footpaths are tarmac or compacted gravel and are sheltered by the vegetation along boundaries.

The former railway line now forms part of the National Cycle network and is a well used cycle route through the city. The footpath along the Water of Leith and the Union Canal is also used for cycling but more usually allows access to adjoining residential areas and for recreation.
### Table 8.5 Landscape Character Summary for Area B

<table>
<thead>
<tr>
<th>Landscape Attributes</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Positive Character** | Areas of intact town houses and traditional buildings such as at Coates and the West End (B3, B4, B8)  
Blend of old and new buildings to maintain intact streetscape such as in Roseburn (B5) and Dalry/Gorgie (B6)  
Housing areas to the north of the main railway line viewed against backdrop of Corstorphine Hill (B2)  
Housing areas to the south of the railway line viewed against and visually enclosed by the Pentland Hills (B1, B9)  
Linear corridor providing a green link for pedestrians and cyclists separate from busy roads and traffic (B12) |
| **Negative Character** | Incongruous mix of housing types and light industrial uses (B7, B10)  
Communal garden surrounds and parking areas (B1)  
Fast moving traffic and congested streets (all main through routes)  
Uninteresting layout and featureless landscape surrounds (B1, B10) |
| **Sensitivity** | High (B2, B3, B4, B5, B6, B7, B8, B11, B12)  
Medium (B1, B11)  
Low (B1, B9, B10) |
| **Quality** | Very attractive (B3, B4, B8, B11, B12)  
Good Landscape – Very attractive (B5)  
Good Landscape (B2, B6)  
Ordinary Landscape (B1, B7, B9, B10) |
| **Likely landscape trends** | Increase in traffic and congestion  
Demolition of large industrial units and development for infill housing |
| **Likely landscape trends (‘do minimum’)** | As above |
| **Public Perception, Visibility & Use** | Housing areas lying to the north of the railway line are generally associated with lower density housing, private garden spaces, well treed surrounds and the softening backdrop of Corstorphine Hill  
Housing areas lying to the south of the railway line are generally associated with higher density housing and tenements, communal garden spaces and the starker backdrop of the Pentland Hills |
8.4.3 C: Landscape dominated by large scale business and office-related developments

The character area comprises of generally large scale business related developments including the modern office development at Edinburgh Park (Sub-Character Area C1) and the adjoining brownfield expansion area (Sub-Character Area C2) and the more traditional large office developments (Sub-Character Area C4). Other large office developments are located closer to the city centre (Sub-Character Area C4). This character area also includes large-scale industrial retail parks (Sub-Character Area C5), small-scale light industry (Sub-Character Area C6), heavy industry (Sub-Character Area C7) and retail/leisure developments (Sub-Character Areas C8/9).

Sub Character Area C1: Edinburgh Park

Edinburgh Park is located to the east of the City Bypass from which it gains easy access to the contemporary commercial office developments which are set in a formal high quality landscape. The buildings are generally streamlined and modern and constructed in large blocks with extensive glazed sections which afford views over the landscaped surrounds. Occasional mature trees remain within the manicured grass areas and the Gogar Burn flows between the blocks associated with attractive waterside planting, walkways and seating areas.

Sub Character Area C2: Brownfield Expansion Zone

This flat area of undeveloped open scrub land is located between Edinburgh Park and the City Bypass. The City Bypass is located on higher ground and encloses the area allowing views of fast moving traffic and lighting columns on the road.

Sub Character C3; South Gyle Business Centre

This area comprises large office developments such as the Royal Bank of Scotland. The plots are generous in size and are individual with landscaped grounds and associated parking.
Sub Character C4: Infill office developments near the city centre.

Close to the city centre these high rise offices are generally located on restricted sites with limited parking and are accessed directly from the street with basement or rear parking areas. These generally stark modern buildings contrast with the more traditional buildings and the historic core, which distinguishes the city centre.

Sub Character Area C5: Large scale industrial retail parks

The industrial retail parks at Sighthill and Newbridge are a mix of large modern warehouses and service areas with associated car parking. The M9 motorway dissect the character area at Newbridge.

At Sighthill the retail units are generally occupied by car salesrooms whereas at Newbridge the larger units and yards house manufacturing companies. Security fencing encloses yards and vehicles often clutter entrance gate areas and frontages. There are few trees and the soft landscaped surrounds are poorly maintained.

An area of Significant Open Space located around the Scheduled Ancient Monument (barrow and standing stones) at Huly Hill to the west of the M9 is an incongruous element within the area.
**Sub Character Area C6: Small scale light industrial centre**

The small scale light industrial areas comprise a series of industrial units with small yard areas. The access road and yard areas are enclosed by unkempt planting bunds. The main use is for vehicle repairs.

**Sub Character C7: Active and disused heavy industrial centre**

The heavy industrial area comprises large scale industrial units within sizeable sites. Some units and yard areas appear derelict and run down. The area is contained to the north by the West Approach Road. Close to the city centre several notable landmarks are visible on the skyline: Edinburgh Castle, Tynecastle football stadium and in the distance to the south the Pentland Hills.

**Sub Character Area C8: Modern retail developments**

The areas of the Gyle and Hermiston Gait comprise modern retail developments. The large parking areas can be viewed from the main road network and the landscaped grounds surround modern buildings. At Hermiston Gait the tent style of the structures is very distinctive.

There are extensive views over the road network.
**Sub Character Area C9: Leisure related developments**

Fountain Park; large scale development of leisure facilities. The modern buildings contrast with the more traditional surrounds. The area is inward looking with few views out.

<table>
<thead>
<tr>
<th>Landscape Attributes</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Positive Character** | Modern buildings with generous parking areas (C1 and C3)  
                        | Spacious landscaped grounds and generous parking areas (C1 and C3)                                                                                                                                            |
|                      | Attractive waterside park areas (C1)                                                                                                                                                                          |
|                      | Bustling modern shopping / leisure areas (C8, C9)                                                                                                                                                             |
| **Negative Character** | Wasteland awaiting redevelopment (C2)  
                             | Modern block office developments contrasting with more traditional buildings such as at Coates (C3, C4)                                                                                                   |
|                      | Incongruous architectural styles (C8, C9)                                                                                                                                                                     |
|                      | Congested and chaotic layout (C5, C6, C7)                                                                                                                                                                     |
|                      | Poorly maintained landscaped areas (C5, C6, C7)                                                                                                                                                             |
|                      | Declining heavy industrial area (C7)                                                                                                                                                                           |
| **Sensitivity**       | Low (C2, C4, C5, C6, C7, C8, C9)                                                                                                                                                                           |
|                      | Medium (C1)                                                                                                                                                                                                 |
|                      | High at Huly Hill (C3, C5)                                                                                                                                                                                   |
| **Quality**           | Very attractive (C1, C3)                                                                                                                                                                                      |
|                      | Poor Landscape (C2, C4, C7)                                                                                                                                                                                  |
|                      | Elsewhere: Ordinary Landscape                                                                                                                                                                                   |
| **Likely landscape trends** | Retail and leisure industries are likely to continue to expand  
                            | It is likely that the pressures on the light industrial areas would continue  
                            | It is likely that the heavy industrial centre would continue to decline  
                            | It is likely that the periphery of Edinburgh Park would continue to expand with the area of derelict land (C2) being filled with new development and buildings. |
| **Likely landscape trends (‘do minimum’)** | As above.                                                                                                                                                                                                   |
| **Public Perception, Visibility & Use** | Perceived as a successful, modern and highly successful office development (C1 and C3)                                                                                                 |
|                      | Incongruous with traditional surroundings (C4)                                                                                                                                                               |
|                      | Generally: Chaotic and crowded spaces over large areas and associated with busy road network                                                                                                              |
8.4.4 D: Urban Fringe Character Greenbelt Dominated by Infrastructure

This character area is relatively rural (Sub Character Areas D1, D2, D3) but with a strongly urban fringe character and comprises large scale- and infrastructure-related developments and corridors, to the west of the City Bypass. The airport (Sub Character Area D4) and the Royal Highland Showground and Ingliston market areas (Sub Character Area D5) dominate the landscape to the west of the City Bypass which largely defines the western urban limit of Edinburgh with major infrastructure corridors crossing this whole area (Sub Character Areas D6 and D7).

Sub Character Area D1: Rolling lowland agricultural landscapes

A matrix of high quality, predominantly arable farmland with medium to large scale fields, divided into a field pattern delineated by hedgerows, occasional mature trees, fences and occasional stone walls. Within this rolling landscape a series of ridges form intermediate visual horizons which are often strengthened by tree planting. The traditional estate planting together with agricultural shelterbelts are a strong and positive influence on the appearance of the landscape.

This character area lies generally south of the A8 and rises to the South. Views extend over the flat lowland plain and: the airport; Royal Highland Showground; and busy road corridors of the A8 and the M9.

Sub Character Area D2: Wooded Estate landscapes

Mature estate plantation woodlands are present at the Norton House Hotel, Gogar Mount and Gogar Park. The area has scattered stone built farmsteads, cottages and other dwellings including Castle Gogar. The large blocks of mature deciduous woodland form significant landscape features and provide a sense of enclosure and structure, particularly around Castle Gogar and Gogar Burn. Other more local landscape features include various stone built farmsteads and associated buildings including Castle Gogar.

There is a relict of a designed landscape around Castle Gogar with surviving features including a tree-lined avenue leading to Castle Gogar from the A8. The trees within the Norton House Hotel are considered to be Heritage Trees of significance and Tree Preservation orders protect trees within the Gogar Burn hospital site currently being developed as a headquarters for the Royal Bank of Scotland.

Views are softened by tree planting and woodland enclosure and extend over the airport and showground and towards the busy moving traffic on the A8. Distant views are obtained to the shale bings which dominate the skyline to the west.
**Sub Character Area D3: Open predominately flat farmland**

An area of high quality, predominantly arable farmland with medium to large scale fields, divided into a field pattern delineated by scrub and occasional hedges. The fields are generally open, flat and lowlying.

Views are obtained to the scattered buildings and infrastructure of the airport and showground as well as to the large shale bings which dominate the horizon to the west.

**Sub Character Area D4: Relatively open agricultural landscape dominated by the airport**

The areas classified for airport uses within this character area are located around and including Edinburgh Airport buildings to the north of the A8. The buildings are urban in character with managed grass verges, shrubs and trees, extensive parking areas and lighting columns. The extensive flat grassland around the airport runways and the numerous lighting columns dominate the area.

To the south the showground screens most views but permits some views of rolling agricultural and wooded landscape in the distance. To the north the flat landscape extends over a wide area bisected by the line of the M9 motorway corridor and the prominent red shale bings.
**Sub Character Area D5: Large scale showground and market facilities.**

The Royal Highland Showground is separated from the A8 by a stone wall and mature trees. Ingliston House a large sandstone mansion with turrets provides a distinctive focal point. To the front of this building mown grass areas are littered with telegraph poles, which provide power during shows. Around the access roads there is a mix of residential dwellings within large plots, a Golf Driving Range, areas of airport parking, Edinburgh Car Auction site and a food processing factory. To the rear the hotel, exhibition centre and Ingliston Sunday market area cover a large part of the site and comprise a mix of building types surrounded by flat grassland areas used for car parking when required.

The airport dominates the area to the west and the flat landscape is bounded by the red shale of two large bings and numerous lighting columns in the foreground.

**Sub Character Area D6: Infrastructure corridor link to Airport**

This area provides a link from the A8 to the airport via a couple of roundabouts. These roundabouts have been landscaped with stone walls and planting but are poorly maintained. They provide a distinctive set of elements along this corridor.

**Sub Character Area D7: M8/M9 and City Bypass Road Corridors**

The M8/M9 converge at the Newbridge interchange which severs the Newbridge Industrial area. The City Bypass encloses the western edge of the city. Both roads are associated with fast moving traffic, motorway structures, bridges and underpasses and afford good views out to the adjoining countryside and city.
Table 8.7 Landscape Character Summary for Areas D

<table>
<thead>
<tr>
<th>Landscape Attributes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Character</td>
<td>Rural matrix of predominantly arable farmland (D1, D3) Subtle topographic and woodland features (D2)</td>
</tr>
<tr>
<td>Negative Character</td>
<td>Multiple urban expansion pressures including scattered development and expansion of the airport and showground (D4,D5) Infrastructure corridors (D6,D7) Prominent quarrying impacts and views to unsightly shale bings</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>Low (D4,D5,D6,D7) Medium (D1) High (D2,D3)</td>
</tr>
<tr>
<td>Quality</td>
<td>Very attractive (D1,D2) Good Landscape (D3) Ordinary (elsewhere)</td>
</tr>
<tr>
<td>Likely landscape trends</td>
<td>Expansion of the airport and the development of landscape surrounds is likely (D4) Possible expansion of the Showground due to its proximity to the airport (D5)</td>
</tr>
<tr>
<td>Likely landscape trends</td>
<td>Expansion of the airport and showground areas as well as retail and commercial development is likely to continue to encroach on the rural landscape Loss of mature trees due to the pressures of development for housing is likely to continue.</td>
</tr>
<tr>
<td>Public Perception, Visibility &amp; Use</td>
<td>A rural landscape with arable areas and mature woodlands contrasting with the busy road network and the pressures of urban edge development</td>
</tr>
</tbody>
</table>

8.5 LANDSCAPE MITIGATION

8.5.1 Introduction

‘Cost Effective Landscape: Learning from Nature’ promotes three central themes to be applied throughout the planning design and implementation of a scheme proposal:

- use of natural characteristics;
- exploration of alternatives; and
- wise use of resources.
Mitigation of adverse impacts associated with the introduction of a new scheme or modification to an existing scheme within the landscape and as a component in views of the area involves a combination of three approaches:

- **Prevention**: Prevention of adverse effects at source (e.g. alignment in cutting and avoiding visual impacts on nearby settlement).

- **Reduction**: Reduction of adverse effects that cannot be eliminated by prevention (e.g. mounding and planting to screen visual impact from property or publicly used areas).

- **Offsetting**: The provision of alternative or compensatory measures where appropriate and feasible (e.g. creation of new habitats to compensate for loss of habitat required for the scheme proposals).

### 8.5.2 Application of Mitigation Principles

The above approaches have been adopted during the planning and preliminary design of the proposed scheme. Preliminary evaluation of options for alignment of the route has to a large extent been focused on avoidance or reduction of potential adverse impacts, as described in the Route Options Report, dated May 2003.

### 8.5.3 Detailed Objectives and Methods of Mitigation

Detailed consideration of horizontal and vertical alignment and junction arrangements during development of the scheme design involved:

- achievement of best fit with the contours;

- retention and best use of existing vegetation;

- protection for nearby houses through the use of false cuttings and existing features;

- avoidance of the loss or damage to landscape features such as hedges, water features or field systems; and

- avoidance of the loss or damage to sites of ecological or archaeological interest.

The following components and techniques are proposed to integrate the proposed scheme into the landscape, thereby mitigating impacts and where appropriate, enhancing the local landscape or townscape structure:

- planting;

- mounding;

- creation of civic space;

- earth shaping;

- restoration of hedge patterns; and

- creation of habitats for ecological interest.

### 8.5.4 Indicative Landscape Mitigation

The implementation of the scheme would be carried out by a contractor, who may, in theory, construct the tram anywhere within the corridor defined by the “Limits of Deviation.” (LOD) However, the Employer has prepared an exemplar engineering design, which, for the purposes of this EA, forms the basis upon which both the assessment and the indicative landscape mitigation is founded.
These measures as illustrated and described below have therefore been developed as a set of committed principles, although it is acknowledged that their exact form would alter with the contractors’ developing scheme.

These principles would be developed into an implementable design using this EA and the Employer’s Design Manual (see Section 2.4.6). The Design Manual sets out the principles of urban design and detailing to be followed in the final design, including the whole of the World Heritage Site. General mitigation commitments arising from the Design Manual include:

- Improvements to the pedestrian realm affected by the tram;
- Careful design of the OLE to simplify the layout, balancing conductor wire and support cable sizes against support spacing so as to minimise the size of the wiring;
- Detailing and design of wire supports and their arrangement to suit the form of the street, particularly at junctions;
- To use visually appropriate methods of OLE support, including designing a bespoke support column, designed to be attractive in its own right;
- To integrate the OLE supports, traffic controls and signage with other vertical elements in the street (lighting and signage poles) as far as possible, and coordinate the spacing of new and existing poles, replacing existing lighting columns where appropriate;
- Simple alignment of the tram track to avoid as far as reasonably possible the need for complex OLE support structures or wiring, including straight alignments along the principal city centre streets to respect the formality of urban design of the New Town;
- The use of surfacing and kerb materials appropriate to the location, in accordance with CEC public realm guidelines;
- A coordinated and visually integrated design for tram stops, creating high quality pedestrian spaces, with the shelters, seating, signage and other equipment designed as an integrated whole, visually light and transparent.
- Soft landscape mitigation, where appropriate.

The mitigation principles were developed with reference to DMRB Volume 10 (Environmental Design) and involve hard landscape, earthworks, planting, and seeding. Where appropriate, proposals include land-take specifically for landscape purposes.

These landscape mitigation commitments in principle are described below in general and then more specific terms and illustrated in Figures 8.3 (sheets 1-11).

**Landtake**

The proposals include additional land take to that required for the essential engineering works for the proposed scheme. These additional areas are identified on Figure 8.3 (sheets 1-11) and generally fall within the LOD or LLAU identified on the figures by a red and blue boundary line respectively. The land would be acquired as part of the Compulsory Purchase Order (CPO), although in some instances may be sold back to the landowners once mitigation has been implemented.

The additional land take would be used to principally modify landform and to create or enhance habitats, as described below.
Earthworks

Proposals for earthworks are targeted at reducing the potential severity of scheme related landform within the open landscape and to enable return of land to agricultural use.

- modification of embankment and cutting slopes by slackening the gradient to allow land to be returned to agriculture where appropriate; and
- softening changes in slope at junctions and overbridges by smoothing out transitions between slopes.

Planting

The main design principles which would be adopted relating to existing and new planting are as follows:

- retention of existing trees and hedgerows wherever possible, where they are in good health and tie in with new planting proposals;
- adoption of contained linear forms of planting such as hedgerows where the route crosses naturally open tracts of land, unless such planting is required for essential screening;
- compensation for existing tree planting lost to the tram construction;
- enhancement of habitat diversity;
- compensation for loss of existing hedgerows and reinforcement of the existing hedgerow structure to enhance local landscape and ecological interests;
- use of mass planting at tram junctions, bridges and other structures to help assimilate the new arrangements into the surrounding landscape;
- planting to screen or reduce potential visual impact for identified receptors;
- planting of severed field corners and landlocked areas where appropriate; and
- introduction of local focal points of planting, where appropriate.

All planting would be based on the use of primarily low-maintenance native species proven to be locally hardy by established presence within the area. There would be a concentration on the use of young stock, which would more readily establish in these conditions, although larger plants may be used for initial impact in specific high-profile locations. The key types of planting that would be introduced are outlined below.

Proposed Broadleaved Woodland Planting

This would comprise a mix of transplants, whips and feathered trees. The objective would be a multi-layered woodland with a mix dominated by native deciduous trees, comprising large woodland species and with oak / ash as the principal climax community.

Proposed Mixed Woodland Planting

This would comprise a combination of transplants, whips and feathered trees. The objective would be a mature multi-layered woodland with a balanced mix of native deciduous and coniferous trees and including native evergreen understorey. Key species would include Oak, Ash and Scots Pine. The balance between deciduous
and evergreen species would be varied to suit desirable density of year-round screening and reflect established planting local to the various sections of the tram.

**Proposed Scrub Planting**

This would comprise small native species such as hawthorn, blackthorn, goat willow, elder and rose with occasional small woodland tree species. The objective would be a dense cover of planting to be used in association with woodland planting and where space would preclude use of more substantial woodland planting.

**Proposed Hedge/Hedgerow Trees**

Hedges would be based on locally established species with hawthorn and blackthorn dominant, planted in a double staggered row. Hedgerow trees would be introduced in random but regular groupings.

**Proposed Habitat Creation for Ecological Interest**

Whilst planting and ongoing management would all be based on sound ecological principles, there would be particular areas where the proposals would include habitat creation outside of the principal planting framework for the proposed tram. This could be, for example, the establishment of semi-natural grassland, scrub, freshwater and marginal habitats within severed areas, left-over corners or damp hollows immediately adjacent to the corridor.

**Amenity Planting**

There would be particular areas, such as in higher-profile urban and sub-urban areas and business parks, where the proposals would include amenity shrub and groundcover planting reinforced, as appropriate, with specimen trees and shrubs and feature hedges. These would normally be planted at a higher density and to a more robust specification than their native counterparts, in order to withstand the higher degree of wear-and-tear and vandalism that they would be subjected to. Amenity tree and shrub mixes would also contain a proportion of evergreen and/or coloured stems, to provide winter interest.

**Seeding**

Three forms of seeding would be used throughout the substantial part of the design. A verge and track infill mix suited to low levels of annual maintenance and with the potential to develop semi-natural characteristics would be the principal mix. Where areas are to be returned to agriculture, appropriate seed mixes would be selected after consultation with the Scottish Executive Environment and Rural Affairs Department (SEERAD). For informal, low maintenance areas, often in association with scrub and also for rural track infill a rough grass mix is proposed, comprising native, non-invasive grass species and wild flowers.

**Track Infill**

Track Infill would be ballast for the majority of the route unless otherwise stated on the drawings and in the text; for example grass is proposed for some sensitive suburban locations, whilst on-road situations would generally match the adjacent surfacing material.

8.5.5 **Description of Indicative Landscape Mitigation Commitments**

Indicative landscape mitigation commitments in principle are illustrated on Figures 8.3 (1-11) and described below. Reference should also be made to the Design Manual.
New Town: St Andrews Square

- Careful choice of construction materials to harmonise with those adjacent;
- Straight alignments either side of St Andrew Square, to respect the formality of urban design of the New Town and allow simple overhead wiring design;
- Possible increased space for pedestrians on South St Andrew and South St David Streets;
- The use of visually appropriate methods of support including a simple and elegant support column;
- The stops located south of St Andrew Square so that they do not impact on the square itself or the designed vista down George Street, and so that they are as close as practical to Waverley Station.

New Town: Princes Street

- Careful choice of construction materials to harmonise with those adjacent;
- A straight alignment, to respect the formality of urban design of the New Town and allow simplest overhead wiring design, along the full length of Princes Street from South Charlotte Street to South St David and St Andrew Streets, and the minimum practical change in alignment at South Charlotte Street;
- A street layout that increases as far as possible the space for pedestrians, whilst maintaining adequate tram run-times and adequate space for bus services including, in particular the footway widening across the nearside traffic lane described above;
- The use of visually appropriate methods of support, including designing a simple and elegant support column;
- The stop located east of the end of Castle Street so that it does not affect the important designed vista of the Castle from Castle Street.

New Town: West End

- Careful choice of construction materials to harmonise with those adjacent;
- A straight alignment along West Maitland Street and Shandwick Place to respect the formality of urban design of the New Town;
- The redesign and reconstruction of the affected parts of the garden spaces to a design and standard acceptable to Historic Scotland and CEC planning department;
- Retention of as many of the existing mature trees as possible, where removal is unavoidable replacement of lost trees with an equivalent number of semi-mature specimen trees of a minimum 40cm girth, of species suitable for the location;
- If the design of Rutland Place entails the realignment of kerbs, the kerbs, adjacent paving, dwarf walls and bespoke railings would be rebuilt and made good to match the existing.

Haymarket - Roseburn

- Careful choice of construction materials to harmonise with those adjacent;
Improvement to the pedestrian realm as part of the comprehensive redesign of Haymarket junction required for the tram;

The creation of an appropriate setting for the war memorial;

A simple alignment of the tram through Haymarket junction to reduce the impact on the designed vista down Shandwick Place terminating at Haymarket Station;

A straight alignment into and along West Maitland Street to respect the formality of urban design of the New Town;

A co-ordinated and visually integrated design for the tram stop including walls or other architectural devices to recreate some of the enclosure of the entrance to Haymarket Terrace lost with the demolition of the Caledonian Ale House, to link the tram stop with Haymarket Station and to enhance the setting of the station building;

The possible introduction of barrier fencing and hedging between Balbirnie Place and the tram in order to create visual enclosure and reinforce the urban form between the housing and the tram;

Soft landscape works to the open space between Balbirnie Place and the new offices at Haymarket yards to compensate for the loss of amenity;

Simple, unobtrusive design for the housing of the substation to the rear of 15 Devon Place.

Roseburn – Murrayfield

A delta junction at the disused railway line/cycle track would pass over Russell Road on a new structure, with retaining walls to the south side of Russell Road which would contain an electricity substation.

Mixed woodland and scrub planting on side slopes linked to realigned cycle path corridor and ramp;

Careful choice of construction materials to harmonise with those adjacent.

The line would pass around Scotrail Murrayfield Depot on retaining structure/embankment with a possible stop location opposite the entrance to Murrayfield Rugby ground. Buildings would be demolished and one would be modified.

High quality hard landscape treatment at Murrayfield / associated specimen trees/seating/signing etc.

Murrayfield - Carrick Knowe

The line would cross Roseburn Street on an overbridge to run alongside the railway on an elevated structure above the flood plain, supported by piers.

Careful choice of construction materials.

The Tram would then cross the Water of Leith and its’ footpath on bridge before passing along the rear boundaries of housing in Baird Drive. During detailed design the Contractor and CEC would work with targeted members of the public directly affected by the tram to agree mitigation proposals. Issues may include types of planting, the appearance of noise barriers and possible alterations to the vertical alignment.
Planting adjacent to Water of Leith to compensate for that lost due to construction;

Tram screened by new embankment and retaining wall which would be softened by mixed woodland screen planting;

Use of mixed woodland planting to soften higher slope and compensate for that lost to construction.

The route would cross Balgreen Road at grade, before attaining a possible stop location on the other side. It would then continue along the edge of Carrick Knowe Golf Course through an existing reserve of rough grass and scrub which would run alongside the existing railway corridor.

- Mixed/broadleaved woodland planting near Jenners Depository to replace that lost to construction and screen sub-station;
- Tree and scrub planting between railway line and tram, to break up linearity of rail/tram corridor;
- Tree planting to north side to frame views of the golf course and echo golf course planting.

**Carrick Knowe - Bankhead Drive (new heavy rail station at Hermiston Gait)**

At Stenhouse, the line would cross from the golf course over the railway on an overbridge, resulting in the demolition of one building. It would then run along the south side of the railway in a grass reserve strip to Edinburgh Park Station, crossing Saughton Road North, Broomhouse Road and South Gyle Access on bridges. Track infill along this section would be low-maintenance amenity grass (maintained by the operator) unless otherwise stated;

- At the Stenhouse overbridge, sideslopes would be graded-out to reduce landscape and visual impacts and woodland structure planting would be introduced to also assist in this aim and infill derelict area to east and hollow to west, between the existing retained footbridge and the proposed bridge;
- Between Stenhouse Drive and Saughton Mains Street, specimen decorative tree groups would be planted in amenity grassland to reflect current character and replace those lost to construction;
- Broadleaved woodland would be introduced as infill structure planting between the railway and the tramline. This would also act as a visual screen to the railway, from nearby housing;
- In the green reserve between the possible stop at Stenhouse Road North and the possible stop at South Gyle Access, a double row of semi-mature amenity trees would be introduced on the south side of the track, with the foreground amenity grassland retained. This would act as a partial screen to the OLE poles; as a formal edge to the informal woodland planting which forms the backdrop to the rear of the tram; and as a reflection of, and enhancement to, the current semi-formal residential/amenity character. The trees would allow views under the branches, which, together with a medium-height, visually permeable fence, would allow for community security at the same time as avoiding lateral pedestrian incursion into the tram corridor. This design would not preclude further enhancement of this linear corridor by others.

- Beyond South Gyle Access, facing the Sighthill Industrial Estate, the theme remains, but native tree species are used in lieu of the amenity trees to the east and ballast would replace grass as track infill.
Edinburgh Park - Gogar Roundabout

The line would curve north past Edinburgh Park Station interchange, crossing over the railway on an overbridge. It would then run north, more or less at grade, through the Edinburgh Park expansion area and then into Edinburgh Park, through amenity grassland alongside waterside structure planting. It would then pass through The Gyle car park before tunnelling under the A8 Glasgow Road to the proposed tram depot, which would be recessed into the ground in order to reduce landscape and visual impacts. At Gogar Roundabout the ES assumes an alignment through existing bunds adjacent to the A8. There is a presumption in favour of retaining these bunds. The limits of deviation have therefore been extended to allow adjustments to the alignment to be made to route the tram behind these bunds.

- At the railway overbridge, the intention would be to reduce landscape and visual impacts using woodland structure planting;
- In the Edinburgh Park Expansion Area, a clipped decorative hedge would be introduced on the east side of the track, with woodland planting at the base of the bridge off-ramp, which would delineate the track meantime, whilst not precluding further enhancement of this area by others;
- Between the possible Edinburgh Park stop and Lochside Crescent and also adjacent to the Gyle Roundabout, specimen decorative tree groups would be planted in amenity grassland to reflect current character; track infill along this section would be low-maintenance amenity grass (maintained by the operator);
- Alongside Lochside Crescent, a clipped decorative hedge would be introduced on the east side of the track, fronted by amenity planting; track infill along this section would be low-maintenance amenity grass (maintained by the operator);
- At The Gyle, either side of the possible stop location, the car park layout would be adjusted by others to accommodate the new feature, with hard landscape and amenity planting to tie it into the surroundings;
- Between the proposed Tram Depot and the Gogar Roundabout, proposed screen bunding around the sunken depot would be at least the height of the roof above the surrounding ground levels. They would be planted with scrub, rather than woodland, so as not to interfere with the airport flight-path; (N.B. See Design Manual, Chapter on Depot Design.)
- Track infill in the depot area to be ballast for operational reasons;
- Track infill at The Gyle would reflect adjacent hard landscape.

Gogar Roundabout - Ingliston Park & Ride

The route would run along the north side of the A8 to the new RBS Gogar overbridge and would then follow the east bank of the Gogar Burn gorge before crossing the burn on bridge and then running through arable farmland to the Ingliston park and ride facility.

- A belt of broadleaved structure planting would be planted alongside the road to screen the tram from the road and the Gogarburn Estate;
- A “willow wall” would be constructed to the rear of the listed lodge house as a visual and noise screen. This is a living, soil-infilled woven willow construction designed to minimise visual and noise intrusion on this sensitive receptor;
• Any avenue planting lost due to construction would be compensated for by strengthening the avenue with semi-mature trees either side of the entrance to a point just beyond the incursion;

• The route does not impact directly on the SAM site and setting impacts are minimised by siting track on the opposite bank and using grass infill along this section. This route also avoids a site of national archaeological interest south of Gogar church and possible direct impacts would be further minimised by the use of non-intrusive construction techniques along this section. These techniques would avoid the necessity for excavation by the laying of tracks on ballast, on geotextile membrane and then covering the completed construction with low-fertility topsoil from nearby sources which would be sown with a wildflower mix of local provenance and cut twice-yearly after flowering, by the tram operator;

• Hedge planting to reduce setting impacts on Gogar Church;

• Habitat creation adjacent to Gogar Burn S.I.N.C.; eradication of Giant Hogweed and replacement with broadleaved woodland, which would also help to soften the impact of the bridge crossing of Gogar Burn;

• Extensive mixed woodland screen planting in severed field segment adjacent to route to reduce landscape and visual impacts on Castle Gogar;

• Tree and scrub planting within hedgerows and along route to strengthen existing landscape framework, with pockets of woodland planting to tie in with existing watercourse vegetation.

**Ingliston Park & Ride – Airport**

Follows a route across arable land and then runs parallel with the Gogar Burn to the airport.

• Use of hedges to tie into existing hedgerows;

• Tree planting within hedgerows and along route to strengthen landscape framework;

• Amenity planting in segmented sections of car park and roadside landscape;

• Amenity hard landscape, planting and feature trees as “statement” and backdrop to new terminus;

• Reconfiguration of airport interchange. All landscape proposals at the airport should reflect both the Landscape Strategy for Edinburgh Airport as well as the BAA Bird Control guidelines.

**Ingliston Park & Ride - Ratho Station**

At the park and ride the route would follow a line across rough ground to the stop for the Royal Highland Showground and would then pass along the centre of the A8 Signalised junction edge of the Showground:

• Use of hedges to tie into existing hedgerows;

• Tree planting within hedgerows and along route to strengthen landscape framework;

• Mixed woodland screening behind sensitive residential receptors;
- Rationalisation of existing lighting columns with the overhead line infrastructure.

Across arable fields to Ratho Station:
- Use of hedges to tie into existing hedgerows;
- Tree planting within hedgerows and along route to strengthen landscape framework;
- Extensive area of woodland planting in segmented field to mitigate visual impacts on Ratho Station and strengthen the landscape structure of the area.

**Ratho Station – Newbridge**

Would follow a route parallel to the railway and would then rise to meet Harvest Road. The route would then run along Harvest Road, under the existing motorway bridge and then past Newbridge Industrial Estate to Old Liston Road. Here it would run in the western verge, skirting Huly Hill SAM, before entering the terminus at Newbridge Park and Ride.

- Mixed woodland screening between Ratho Station possible stop and disused railway line, to reduce impacts on sensitive residential receptors;
- Planting of severed corners with broadleaved woodland planting;
- Maintain, augment and strengthen existing hedge to screen setting to Huly Hill SAM;
- Hedgerow strengthening as interface between road and terminus;
- Rationalisation of existing lighting columns with the overhead line infrastructure.

8.6 **LANDSCAPE RESIDUAL IMPACTS**

The following section provides an assessment of the overall effects that the development would have on the local landscape areas during construction and once operational, winter year of opening and 15 years after opening.

It is acknowledged that a majority of these impacts are potentially reversible, i.e., most of the tram infrastructure could be removed in the future without permanent damage to the landscape character of the study area. However, for the purposes of this assessment, the “worst-case scenario” has been adopted, i.e., the assumption that these impacts are permanent unless otherwise stated in the Magnitude and Impact Tables in Appendix 8.

The landscape impacts of the proposed scheme have been assessed taking into account the sensitivity of the landscape sub-area to change and the magnitude of change before and after the implementation of the above mitigation measures. These considerations are illustrated in tabular form in Appendix 8, providing details of the sensitivity of, and changes taking place within, each Landscape Character sub-area, together with their scale, duration, permanence and magnitude. Table 8.8 provides a summary of impacts on each of the Landscape Character sub-areas impacted and on each of the four LCA’s.

*Note that only those sub-areas impacted by the proposals are listed.*
<table>
<thead>
<tr>
<th>Character Area</th>
<th>Summary Description of Local Impacts</th>
<th>Construction Impacts</th>
<th>Winter, Year of Opening</th>
<th>Summer, 15 years after Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Poles and wires would impact negatively on the character of this famous square</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
</tr>
<tr>
<td>A2</td>
<td>Poles and wires would generally impact negatively on the open character of this famous street and the appreciation of it's backdrop. (N.B. Calton Hill/Princes Street components not impacted due to distance and lack of intervisibility respectively.)</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
</tr>
<tr>
<td>A3</td>
<td>Poles and wires and direct impact of stops on Atholl Crescent would impact negatively on the character of this area.</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
</tr>
<tr>
<td>A4</td>
<td>Not as sensitive to change as A1, 2 &amp; 3; a busy thoroughfare, but nevertheless poles and wires would impact negatively. Opportunities to hang OLE from buildings would reduce adverse impacts, however. Improvements to Haymarket Terrace area associated with tram stop would lead to localised beneficial impacts.</td>
<td>Substantial Adverse</td>
<td>Generally Moderate-Substantial Adverse; Locally Slight Beneficial (Haymarket Terrace)</td>
<td>Generally Moderate-Substantial Adverse; Locally Slight Beneficial (Haymarket Terrace)</td>
</tr>
<tr>
<td>A5</td>
<td>Not as sensitive to landscape change as A1, 2, 3 &amp; 4; but nevertheless poles and wires and removal of planting would impact negatively on local landscape</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
</tbody>
</table>

**AREA A; Historic Core; Overall Impact On Landscape Resource; Moderate-Substantial Adverse; Significant**

<table>
<thead>
<tr>
<th>Character Area</th>
<th>Summary Description of Local Impacts</th>
<th>Construction Impacts</th>
<th>Winter, Year of Opening</th>
<th>Summer, 15 years after Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>Landscape impacts on housing areas bounding Broomhouse and Stenhouse Drive due to construction of Saughton Road North Station and the tramline within the green reserve</td>
<td>Slight Adverse</td>
<td>Negligible</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>B2</td>
<td>Direct impact of the tram line overbridge as it crosses the railway at Carrick Knowe</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>B2</td>
<td>Indirect impacts on the rear gardens of properties in Baird Drive. Loss of mature tree screen to railway made good in time by replanting.</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>B5</td>
<td>Landscape impacts due to the overbridge at Roseburn</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>B9</td>
<td>Landscape adversely affected due to indirect impacts along the corridor of the tramline from Sighthill</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Negligible</td>
</tr>
<tr>
<td>Character Area</td>
<td>Summary Description of Local Impacts</td>
<td>Construction</td>
<td>Winter, Year of Opening</td>
<td>Summer, 15 years after Opening</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------------------------------------------</td>
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<td>-------------------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>B10</td>
<td>Direct impact on yard area and the periphery of Ratho village</td>
<td>Moderate - Slight Adverse</td>
<td>Slight Adverse</td>
<td>Negligible</td>
</tr>
<tr>
<td>B11</td>
<td>Direct impacts of retaining walls and the tramline on the southern boundary of Murrayfield rugby pitch</td>
<td>Substantial - Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>B11</td>
<td>Direct impact on some mature trees due to the construction of Balgreen Road station</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>B11</td>
<td>Direct impact of the tram line overbridge as it crosses the railway at Carrick Knowe</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>B11</td>
<td>Direct impacts of the tramline due to loss of some young trees/scrub along the southern boundary of the golf course</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>B11</td>
<td>Landscape impact on Sighthill Park due to influence of Saughton Road North station and along the tram line corridor</td>
<td>Moderate- Slight Adverse</td>
<td>Slight Adverse</td>
<td>Negligible</td>
</tr>
<tr>
<td>B12</td>
<td>Direct impact of the tram line overbridge as it crosses the cycle path at Roseburn</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>B12</td>
<td>Direct impact of the tram line overbridge as it crosses the Water of Leith at Saughton due to loss of mature trees</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
</tbody>
</table>

**AREA B; Urban and Suburban Residential with Urban Green Space; OVERALL IMPACT ON LANDSCAPE RESOURCE; Slight Beneficial–Moderate Adverse; Significant**

<p>| C1             | Direct impacts on landscaped grounds within Edinburgh Park                                          | Substantial Adverse     | Moderate Adverse        | Slight Adverse               |
| C2             | Direct impacts on brownfield expansion area; bridge (negative) landscaping (positive)              | Moderate Adverse         | Slight Adverse          | Slight Adverse               |
| C5             | Landscape impacts on the northern boundary of the Sighthill Industrial park                        | Moderate - Slight Adverse | Slight Adverse          | Negligible                   |
| C5             | Indirect impacts on open space associated with Huly Hill Scheduled Ancient Monument, an incongruous element within a largely light industrial setting | Moderate - Slight Adverse | Slight Adverse          | Negligible                   |
| C6             | Impact of overbridge, retaining walls and demolition and modification of buildings at Murrayfield   | Moderate Adverse         | Slight Adverse          | Slight Adverse               |
| C6             | Impact due to the construction of a station at Murrayfield                                          | Moderate - Slight Adverse | Slight Adverse          | Negligible                   |
| C8             | Landscape impacts associated with new bridge on parking areas at Hermiston Gait                    | Moderate - Slight Adverse | Moderate - Slight Adverse | Slight Adverse               |</p>
<table>
<thead>
<tr>
<th>Character Area</th>
<th>Summary Description of Local Impacts</th>
<th>Construction</th>
<th>Winter, Year of Opening</th>
<th>Summer, 15 years after Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>C8</td>
<td>Direct Impacts on car parking areas at the Gyle due to the tramline, construction of a station and tunnel to provide access under Glasgow Road</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
</tr>
</tbody>
</table>

AREA C; Landscape dominated by large-scale business and office-related developments; OVERALL IMPACT ON LANDSCAPE RESOURCE; Slight Adverse–Slight Beneficial; Not Significant

<table>
<thead>
<tr>
<th>D1</th>
<th>Fields east of Ratho</th>
<th>Substantial Adverse</th>
<th>Moderate Adverse</th>
<th>Slight Adverse</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2</td>
<td>Direct impacts on the historic setting of Gogar Church; Small amount of tree loss; direct and indirect impacts on Gogar Castle avenue; demolition of old houses by road</td>
<td>Substantial Adverse</td>
<td>Substantial Adverse</td>
<td>Moderate Adverse</td>
</tr>
<tr>
<td>D2</td>
<td>Indirect landscape impacts on the wooded estate at Norton House Hotel</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>D3</td>
<td>Direct impacts on flat arable fields due to loss of land for the tramline</td>
<td>Moderate Adverse</td>
<td>Moderate Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>D4</td>
<td>Direct impacts on the airport due to positive influence of the tramline and station as a landscape element</td>
<td>Slight–Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>D5</td>
<td>Landscape impacts on the showground due to influence of the tram line</td>
<td>Slight–Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
</tr>
<tr>
<td>D6</td>
<td>Tram crosses road corridor</td>
<td>Slight–Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Adverse</td>
</tr>
<tr>
<td>D7</td>
<td>Tram skirts Gogar roundabout; existing mounding modified; sunken depot</td>
<td>Slight–Moderate Adverse</td>
<td>Slight Adverse</td>
<td>Slight Beneficial</td>
</tr>
</tbody>
</table>

AREA D; Urban Fringe Character Greenbelt dominated by infrastructure; OVERALL IMPACT ON LANDSCAPE RESOURCE; Slight Beneficial–Moderate Adverse; Locally Significant at Gogar hamlet area; elsewhere, not significant

### 8.7 LANDSCAPE SUMMARY

The first section of the route would run through the World Heritage Site, from St. Andrew Square, through Princes Street, to Haymarket and incorporates the New Town Designed Landscape (of which Princes Street Gardens forms a part). This designation reflects the world standing of this townscape, which would be impacted adversely and significantly by the proposals.

There are no other international or national landscape designations in the study area. However, there are three (non-statutory) historic gardens and designed landscape (HGDL) listings in the area. Millburn Tower designed landscape is classified in the Inventory as having little scenic value, as it is well screened by shelterbelts set in agricultural land. The designed landscape would not be intervisible with the proposed tram route. Newliston designed landscape is classified in the Inventory as having some scenic value, with its shelterbelts screening the park from outside but providing a woodland contrast to the surroundings that make some contribution to the scenery. Cammo is situated well to the north of Gogar Roundabout and as with Newliston, there would be little intervisibility between the...
landscape and the proposed tram route. None of these three designed landscapes would be directly impacted by the proposed scheme nor would their settings be significantly adversely impacted.

The AGLV at the Gogar Hospital Site represents a regional level of planning designation, which reflects areas of highest landscape quality in Rural West Edinburgh. The intrinsic nature of this high quality landscape would not be significantly adversely impacted by the proposed scheme. The proposed tram alignment would run to the north of the A8 with broadleaved structure planting largely screening the tram from the road and from the setting of the AGLV to the south.

The Green Belt between Gogar and Newbridge also represents a regional level of planning designation and reflects the strategic and sensitive nature of this urban fringe landscape. Generally this would not be significantly impacted. At a local level, however, at Gogar hamlet, residual impacts would be significant and adverse.

8.7.1 Significant Impacts in Winter Year of Opening

Substantial Adverse or Moderate/Substantial impacts would occur:

- Due to poles and wires which would impact negatively upon the open character of Princes Street and the appreciation of it's backdrop;
- Due to poles and wires which would impact negatively on the townscape character of St. Andrew Square and Shandwick Place;
- Due to direct impacts upon Atholl Crescent;
- Due to poles and wires which would impact negatively on the townscape character of Haymarket;
- Due to the construction of an overbridge at Carrick Knowe which would cross over the railway;
- Due to the loss of the mature tree screen as the tramline bridges the Water of Leith and runs between the railway and the rear gardens of houses in Baird Drive.
- Due to the loss of some trees and impacts on the historic setting of the areas around Gogar hamlet.

Moderate or Moderate/Slight Adverse impacts would occur:

- Due to loss of screen planting at Balbirnie Place, prior to maturity of new screening measures;
- Due to the construction of an overbridge at Roseburn which would impact upon character of adjacent housing area and cross over the cyclepath;
- Due to the impacts of the retaining walls required as the tram line along the boundary of Murrayfield Rugby pitch and on the green edge of Carrick Knowe golf course;
- Due to the loss of mature trees and the construction of Balgreen Road Station;
- Due to the loss of the mature tree screen as the tramline bridges the Water of Leith;
- Due to the new railway overbridge at Hermiston Gait;
• Due to the loss of some trees within Edinburgh Park Development and the loss of setting for the waterside park;
• Due to direct impacts on fields near Ratho;
• Due to indirect influence on wooded estate of Norton House Hotel.

8.7.2 Significant Impacts in Summer 15 years after opening

Substantial or Moderate/Substantial Adverse impacts would remain:
• Due to poles and wires which would impact negatively upon the open character of Princes Street and the appreciation of its backdrop;
• Due to poles and wires which would impact negatively on the townscape character of St. Andrew Square and Shandwick Place;
• Due to poles and wires which would impact negatively on the townscape character of Haymarket.

Moderate Adverse impacts would remain:
• Due to the construction of an overbridge at Roseburn which would impact upon character of adjacent housing area and cross over the cyclepath;
• Due to the loss of tree screen to houses in Baird Drive;
• The new overbridge structure at Carrick Knowe which would cross over the railway with elevated OLE and poles would impact negatively;
• Due to the loss of some trees and impacts on the historic setting of the areas around Gogar hamlet.

The most significant residual adverse impacts would be localised and result from the poles and OLE and the passage of the trams. Specifically, their impact on the character of the sensitive and internationally renowned west-end and city centre townscape; the initial loss of mature trees at Baird Drive prior to mitigation taking effect; due to the introduction of intrusive structures at Carrick Knowe, Roseburn, Hermiston Gait and the Water of Leith; and the impact on the historic and landscape setting of Gogar hamlet. These latter impacts can be reduced, but not eliminated, by planting.

Beneficial impacts would occur over a wide area including the airport and Showground, the setting of Gogar roundabout, Hermiston Gait and The Gyle, and housing areas bounding Broomhouse and Stenhouse Drive generally to the south of the proposed tram line due to the proposed mitigation by associated planting. However, these impacts would not be significant.
VISUAL IMPACTS

8.8 VISUAL INTRODUCTION

This chapter presents the assessment of the impacts of the proposed tram route on the visual amenity of the study area during construction and operation of the proposed scheme. Visual amenity is defined as the pleasantness of the view or outlook of an identified receptor or group of receptors.

The assessment determines the degree of anticipated change to visual amenity, considering buildings, areas of public open space, roads and footpaths that would occur as a result of the proposed scheme. The buildings, open spaces, roads and footpaths that would yield views of the tram development are collectively referred to as ‘receptors’. The potential to mitigate adverse impacts has been taken into account in the assessment and the residual impacts identified. It is for this reason that mitigation measures are referred to in the text prior to the description of residual impacts.

8.8.1 Potential Impacts

Development can change people’s direct experience of landscape depending on existing context, the scale, form, colour and texture of the proposals, the nature of activity associated with the development, and the distance and angle of view.

In this instance the proposals involve the introduction of a tram line (Edinburgh Tram Line 2) from St Andrew Square west to Newbridge. The principal scheme elements would comprise; the overhead line equipment (OLE), poles, signals, stops and shelters, the tram vehicles themselves, the buildings associated with the tram such as the depot and substations and the construction of new structures and alterations to existing ones. Due to its vertical dimension the OLE and poles would have the most significant impact on the townscape and wider landscape.

There are two key concerns relating to visual impact:

- the extent to which the new structures would intrude into existing views experienced by residents and day to day users of the area, and

- the extent to which tourists and visitors would be subject to new impact in a highly valued townscape and wider landscape.

8.9 VISUAL METHODS

The visual assessment was undertaken in accordance with DMRB (Volume 11, Section 3, Part 5) with reference to the following documents:

- Landscape & Visual Assessment Supplementary Guidance (Scottish Executive; 2002);
- Guidelines for Landscape and Visual Impact Assessment (Institute of Environmental Management and Assessment: IEMA; 2002);
- Cost Effective Landscapes: Learning from Nature (CEL:LfN) (The Scottish Office; 1998); and
- Planning Advice Note (PAN) 58; Environmental Impact Assessment (Scottish Executive 1999).
The following data sources were utilised in the visual assessment:

- Scheme proposal drawings, reviewed to ascertain the likely nature of proposals;
- field studies to identify buildings, public spaces, roads and footpaths inter-visible with the tram scheme and assess the likely impact of the proposals; and
- Zone of Visual Influence (ZVI) to guide field studies (see below for details).

8.9.1 Zone of Visual Influence

A ZVI was prepared to indicate those areas of land and buildings that may have views of the proposed scheme upon completion. It further provides a means of identifying potential receptors (areas of land used by the public and individual/groups of buildings) so that impact assessments can be undertaken. The ZVI is not representative of impact in itself nor does it indicate that the development would be visible from all locations in the ZVI.

The ZVI was generated manually by way of field survey due to the complex nature of visibility within the city. Whilst considerable care was applied to definition of the ZVI it was not practical to obtain access to all potential viewpoints to verify inter-visibility. There are also numerous localised obstructions within urban corridors that would temporarily close views for pedestrians and users of public areas. Local variations in topography, hedgerows, individual trees, buildings, walls or similar features can also vary the ZVI locally, particularly close to the viewpoint. Nevertheless the ZVI is a useful indicator of the potential area of influence of the tram line and system components and a valuable tool in landscape character and visual impact assessment.

In common with many urban corridors located in densely developed urban and suburban areas, the ZVI is defined by the buildings fronting onto or adjacent to the proposed tram line. There are, however, areas of space, which open views and extend the influence of the tram line. There are also views through gaps in the built fabric which frame development and of the OLE and poles inherent in the tram development which extend the influence of the tram proposals beyond the clearly recognisable framework of houses and planting.

The ZVI was initially drafted onto 1:2500 Ordnance Survey bases of the tram corridor and its surrounding area by desk-based scrutiny of the mapping and analysis of the relationships between building, planting and landform. The initially drafted ZVI was then checked and modified on site. The assumptions adopted in drafting the ZVI was that the observer height is 1.8m and that the assumed height of tram vehicles which could intrude into views is 3.5m with the average height of overhead poles 5m for off-street sections and 7m for sections of shared running.

Figure 8.4 illustrates the ZVI summer 15 years into operation for the tram system. A ZVI during the construction of the tram system was not drafted as it was recognised during the site-based appraisal that areas in which the tram corridor would temporarily feature in views as a result of the construction activity would also feature in similar views in operation, by virtue of the permanent visually intrusive elements associated with the tram system such as the OLE and poles.

The ZVI clearly demonstrates that the visual awareness of the tram corridor is more contained in the eastern, urban city centre sections of the study area than the westerly, more suburban and urban fringe areas, where the visual awareness of the tram corridor is more extensive.

The ZVI for much of the section from St Andrew Square to Haymarket is relatively narrow. Along much of this section of route the tram and its infrastructure would be seen from a comparatively restricted area; from buildings facing directly onto the
tram line and from streets that cross the line. The buildings that form the streets
generally block views from further a field. The exception to this is where the tram
runs along Princes Street where the visual envelope widens to the south. From
Haymarket west the visual envelope is contained in sections by localised planting
and buildings but generally forms a relatively wide corridor limited by flats and the
railway corridor to the south and open to the north extending across Carrick Knowe
golf course towards Corstorphine Hill. The envelope from Carrick Knowe west
remains wide although largely defined by the railway corridor to the north and by
buildings to the south. From Gogar Roundabout west the visual envelope is more
open and extensive. The ZVI although often contained to the south by landform and
woodland planting is open, encompassing large areas to the north with more
localised built developments, occasional landform and pockets of planting restricting
views.

8.9.2 Receptors

For there to be visual impact there is the need for a viewer (receptor). Receptors
include residential properties, workplaces, recreational facilities, road users,
pedestrians and other outdoor sites used by the public which would be likely to
experience a change in existing views as a result of the construction and operation
of the proposed tram line.

The ZVI for the proposed scheme was reviewed to aid identification of potential
receptors. Those identified were then validated through site survey, which
additionally verified the elements of the proposed scheme, which would be visible
from the various receptors. Due to the scale and complexity of the urban fabric all
but the most important receptor buildings were grouped and considered as streets
and blocks rather than individual dwellings, offices etc.

8.9.3 Assessment of Impacts

All receptors within the study area likely to experience visual impacts were
assessed, including buildings, outdoor spaces, roads and footpaths.

In order to assess the significance of any impacts, the sensitivity of receptors and
the likely magnitude of change were considered as outlined below.

Sensitivity of Receptors

The sensitivity of the visual receptor/viewpoint was assessed by evaluation of a
range of factors, including:

- the nature and context of the viewpoint;
- expectations of users/receptors; and
- the importance and value of the changed landscape in the view.

‘Importance’ in the context of ‘changed landscape in the view’ relates to the number
and type of windows/rooms (where known) looking towards the view. ‘Value’ in the
context of ‘changed landscape in the view’ relates to the degree of visual amenity of
that view. In the case of roads and footpaths, the type of users and degree of usage
is taken into consideration, with business/commercial traffic being less sensitive
than visitor/leisure traffic.

The criteria used to determine sensitivity to the proposed changes are shown in
Table 8.9:
Table 8.9: Sensitivity of Visual Receptors Criteria

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Receptors where the changed landscape in the view is of high value and importance and/or the receptor would notice any change to visual amenity by reason of the nature of use and their expectations.</td>
</tr>
<tr>
<td>Medium</td>
<td>Receptors where the changed landscape in the view is not a major element in the overall view and not critical to amenity and/or the nature of the view is not a primary consideration of the users.</td>
</tr>
<tr>
<td>Low</td>
<td>Receptors where the changed landscape in the view is unimportant/irrelevant and/or users are not sensitive to change.</td>
</tr>
</tbody>
</table>

**Magnitude of Change**

The assessment of magnitude of change included consideration of the likely effects of development on visual amenity, taking into account the scale of change to the landscape in the view with respect to the addition or loss of features, change in character and the amount/extent of the view affected.

The main elements of magnitude evaluation include:

- the extent of the receptor’s view affected by the development as a proportion of the overall view available;
- the distance of the receptor from the changed landscape;
- the angle of view relative to the main activity of the receptor;
- the level of integration or contrast created by the tram line and its associated elements within the view; and
- the potential for the tram line proposals to be mitigated.

The criteria used to determine magnitude of change are shown in Table 8.10. Note that each magnitude band can incorporate a range of change in view, from negligible at the lower end to very high at the top end. For convenience in the tabulation of this evaluation, however, only the three values are listed.

**Table 8.10: Magnitude of Change Criteria**

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>The proposals dominate the view and fundamentally change its character and components.</td>
</tr>
<tr>
<td>Medium</td>
<td>The proposals are noticeable in the view, affecting its character and altering some of its components and features.</td>
</tr>
<tr>
<td>Low</td>
<td>The changes are only a minor element of the overall view.</td>
</tr>
</tbody>
</table>

**Significance of Impact**

Visual context changes over time as planting included as part of the mitigation proposals establishes and matures, and as the existing landscape external to the development evolves. The assessment acknowledges change and reports on the impacts during construction, for winter year of opening and summer fifteen years after opening.
The significance of impacts (adverse or beneficial) was determined using a matrix of sensitivity and magnitude, as shown in Table 8.11. However, as with the consideration of landscape impact significance, professional judgement and experience was used to confirm the assessment of significance or amend where necessary, taking into account the fact that the criteria represent levels on a continuum or continuous gradation, and the relative balance of importance between sensitivity and magnitude.

The matrix provided in Table 8.11 has been adapted from LVASG to accommodate a seven point scale to enable a consistent use of impact criteria with the Edinburgh Tram Line 1 Visual Assessment. Impact ratings adopted comprise Substantial, Moderate, Slight or Negligible and adverse or beneficial. A rating of negligible has been applied where there is no discernible impact.

### Table 8.11: Impact Significance Criteria for Visual Issues

<table>
<thead>
<tr>
<th>Magnitude</th>
<th>Sensitivity</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>Substantial</td>
<td>Substantial</td>
<td>Moderate</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Substantial</td>
<td>Moderate</td>
<td>Slight</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Slight</td>
<td>Slight</td>
</tr>
</tbody>
</table>

For the purposes of this assessment impacts of Moderate and above are considered to be significant, as this is the level at which changes would be clearly perceived.

#### 8.9.4 Limitations of the assessment

The limitations of the ZVI are described under section 8.9.1 above. The assessment of visual impacts has been undertaken from outside properties and assumptions have been made about the types of room existing and about the types and importance of views obtained from these rooms. Not all properties were visited but instead viewed from the centreline of the proposed tram alignment. Access was not gained to the area of light industrial and commercial premises to the north of Haymarket rail depot nor the section of alignment which would run through this area. The assessment was therefore based on anticipated views from adjacent areas with inward views of the area and aerial photographs.

Not all of the footpaths, cycleways or tracks have been walked/visited. Assumptions have been made about extent and degree of importance of views relative to the routes as a whole, based on assessment of sample routes/locations and reference to the ZVI.

Due to the scale and complexity of the urban fabric receptors with a similar outlook have been grouped together to give receptor groups rather than thousands of individual receptors. In the more rural and open landscapes to the west of the study area individual receptors have been considered, where appropriate. Equally, only roads and adjacent footpaths along the immediate tram corridor have been assessed, as these were considered to be the only receptors of this type likely to experience significant impacts.

The method of procurement which will be utilised contract to construct the proposed works has not yet been decided; however the assessment is based on the schematic alignment shown in this Environmental Statement, the finer details of which would be developed later as part of the design process.

#### 8.10 VISUAL BASELINE SITUATION

The ‘Guidelines for Landscape and Visual Impact Assessment’ (IEMA; 2002) state, ‘landscape and visual assessments are separate, although linked, procedures. The
landscape baseline, it’s analysis and the assessment of landscape effects all contribute to the baseline for visual assessment studies”.

Accordingly, the baseline visual situation is described earlier in this Chapter under the Landscape Character section. The proposed scheme can be divided into the following sections within which the majority of receptors are located:

- City centre (St Andrew Square – Haymarket)
- Haymarket – Roseburn (delta junction)
- Roseburn – Murrayfield
- Murrayfield – Carrick Knowe
- Carrick Knowe – Bankhead Drive (new heavy rail station at Hermiston Gait)
- Edinburgh Park – Gogar Roundabout
- Gogar Roundabout – Airport Terminal
- P&R – Newbridge

Groups of receptors (buildings, outdoor locations, roads, rail and footpaths) are illustrated on Figure 8.5 (sheets 1-10).

8.11 VISUAL MITIGATION

Visual impacts resulting from the introduction of the tram system would arise from the infrastructure; the OLE, poles, signals, stops and shelters, by the tram vehicles themselves, by the buildings associated with the tram such as the depot and substations and by construction of new structures and alterations to existing ones. Due to its vertical dimension the OLE and poles would have the most significant impact on the landscape, which for the most part cannot be screened or hidden. The mitigation for these, to which tie has committed through the Design Manual, is to design them so that they fit as comfortably into the landscape and streetscape as possible. Principles in the Manual which are specifically intended to reduce the visual impact of the tram system as a whole, are described earlier in this Chapter under the Landscape Character section. Visual impacts on individual receptors / receptor groups would also be mitigated by the principles and specific measures identified by the landscape mitigation commitments, also described earlier in this Chapter under the Landscape Character section and illustrated in Figure 8.3 (sheets 1-11).

8.12 VISUAL RESIDUAL IMPACTS

The likely impacts of the proposed scheme on each receptor or group of receptors (buildings, open spaces, roads, rail and footpaths) are presented in detail in Appendix 8 and summarised below.

Figure 8.5 (sheets 1-10) illustrate impacts on receptors during construction, winter year of opening and summer 15 years after completion.

Refer to section 8.2.4 in the earlier Landscape section for details of the assessment assumptions.

In certain locations within the study area the existing outlook for receptors is on occasion focused on neglected corridors of land. Whilst the introduction of the tram system would form a negative intrusion into existing views, the landscape mitigation
planting would enhance what was a neglected landscape and would help to minimise the visual intrusion of the tram. In such locations the benefits and disbenefits would effectively cancel one another out resulting in a neutral (Negligible) impact.

8.12.1 View from Buildings and Open Space

City Centre (St Andrew Square – Haymarket)

Principal receptors include:

- Buildings containing offices, shops, restaurants and the National Portrait Gallery surrounding St Andrew Square, North and South St Andrew and St David Street and a section of Queen Street (Receptors 180-189) with views of the tram alignment and stops;

- The Balmoral Hotel, buildings fronting onto the section of Princes Street from South St Andrew Street east and Princes Mall - occasional shops/café and plaza area (Receptors 176-178) with views of the tram alignment along Princes Street and as it turns in and out of South St David and South St Andrew streets;

- East Princes Street Gardens, The Scott Monument and the National Galleries (Receptor 171 and L30a and b) with views of the tram alignment as it runs along Princes Street;

- Buildings with shops at street level, offices and some residential properties above, fringing the entire northern side of Princes Street from South St Andrew Street west to the junction with Lothian Road (Receptors 164, 166, 169, 173, 175) with immediate views of the tram alignment and stops as it runs along Princes Street;

- Buildings with shops at street level, restaurants, offices and some residential properties above, fronting onto streets angled 90° to Princes Street (Receptors 163, 165, 168, 172) with oblique views towards the tram alignment as it runs along Princes Street;

- Edinburgh Castle, Calton Hill and the elevated groups of buildings and properties on the northern edge of the Old Town (Receptors 167, 170, 174, 179) with extensive, elevated views across north Edinburgh in which the tram alignment along Princes Street and around St Andrew Square would be visible in mid ground views;

- Buildings (offices, shops, hotels, bars, restaurants and a church) around the junction of Lothian Road and Princes Street including Caledonian Hotel (Receptors 157 – 161) with immediate views of the tram alignment and offices (Receptors 160a and b) with more distant slot views of the tram alignment;

- Buildings along Shandwick Place and on adjacent side streets (Receptors 153 – 156) with both immediate views of the tram alignment and more distant, oblique ones from the side streets;

- Buildings on Coates and Atholl Crescents (Receptors 148 – 149) with immediate views of the tram alignment and stop, and views from buildings along sections of adjacent side streets (Receptors 150 – 152) with more oblique and distant views of the tram alignment and stop;

- Buildings from Coates and Atholl Crescents west to Haymarket including direct views from buildings immediately fronting the corridor, oblique views
from buildings on side streets and glimpsed views from more distant buildings (Receptors 134, 135, 138 - 147) of the tram alignment.

During both construction and once the tram is in operation, no receptors within this section of corridor would sustain Substantial and adverse visual impacts. Moderate and adverse impacts would however be experienced by the majority of receptors along this section of route during construction. The various buildings which fringe the tram alignment particularly around St Andrew Square, Princes Street and Shandwick Place to Haymarket would have immediate views of the construction works.

Upon scheme completion Moderate and adverse impacts would only be experienced by visitors to the Scott Monument (L30b) where immediate views particularly from lower levels would be dominated by the visual intrusion associated with the mass of poles and the OLE associated with the tram alignment. Slight to Moderate and adverse impacts would result for the remaining receptors (187,184,181,180,177,175,173,169,166,164, 155, 146, 145, 143, 140, 132, 130a), which would have immediate views of the passing trams and more specifically the poles and the OLE. Whilst the passing trams would not be more obtrusive than the existing double decker buses, the visual intrusion of the OLE and poles would be such that they would permanently alter the character, components and features of views gained from these receptors.

The majority of receptors along this section of the route would therefore accrue significant long term impacts with slight and adverse or negligible long term impacts limited to receptors with distant and oblique views of the tram alignment, generally from buildings on adjacent side streets and more distant elevated buildings, such as from the Old Town.

Slight to Moderate and adverse impacts would result in the visual amenity and views experienced by visitors to Edinburgh Castle during construction with Negligible impacts in the long term when the tram line and stops would be seen in mid ground views of Princes Street but as barely discernible elements within the wider panoramic vista. Similarly the tram alignment, OLE and poles would be a visible but not dominant element in the long vista down Princes Street from Calton Hill and from the various elevated properties in the Old Town.

**Haymarket – Roseburn (delta junction)**

Principal receptors include:

- Properties on Clifton Terrace and Haymarket Terrace including the train station (Receptors 129 – 132) with views of the tram alignment and stop at Haymarket;

- Properties to the south of the railway corridor, including occasional properties along Dalry Road (Receptors 119, 120, 123, 133, 137) with views of OLE, poles, passing trams along various sections of the tram alignment;

- Office and industrial premises in Haymarket Yards area to the north of the railway corridor (Receptors 126 – 128) with immediate views of the tram alignment and office and residential properties on Devon Place (Receptors 122, 124 –125) with both immediate and more distant views of the tram alignment;

- Properties on Balbirnie Place and occasional properties to the north of this area (Receptors 112 – 118) with both immediate and more glimpsed views of the tram alignment.

The Caledonian Alehouse building would be demolished.
Substantial and adverse impacts during construction would be limited to the properties along Balbirnie Place (Receptors 114 and 117) which would be directly orientated towards the proposed alignment. Whilst their existing views are largely of the railway corridor the proposals would run closer and parallel to their main views and through the section of woodland planting which currently offers a partial screen for existing views of the railway corridor. With insufficient space to reinstate the existing screen planting these impacts would remain significant with Moderate and adverse impacts in operation as the tram proposals would continue to dominate views.

Moderate and adverse impacts during construction would be experienced by the remaining properties along Balbirnie Place (Receptors 113, 115) and the area to the north, with slightly more distant and glimpsed views of the tram alignment. Office buildings in the Haymarket Yards area (Receptors 121,122,126-128) and the buildings along Haymarket Terrace and Haymarket Station (Receptors 130a, 132) would also experience Moderate and adverse impacts, with the tram alignment travelling immediately adjacent to the buildings. Impacts upon scheme completion would generally remain Moderate to Slight and adverse in the longer term, due to the immediate negative visual intrusion of the OLE and poles. Operation impacts experienced by the office buildings with more distant or oblique views would reduce to Slight and adverse or Negligible.

The properties to the south of the railway corridor and occasional properties on Dalry Road and various properties with glimpsed slot views to the north of the railway corridor would accrue Slight and adverse impacts during the construction period. Upon scheme completion and in the long term visual impacts for these receptors would be reduced to Negligible.

**Roseburn - Murrayfield**

Principal receptors include:

- Properties in Roseburn (Receptors 75, 74, 70, 71, 68) with views of the tram alignment and passing trams, tram stop at Murrayfield, substation and the two overbridge structures across Roseburn Street and Russell Road;

- Light industrial units and commercial buildings to the north of Haymarket Depot and the car show room and light industrial unit to the south of the railway corridor (Receptors 72, 73, 69, 76) with both immediate and more distant views of the tram alignment, tram stop and the two overbridge structures;

- Beechwood Bowling Green (Receptor L8) with glimpsed views of passing trams and the OLE.

Receptors which would accrue significant visual impacts during construction along this section of the route would be restricted to the residential flat development on Russell Road (Receptor 75) which would experience Substantial to Moderate and adverse impacts and the cluster of one and two storey detached properties on Roseburn Street (Receptor 68) with Moderate and adverse impacts. Both receptor groups would have immediate views of the tram alignment raised on new structures crossing Roseburn Street and Russell Road, the former receptor would also have views of the construction of the sub station and delta junction, whilst the latter would gain views of the construction of the proposed tram stop at Murrayfield.

In the longer term Receptor 75 would accrue the greatest visual impact sustaining Moderate and adverse impacts as a result of the transient movement of passing tram vehicles and the permanent intrusion of the OLE, poles and delta junction into both lower level and higher level views. Whilst the introduction of the elevated tram alignment would maintain the negative intrusion into views already incurred during construction by Receptor 68, the high quality urban plaza assumed to be created at the tram stop would enhance the existing view. This visual benefit would partially negate the disbenefits, which would result in a Slight and adverse long term impact.
Remaining receptors in this section of route would generally have more obscured and relatively distant views of the tram alignment and would experience Slight and adverse impacts during construction and either Slight and adverse or Negligible impacts upon completion. Beechwood Bowling Green (Receptor L8) would have glimpsed views of the OLE and possibly passing trams from its relatively contained bowling green area and more elevated views from the club house which overlooks the green and surrounding residential and industrial premises. Impacts would be Slight and adverse during construction but Negligible in operation.

**Murrayfield – Carrick Knowe (flats at footbridge)**

Principal receptors include:

- Murrayfield Rugby Ground including club house and Murrayfield ice rink (Receptor 67) with views of the tram line on a new elevated structure, supported by piers, tram stop at Murrayfield and overbridge structure across Roseburn Street;

- Properties along Baird Drive (Receptor 63) with direct views of the tram alignment as it passes between the southern garden curtilage and the railway embankment;

- Properties and buildings along the northern side of Baird Drive, Saughtonhall and Balgreen (Receptors 64 - 66, 61, 62) with generally more distant, often glimpsed views of the tram alignment and tram stop at Balgreen;

- Buildings and properties to the west of Balgreen Road including Jenners Depository (Receptors 59, 60) with direct views of the tram alignment and tram stop at Balgreen;

- Carrick Knowe Golf Course and adjacent allotment gardens to the north of the rail corridor (Receptors L6, L7) with views of the tram alignment as it runs along the southern boundary of these two open spaces;

- Properties on Whitson Road and Stenhouse Avenue West which fringe the rail corridor to the south (Receptors 58, 55) with direct views of the tram alignment as it runs to the south of Carrick Knowe golf course, more obscured views of the tram stop at Balgreen and views of the overbridge across the railway line at Carrick Knowe and the cluster of properties and buildings to the south of the existing footbridge (Receptor 54) with more distant views of the tram alignment on the overbridge structure;

- The Fairways flats and properties which fringe the western edge of Carrick Knowe golf course (Receptors 56, 57) with immediate views of the overbridge structure and tram alignment as it runs to the south of the golf course.

Various commercial/light industrial premises in this section of the route corridor would be demolished including the National Car Rental building and the Cadets building adjacent to the existing footbridge at Carrick Knowe.

Along this section of route substantial impacts during construction would be accrued by the properties along Baird Drive (Receptor 63) and the flats adjacent to the footbridge at Carrick Knowe (Receptor 56). The tram alignment would run in a false cutting along the back garden boundaries of properties along the south side of Baird Drive. Whilst the rail corridor dominates existing views from these properties and their gardens, a band of mature largely deciduous planting does provide a visual buffer and reduces the visual intervisibility between passing trains and the properties. During construction impacts would be Substantial and adverse and
would not significantly diminish in winter year of opening as the wall of the retaining structure, upper sections of passing trams and the OLE would form prominent features in the immediate view from these properties. In summer 15 years into operation, the mixed woodland screen planting along the foot of the retaining structure would have matured and would reduce the visual dominance of the tram elements resulting in Moderate and adverse long term impacts.

The modern flat development of The Fairways (Receptor 56) affords open panoramic views across the golf course, along the rail corridor to Murrayfield stadium and surrounding residential areas, to Edinburgh Castle to the east and the Pentland Hills to the south. The proposed tram alignment would be visible both in middle distance views as it would run parallel to the rail corridor and in more immediate views as it would rise on a new structure to cross the rail corridor. The combination of the elevated tram alignment exacerbated by the further visual intrusion from the OLE would cause a noticeable deterioration in the overall view from some of these properties. Substantial and adverse impacts would result during construction with Moderate and adverse long term impacts.

The properties along Stenhouse Avenue West to the south of the rail corridor (Receptor 55) would incur Moderate to Substantial and adverse impacts during construction with the raised tram alignment bridging the railway corridor, visible in both more immediate and middle distance views. Impacts upon scheme completion would remain Moderate and adverse although the mixed woodland planting on the embankments would reduce impacts to Slight and adverse in the longer term. Moderate and adverse impacts are limited to Jenners Depository (Receptor 60) and the Allotment gardens (Receptor L7). Partially obscured views from Jenners Depository would be limited to the external loading areas and upper window areas from which views of the tram alignment and stop would be gained. The existing planting along the disused railway corridor would be removed and the fence line defining the building curtilage modified in order to accommodate the tram proposals. Impacts in operation would be Slight and adverse until the mitigation planting matures when impacts would become Negligible. Similarly the allotment gardens would incur greatest visual intrusion during the construction period which in the long term would reduce to Slight and adverse.

The grounds of Murrayfield Rugby Stadium including the main entrance gates, pitches and club house, Carrick Knowe golf course and the properties along Whitson Road would all accrue Moderate to Slight adverse impacts during construction. Upon completion these impacts would reduce to Slight and adverse with the mitigation planting further reducing the impact in the longer term to Negligible for some receptors. The remaining receptors with more distant, largely glimpsed views of the tram alignment would generally accrue Slight and adverse impacts during construction and Negligible impacts in the long term when the tram alignment and passing trams would form barely discernible elements in their more distant wider view. Sections of elevated tram alignment would be visible although not as a prominent feature in the views from these receptors, due to the various localised obstructions and the general vertical visual clutter that currently exists.

**Carrick Knowe – Bankhead Drive (Edinburgh Park heavy rail station)**

Principal receptors include:

- Properties and buildings fronting the immediate tram corridor (Receptors 49, 46, 42, 41) with direct views of the tram alignment, tram stop and various views of the overbridge structures over the rail line, Saughton Road and Broomhouse Road;
- Properties in the Broomhouse estate and to the south of Stenhouse Drive (Receptors 50, 48, 47, 43, 38, 39) with more distant and largely obscured views of the tram alignment, stop and overbridges;
• Properties and buildings to the north of the rail corridor (Receptors 52, 51, 45, 44, 40) with more distant, often partially obscured views towards the tram alignment and overbridge structures;

• Distant properties and buildings to the south of the railway corridor including Stevenson College and the Sighthill high rise flats (Receptors 36, 37) with elevated distant views of the tram alignment;

• Various areas of open space along this section of corridor including the allotments to the north of Saughton Mains Street, Sighthill Community Park and the 5 a-side pitches (Receptors L4, L5, 35) with views of the tram alignment, stop and overbridges;

• Various light industrial units, car show rooms and retail outlets along Bankhead Drive (Receptors 29-34) with a combination of relatively direct, un-obscured views towards the tram alignment, tram stops and overbridge structures over South Gyle Access and more prominently over the railway corridor.

No receptors within this section of tram corridor would sustain Substantial and adverse impacts either during construction or in the long term. Moderate and adverse impacts during construction would be restricted to those receptors fronting the immediate tram corridor or with direct views of the construction works particularly associated with the new overbridge structures. This would include properties and buildings on or adjacent to Saughton and Broomhouse Roads (Receptors 39,41,46,47,49) and the Allotment Gardens (Receptor L5). The long term impacts accrued by these receptors would reduce to Slight and adverse upon completion and Negligible once the landscape proposals mature, with the exception of the residential properties which immediately front the road and the Allotment gardens which would maintain immediate views of the tram alignment with Slight and adverse impacts.

Receptors with slightly more distant and often partially obscured mid-ground views of the tram alignment would experience Slight to Moderate adverse construction impacts. These impacts would become Negligible in the long term with the establishment of the mitigation planting. The remaining receptors including more distant properties, Sighthill Community Park and adjacent 5-a-side pitches and views from the various light industrial units, car show rooms and retail outlets along Bankhead Drive would result in Slight and adverse construction impacts. These would become Negligible in the long term through the visual benefit associated with the mitigation planting which would help negate the negative visual influence of the tram. Views of the tram alignment during construction and once in operation from the high rise flats at Sighthill and from Stevenson College would be Negligible within which the alignment would form barely discernible elements within the wider view.

**Edinburgh Park – Gogar Roundabout**

Principal receptors include:

• Office units at Edinburgh Park (Receptors 21-25) with direct, un-obstructed views of the tram alignment, stop, overbridge structure and occasional more distant views of the depot;

• Office units at Edinburgh Park and South Gyle Business Park (Receptor 26, 28) with distant and largely obscured views of the tram alignment and overbridge structure;

• The waterside landscape corridor in Edinburgh Park (Receptor L3a+b) through which the tram alignment would run and the tram stop would be located;
The Gyle retail development (Receptors 20, 27) with various views, largely from the external car park space through which the tram alignment would pass.

Substantial and adverse impacts during construction would be limited to the buildings which would directly overlook the tram alignment and stop in Edinburgh Park (Receptor 24) and the waterside landscape corridor through which the proposed alignment would run (Receptors L3a, L3b). The new structure over the railway corridor would also be visible from these receptors. Views from the offices and buildings which fringe this section of route would be significantly impacted and the visual amenity of this section of landscape corridor particularly the southern section which is not influenced by adjacent roads, would significantly and irreversibly alter. Consequently long term impacts would remain Moderate and adverse and would only reduce to Slight and adverse for the northern section of landscape corridor (Receptor L3b) where the existing visual amenity is more influenced by its proximity with adjacent roads. Office units which fringe the west side of the landscape corridor would have more distant views of the tram alignment and would accrue Moderate and adverse impacts during construction becoming Slight and adverse during operation.

The corner office units in Edinburgh Park which would have oblique views of the alignment and depot site would experience Slight to Moderate and adverse impacts during construction and once the mitigation planting and earth bunds associated with the depot site established, Negligible long term impacts would result. The Gyle shopping centre would have varying views of the tram alignment and stop, largely from the car park areas resulting in Slight to Moderate construction impacts through the temporary disturbance and loss of visual amenity from construction activity and Negligible long term impacts once the mitigation planting becomes established to visually connect the tram proposals into the existing landscape.

Remaining office units in Edinburgh Park and adjacent business parks with distant mainly oblique and glimpsed views of the tram alignment would accrue Slight and adverse impacts during construction becoming Negligible in the long term.

**Gogar Roundabout – Airport Terminal**

Principal receptors include:

- Properties and buildings to the north of Gogar roundabout (Receptors 16, 17) with distant views of the tram alignment and depot;
- Properties to the west of Gogar roundabout in the A8 corridor, including Castle Gogar and Gogar Church (Receptors 5, 7, 13, 18, 19, 21b) with both direct open views of the tram alignment and tram stop at Gogar Burn and more distant partially obscured views;
- Properties and buildings along Eastfield Road and the airport (Receptors 2, 1, 8, 9, 10) with views of the tram alignment and stop at Inglisotn;
- Properties and golf course to the south of the A8 and to the north east of the airport (Receptors 6, 14, 18, L2) with distant often glimpsed views of the tram alignment as it runs across agricultural fields to the stop at Inglisotn and to the airport;
- The airport and adjacent Hilton Hotel (Receptors 4, 11, 12) with views of the tram alignment as it runs through the airport to a tram stop adjacent to the airport terminal.

The cluster of properties adjacent to the A8 to the east of the RBS overbridge would be demolished to accommodate the tram alignment.
The only receptor along this section of route which would accrue Substantial and adverse impacts during construction and in year 1 of opening would be Castle Gogar Lodge House (Receptor 19). Despite the property being well screened by a surrounding wall and planting, it would have direct, immediate views of the alignment as it would pass the property immediately to the north. The introduction of a ‘willow wall’ and broadleaved structure planting between the A8 and tram alignment would help marginally mitigate the visual intrusion caused, with Moderate and adverse long term impacts remaining.

The majority of receptors along this section of route would experience Moderate and adverse impacts during construction. East Lodge House (Receptor 16) would have direct views across the A8 corridor of the tram works; Gogar Church and graveyard (Receptor 13) would gain immediate views of the tram alignment and stop intruding into what is an open view across agricultural land, although the RBS overbridge would be evident in more oblique views; various properties which fringe Eastfield Road (Receptors 1,3,8,9) which would have more distant views of the tram alignment as it runs from the P&R site to the airport; the Hilton Hotel (Receptor 11) the curtilage of which the tram would run through; and Castle Gogar (Receptor 7) and Gogar Mains Estate offices (Receptor 5) which would have long, more distant views of the tram as the alignment runs through agricultural fields. All of these impacts would reduce to Slight and adverse in the long term once the mitigation planting establishes and integrates this linear system into what is a particularly open stretch of landscape. The only exception to this would be Gogar Church where impacts would remain Moderate to Slight and adverse due to the more immediate visual intrusion experienced from the tram and Castle Gogar and East Lodge House where impacts would be largely mitigated by extensive screen planting resulting in Negligible long term impacts.

Remaining receptors along Eastfield Road and more distant receptors to the north of Gogar roundabout with longer views towards the depot would generally accrue Slight and adverse impacts during construction where views are distant and often largely obscured by localised planting, buildings and landform. These impacts would largely become Negligible in the long term, although occasionally remaining Slight and adverse where mitigation planting would not completely negate the minor visual impacts.

Impacts experienced by users of Edinburgh Airport would be Slight and adverse during construction as the scale and type of works during construction would not be dissimilar to the construction activity often visible in the airport environment. It has been assumed that mitigation in line with the Airport Landscape Strategy to create a high quality environment with amenity planting, feature trees and hard landscape proposals would negate the negative visual intrusion of the OLE and poles enabling Slight and Beneficial visual impacts to result.

**Park & Ride - Newbridge**

Principal receptors include:

- Properties and buildings on Ingliston Road (Receptors 77, 78, 79, 80, 81) with views, often partially obscured of the tram alignment as it passes from Ingliston P&R stop through the area of airport parking to join the A8;

- Properties immediately fringing the A8 corridor (Receptors 82, 83, 85, 86) and occasional properties set back from the A8 (Receptor 84) with views of the tram alignment as it runs along the central reserve of the A8;

- The Royal Highland Showground and associated buildings and Ingliston market (Receptors L10, L12, 87) with varying views of the tram alignment, often distant and partially obscured by localised planting, as the tram runs along the A8 and then heads south across the fields to Ratho Station;
- Properties at Ratho Station and the area of public open space (Receptors 88-91, 94, L11) with views of the tram alignment as it crosses from the A8 and rises up to the railway corridor along the southern boundary of the village of Ratho Station where a tram stop is proposed. Views are often obscured by localised planting;

- Properties and buildings including light industrial units (Receptors 92, 93) with distant glimpsed views of the tram alignment as it rises to cross the rail corridor along the southern edge of Ratho Station;

- Properties and buildings including light industrial warehouses adjacent to Harvest Road (Receptors 95, 96, 97) with views of the tram alignment as it travels in shared running along Harvest Road;

- Light industrial units and warehouses at Newbridge (Receptors 98, 99, 100, 111) with views of the tram alignment as it passes on shared running along adjacent roads and of the tram stop at Newbridge South;

- Properties and buildings in Newbridge village (Receptors 101, 108, 109, 110) with views of the tram alignment and the tram stop at Newbridge South;

- Newbridge Bowling club and Huly Hill Scheduled Ancient Monument (SAM) (Receptors L20, L21) with views of the tram alignment as it joins Old Liston Road and runs along the verge and southern boundary of the SAM;

- Industrial and commercial buildings, petrol station and fast food facilities (Receptors 105, 106, 107) with views of the tram alignment as it passes along the northern verge of Old Liston Road and to the west of Newbridge roundabout;

- Industrial and commercial buildings including car show rooms and adjacent petrol station and Newbridge Post Office (Receptors 102, 103, 104) with views of the tram alignment and terminus.

Substantial and adverse impacts along the final section of route to the terminus at Newbridge would be limited to the property on the corner of Ingliston Road (Receptor 79). The tram alignment and stop would form dominant elements in the immediate views form this property and its garden accentuated by the alignment which would run through a section of the garden and across the drive. Impacts would remain Substantial and adverse in the long term as the visual intrusion incurred by this property would be such that mitigation would not lessen the impact nor lessen the fundamental change in their views.

The visual amenity of Huly Hill SAM (Receptor L21) would also experience Substantial to Moderate and adverse impacts during construction as the tram alignment would run adjacent to the southern boundary and in immediate view to the east. Impacts would remain Moderate and adverse in winter year of opening and reduce slightly to Moderate to Slight and adverse in summer 15 years after opening once the mitigation hedge planting establishes, although the OLE and poles would remain a negative element in view.

The majority of receptors in this section of the corridor would accrue Moderate and adverse impacts during construction including; the properties which fringe the A8 with immediate views of the tram alignment running in a dedicated section of the central reserve (Receptors 82, 83, 85, 86), properties along the eastern edge at Ratho Station (Receptor 90) and adjacent to the railway corridor to the south of Ratho Station (Receptors 91, 94) with views of the tram alignment and tram stop and the factory buildings and car show rooms (Receptor 102) with views overlooking the tram terminus at Newbridge.
The majority of these impacts would become Slight and adverse in the long term with the various mitigation proposals helping to reduce the impact, with the exception of Receptor 86 where impacts would remain Moderate to Slight and adverse as despite the mitigation planting, the alignment would remain a visually intrusive element in views which extend across the open arable fields. Conversely the mixed woodland planting proposed for the area to the south of properties at Receptor 90 would effectively screen views of the alignment resulting in Negligible long term impacts.

The remaining receptors would largely accrue Slight and adverse impacts during construction although occasional clusters of buildings in Newbridge would experience Slight to Moderate and adverse impacts due to their orientation in relation to the proposed alignment. Long term impacts however would remain Slight and adverse or Negligible.

The Royal Highland Showground and Ingliston Sunday market areas form the largest area of open space in the study area. The visual amenity experienced by users of the show ground and the market would not be significantly impacted with possible Slight and adverse impacts during construction from distant and largely obscured viewpoints and Negligible impacts in the long term.

8.12.2 View from Roads, Railway Lines and Footpaths

**City centre (St Andrew Square – Haymarket)**

Travellers and users of the following roads and footpaths:

- Section of Queen Street (Receptor R34), North and South St David Street and North and South St Andrew Street (Receptor R33) used by vehicles and pedestrians with immediate views of the tram alignment and stops;

- Princes Street as a tourist corridor for pedestrians, cycle and vehicle travellers (Receptor R30) with immediate views of the tram alignment and stops;

- Section of Shandwick Place west to Haymarket (Receptor R31) with immediate views of the tram alignment;

- Cyclists using the cycle route from George Street, across Princes Street to the Mound (Receptor R32) with elevated views from the Mound of the tram alignment on Princes Street and immediate views where the tram alignment would cross the cycle route on Princes Street.

Princes Street is a key tourist attraction and popular tourist corridor for pedestrians and vehicle travellers (Receptor R30). Views east down Princes Street are focussed on the monument on Calton Hill, framed by shops, National Galleries and the Scott Monument. Views south across Princes Street are open, focussed on the castle and Old Town buildings with foreground views of the gardens and activity of Princes Street and frequent double decker buses. Substantial and adverse impacts would be experienced by users of Princes Street both during construction and in the long term. The OLE and poles would form intrusive visual elements fundamentally changing the iconic vistas and long views currently experienced from Princes Street.

The north and south axis which form St Andrew Square are heavily trafficked by cars and buses as well as pedestrians moving around the square. Several long, important vistas are generated from these axial routes, including views south towards the Scott Monument, west along George Street and north to Fife. Substantial and adverse impacts would result during construction, which would remain significant in the long term with Substantial to Moderate and adverse impacts. The OLE and poles would form intrusive visual elements fundamentally
changing the iconic vistas particularly towards the Scott Monument with the concentration of poles around the junction into South St David Street.

Cyclists using the designated cycle route which links George Street with the Mound, via Princes Street (Receptor R32) as well as pedestrian and vehicle users gain several outstanding views. Views to the south from Hanover Street encompass the National Galleries and Old Town buildings beyond, whilst views looking to the north from the Mound take in Princes Street Gardens and extend to the New Town and Fife. During construction impacts would be Moderate and adverse and would remain Moderate and adverse in the long term with the OLE and poles intruding into various foreground views and seen against the buildings and skyline.

The short section of Queen Street (Receptor R34) is currently heavily trafficked by buses and cars. Views are generally contained by adjacent buildings apart from to the north across New Town gardens and the side on views of vistas to St Andrew Square and Fife. Impacts during construction would be Moderate and adverse and Slight and adverse in operation with the shared running of the tram and associated OLE and concentration of poles as the tram turns onto Queen Street negatively impacting on views along this section of road. Similarly the section of road from Shandwick Place to Haymarket (Receptor R31) would accrue Moderate and adverse impacts during construction and Slight and adverse in operation. Views are generally focussed towards the station at Haymarket to the west through two Georgian Crescents and to the west end of Princes Street to the east into which the shared running of the tram and associated OLE and poles would negatively impact.

**Haymarket – Roseburn (delta junction)**

Travellers and users of the following roads and footpaths:

- Cycle route which runs from Russell Road along Balbirnie Place, through the office space connecting to Haymarket Terrace (Receptor F21) with immediate views of the tram alignment along most of the cycle route as the tram alignment would follow a similar route.

The cycle route from Russell Road to Haymarket Terrace (Receptor F21) currently follows sections of track and road through Haymarket Yards which are generally restricted in use to employees and visitors to the various office premises. Views are generally contained by the flats to the south of the railway corridor and by office, residential and commercial buildings to the north. The proposed tram alignment would follow a section of the existing cycle route resulting in possible temporary diversions of the cycle route during construction. Moderate and adverse impacts would be experienced during construction with Slight to Moderate and adverse impacts on cyclists views upon completion due to the visual intrusion of the OLE and poles.

**Roseburn - Murrayfield**

Travellers and users of the following roads and footpaths:

- Section of Russell Road from junction with Roseburn Street to the rail bridge (Receptor R11), with immediate views of the tram alignment, substation and overbridge delta junction;
- Section of Roseburn Street (Receptor R10) with views of the tram alignment and tram stop at Murrayfield;
- The southern, end section of the Roseburn Railway corridor (Receptor F1) with immediate views of the overbridge structure over Russell Road.

Users of the southern section of the Roseburn Railway corridor (Receptor F1) would experience Substantial and adverse impacts during construction and Moderate and
adverse long term impacts with the introduction of the tram alignment, delta junction and overbridge fundamentally changing the visual experience of this route.

Sections of Russell Road and Roseburn Street (Receptors R11, R10) would incur Moderate and adverse visual impacts during construction with Slight and adverse impacts upon completion. The new overbridge structures which would span both these roads combined with the OLE, poles and substation would form negative features in the immediate views from limited sections of these roads. The tram stop at Murrayfield would provide a visual benefit to localised views along Roseburn Street and would help to partially negate from the negative incursion of the intrusive tram structures and OLE.

**Murrayfield – Carrick Knowe (flats at footbridge)**

Travellers and users of the following roads and footpaths:

- Section of Balgreen Road (Receptor R9) with immediate views of the tram alignment and oblique views of the tram stop at Balgreen;

- Localised sections of the Water of Leith walkway and the disused railway line at Balgreen (Receptors F2, F3) used by cyclists and pedestrians with varying views of sections of the tram alignment from Baird Drive to Murrayfield and the tram stop at Balgreen respectively;

- The footbridge used by pedestrians and cyclists at Carrick Knowe (Receptor F6) with views of the tram alignment as it passes on the new overbridge structure and the alignment both east and west of this point.

Substantial and adverse impacts would be experienced by users of the section of footpath/cycleway along the disused railway corridor embankment (Receptor F3) which would be permanently realigned to accommodate the tram alignment and stop. Impacts would remain Moderate and adverse in the long term as the visual amenity experienced from this section of route would be fundamentally and permanently altered by the introduction of the tram alignment, stop, substation and associated earthworks.

Localised sections of the Water of Leith walkway (Receptor F2) would gain Moderate and adverse impacts during construction and Slight and adverse long term impacts with the tram alignment and new structures along Baird Drive, the Water of Leith and Murrayfield in view.

Slight and adverse impacts would be experienced by users of the section of Balgreen Road (Receptor R9) with passing and short-lived views of the tram alignment as it would cross the road and passing glimpsed views of the tram stop resulting in Negligible long term impacts.

The proposed alignment and associated new structure adjacent to the existing footbridge at Carrick Knowe (Receptor F6) would not significantly impact the visual amenity of views from the footbridge in the long term.

**Carrick Knowe – Bankhead Drive (new heavy rail station at Hermiston Gait)**

Travellers and users of the following roads:

- Sections of Stenhouse Drive, Broomhouse Drive and Bankhead Drive (Receptors R7, R8) with views of the tram alignment, stops and overbridges as the tram runs parallel to these roads;

- Distant, elevated views of the tram alignment and overbridge structure from localised sections of the City Bypass (Receptor R6);
Cycle route along Cultins Road (Receptor R26) with views of the tram alignment as it would pass on a new structure over the cycle route.

The introduction of the tram alignment and associated overbridge structures and tram stops would not significantly change the visual experience for users of Stenhouse Drive, Broomhouse Drive and Bankhead Drive (Receptors R7, R8), accruing Slight and adverse impacts during construction and Negligible impacts upon completion. Equally, impacts would be Negligible for traffic using sections of the City Bypass where the tram proposals would have a barely discernible impact on the visual experience of the road users.

A short section of Cultins Road is designated as a cycle route. Currently it is almost impassable as a result of earthworks and fly tipping. The tram alignment would bridge over this road on a new structure with Slight and adverse impacts during construction and Negligible impacts in operation as a result of the visual benefits associated with the mitigation planting outweighing the visual disbenefits of the OLE.

Edinburgh Park – Gogar Roundabout

Travellers and users of the following roads and footpaths:

- Localised sections of roads in Edinburgh Park and The Gyle (Receptors R25) with generally highly localised, glimpsed views of the tram alignment and stops;
- Public Right of Way (PRW) which loops into the undeveloped land between Edinburgh Park and the railway corridor (Receptor R40) with views of the tram alignment and new structure crossing the railway corridor.

A public right of way loops from west of the City Bypass into the area of currently undeveloped land following the Gogar Burn back west under the Bypass. The tram proposals would not directly impact the PRW although the proposals would feature in walkers’ views. Construction impacts would be Slight to Moderate and adverse from the visual intrusion associated with the construction of the overbridge, alignment and tram stop and would remain Slight and adverse in the long term when the tram alignment and new structure would be viewed in the context of the existing dominant infrastructure developments.

Localised sections of roads servicing Edinburgh Park and The Gyle would experience glimpsed, often distant and short-lived views of the tram alignment with Slight and adverse construction impacts and Negligible long term impacts whereby the tram alignment would not compromise the visual experience of users of these routes.

Gogar Roundabout – Airport Terminal

Travellers and users of the following roads and footpaths:

- Sections of Turnhouse Road (Receptor R5) with distant intermittent views of the depot and alignment;
- Sections of the A8 between the airport junction up to and including the Gogar roundabout (Receptors R1, R3, R4) with both foreground and more distant, often localised views of the tram alignment and more immediate views of the depot;
- Eastfield Road (Receptor R2) with glimpsed views of the tram alignment;

No significant impacts would be experienced by users of roads or footpaths along this section of the tram route.
Impacts would be Negligible for the majority of road users with only distant glimpsed views of the tram proposals (Receptor R1, R5) although the travellers along the section of the A8 corridor from the RBS overbridge east to, and including the Gogar roundabout and along Eastfield Road would experience Slight and adverse impacts from the visual intrusion of the adjacent tram alignment and depot construction. Long term impacts would be Negligible with the establishment of the mitigation planting including the mixed woodland screen planting screening the majority of passing views of the tram infrastructure from these road corridors with only the upper section of the depot buildings in view.

**P&R – Newbridge**

Travellers and users of the following roads and footpaths:

- The section of the A8 west of the airport junction (Receptors R14) with views dominated by the tram as it follows a shared alignment along the central reserve of the A8;

- Various side roads off the A8, particularly Ingliston Road (Receptor R13) which the tram alignment crosses and others with more distant views of the tram alignment as it runs along the A8;

- The Public Right of Way from the A8 junction with Ingliston Road to Ratho Station (Receptor F4) with varying views of the tram proposals, both immediate where it would cross the path and more distant and glimpsed and the path to the south of Ratho Station (Receptor F5) which would be realigned to accommodate the tram alignment as it joins Harvest Road;

- Various roads in the Newbridge area including Harvest Road, Clifton Hall Road, Newbridge Road, Old Liston Road and A89 Edinburgh Road (Receptors R15, 16, 20, 24) with immediate views of the tram as it follows a shared running alignment along or immediately adjacent to these various roads;

- Sections of the M9 and M8 link and Newbridge roundabout (Receptors R21, 22) and the overbridge used by cyclists and pedestrians (Receptor F20) with more distant views of the tram alignment and terminus.

Substantial and adverse construction impacts would be experienced in views from the footpath (Receptor F5) to the south of Ratho Station which would be re-aligned to accommodate the tram proposals. The existing woodland planting would also be lost through construction works thereby opening up views which currently screen adjacent industrial buildings from view. Long term impacts would be Moderate and adverse with the tram alignment forming a dominant element in the immediate view of path users.

Walkers using the PRW (Receptor F4) would experience Moderate and adverse construction impacts with the tram crossing the path at one point and running both adjacent to it for a section and as a visible element in more distant views. Long term impacts would become Slight and adverse with the mixed woodland planting screening immediate views of the tram alignment and stop. Localised planting adjacent to the PRW would partially screen more distant views of the proposals.

Passing views for travellers along roads in this section of the tram corridor which have distant and short-lived views of the tram alignment are limited to various side roads off the A8 including Inglinton Road (Receptors R13, R20, R21) which would experience Moderate and adverse impacts during construction but Negligible upon operation. Users of the roads which would share running with the tram (Receptors R15, R16, R24) would generally experience Moderate and adverse impacts in their views during construction and Slight and adverse impacts in the long term. Vehicles travelling round the Newbridge roundabout would likely gain Moderate to Slight adverse impacts during construction and Slight and adverse impacts in scheme
operation although the OLE and poles would add to the mass of vertical elements which already intrude into views. Sections of the M9 and M8 link would experience generally distant and elevated views towards the tram alignment resulting in Slight and adverse to Negligible construction impacts and Negligible long term impacts when the tram proposals would form barely discernible elements in passing views.

The rail corridor from Haymarket to Hermiston Gait and again at Ratho Station (Receptor R23) would gain passing side on views of the tram alignment to the north of the rail line from Haymarket to Carrick Knowe and then to the immediate south of the corridor until Hermiston Gait and at Ratho Station glimpsed views of the alignment as it would run to the north of the rail line again. Impacts during construction would be Slight to Moderate and adverse and in the long term Negligible as the tram alignment would form a minor, often barely discernible element within the wider view. The mixed woodland planting proposed for the area between the railway corridor and the tram alignment to the south would largely screen views of the tram proposals along this section of rail journey.

8.13 SUMMARY OF VISUAL IMPACTS

During the construction period, in terms of buildings, the majority of receptor groups which directly front the tram corridor, or with immediate views towards it would experience significant and adverse visual impacts as a result of the visually intrusive construction activity associated with the construction of a tram system.

In the long term, significant and adverse visual impacts would be limited to the following receptor groups by virtue of their sensitivity (expectation and importance of the changed landscape to the receptor), their immediate orientation towards the tram alignment and visual proximity to new structures, OLE and poles:

- Properties on Balbirnie Place (Receptors 114, 117) – Moderate adverse;
- Flats on Russell Road (Receptor 75) – Moderate adverse;
- Baird Drive (Receptor 63) – Moderate adverse;
- The Fairways flats at Carrick Knowe footbridge (Receptor 56) – Moderate adverse;
- Offices and part of waterside landscape corridor at Edinburgh Park (Receptors 24 and L3a) – Moderate adverse;
- Castle Gogar Lodge House (Receptor 19) – Moderate adverse;
- Property at junction of A8 and Ingliston Road (Receptor 79) – Substantial adverse;

The following building receptors and receptor groups would experience Slight to Moderate and adverse long term impacts which for the purposes of this assessment have been considered significant and adverse:

- Majority of buildings which front St Andrew Square, Princes Street and between Shandwick Place to Haymarket (Receptors 187, 184, 181, 180, 177, 175, 173, 169, 166, 164, 155, 146, 145, 143, 140, 132, 130a);
- Two office/commercial premises in Haymarket Yards and one on Devon Place (Receptors 128, 122, 121);
- Gogar Church (Receptor 13);
- Ingliston Park Lodge (Receptor 86);
Visual Impact on Open Space would not be significant and adverse other than from the Scott Monument and adjacent gardens (L30a, L30b) with Moderate adverse and Slight to Moderate adverse impacts respectively, Huly Hill (L21) with Moderate to Slight adverse impacts and a section of the waterside landscape corridor at Edinburgh Park (L3a) with Moderate adverse impacts.

Visual impacts would only be significant and adverse for localised sections of the following footpaths and roads where the tram proposals would either fundamentally change the visual amenity experienced along the paths or adversely impinge on the iconic vistas and long views currently experienced from various streets in the New Town:

- North/south axis of St Andrew Square (R33) – Moderate to Substantial adverse impacts
- Princes Street (R30) – Substantial adverse impacts;
- Sections of footpaths along the disused railway corridors at Roseburn, Balgreen and to the South of Ratho Station (Receptors F1, F3, F5) – Moderate adverse impacts.

The only beneficial visual impact in the tram corridor would be at Edinburgh Airport with Slight beneficial long term impacts experienced as a result of the assumed high quality amenity planting and hard landscape to the tram stop and terminus in line with the Airport Landscape Strategy.
9 Ecology and Nature Conservation

9.1 INTRODUCTION

This chapter considers the likely environmental impacts of the proposed scheme on habitats and their associated flora and fauna. It identifies and assesses potential construction and operational impacts and formulates an appropriate mitigation strategy.

In summary, the scope of the ecological assessment was to:

- Identify statutory and non-statutory designated areas along or adjacent to the route of the tram.
- Identify any rare, notable or protected species or habitats along or adjacent to the proposed tram route.
- Consider the potential for adverse and positive impacts arising from the proposed development along and adjacent to the proposed route.
- Describe mitigation of adverse impacts along or adjacent to the tram route.

The information in this Chapter informs and draws upon information provided in other Chapters, in particular Chapter 8 with respect to landscape mitigation. This Chapter should be read in conjunction with Figures 9.1 to 9.10 Habitat Mapping. A separate and confidential Protected Species report is provided in Volume 5 of this ES.

9.2 METHODS

The assessment methodology follows that contained within the Guidelines for Ecological Impact Assessment: Amended Pilot, November 2002 published by IEEM. However, due note and reference has also been made to: The Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment – Section 3, Part 4 Ecology and Nature Conservation, June 1993; and The Guidance on the Methodology for Multi-Modal Studies, May 2000, (GOMMMS) specifically Section 4.10 ‘The Biodiversity sub-objective’.

Survey methodology complies with that published in the Guidelines for Baseline Ecological Assessment, (1995) published by the Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment). In the first instance, a desk study and an extended Phase 1 survey, based on the methodology outlined by the Nature Conservancy Council in A Handbook for Phase 1 Habitat Survey, 1990, was carried out. Further species specific survey work was subsequently carried out (see Section 9.2.2 and Technical Appendix 9b).

9.2.1 Desk Study and Consultation

A desk study and consultation exercise was carried out in 2003 in order to gather relevant existing ecological records and data. Records of, and data on, species and sites of ecological and nature conservation value were requested within the route corridor, defined as a 2 km wide corridor centred on the Tram Line 2 route. The consultees/organisations contacted and the information provided is summarised in Table 9.1 below.
### Table 9.1 Consultees/Organisations Contacted

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Information Provided</th>
<th>Description of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Edinburgh Council and Scottish Natural Heritage</td>
<td>Draft Edinburgh Habitat Survey 2001-02</td>
<td>Provides a detailed listing of habitats, notable species and their presence along the route corridor.</td>
</tr>
<tr>
<td>City of Edinburgh Council</td>
<td>Planning Policy Guidelines - Biodiversity</td>
<td>Provides guidance on how the Council would wish the principles of biodiversity be incorporated into development proposals.</td>
</tr>
<tr>
<td>City of Edinburgh Council</td>
<td>Urban Nature Conservation Strategy for Edinburgh *</td>
<td>Details locally designated Urban Wildlife Sites, Wildlife Corridors and Neighbourhood Nature Areas throughout Edinburgh. The Strategy also details policies for the protection of such wildlife sites, the sympathetic management of these sites, opportunities for habitat creation and nature conservation.</td>
</tr>
<tr>
<td>Scottish Natural Heritage</td>
<td>Sites of Special Scientific Interest, Local Nature Reserves and ‘Ancient’ or ‘Long-Established Woodland pf Plantation Origin’ within 2km of the proposed tramline corridor</td>
<td>Details of statutorily designated areas that have been assessed as significant sites across Edinburgh.</td>
</tr>
<tr>
<td>Lothian Wildlife Information Centre</td>
<td>Ecological Data</td>
<td>Records of notable species found within 500 metres of the proposed area that are contained on the Lothian Wildlife Information Centre’s species record database.</td>
</tr>
<tr>
<td>Edinburgh and Lothians Badger Group</td>
<td>Detailed records of badger activity along the tram line corridor*</td>
<td>Plan detailing setts, latrines, foraging areas, sightings and records of road kill of badgers along the tramline corridor.</td>
</tr>
<tr>
<td>Scottish Natural Heritage</td>
<td>Letter &amp; Site Meeting – advice on the procedures relating to the protection of badgers during development.</td>
<td>Letter reiterating the importance of protecting badgers, a requirement under the Protection of Badgers Act 1992. Site meeting to discuss issues relating to badgers</td>
</tr>
</tbody>
</table>

In conjunction with the desk study and consultation, published sources of information were also sought. A list of all documents referenced in this Chapter is provided in the References at the end of the ES. Examples of such documents include:


As a result of the desk study, consultations and gathering of published sources of information, records of protected species and designated sites within the route
9.2.2 Site Surveys

Two forms of survey have been undertaken. These are identified below.

**Phase 1 Habitat Survey**

A phase 1 habitat survey of the site was carried out between 20th and 22nd August 2003 following the criteria set down in the Handbook for Phase 1 Habitat Survey by the Joint Nature Conservation Committee (JNCC 1993). This survey was informed through the ecological scoping exercise and information collected through consultation. This includes previous phase 1 habitat survey data.

Where access could be safely gained, the proposed route was traversed on foot. Descriptions of the habitats and dominant plant species were made using the above methodology. It should be noted however that some spring and early summer flowering species might not have been identified during this period. Phase 1 mapping at 1:5,000 scale on OS based plans was subsequently produced for the areas of the route with greatest ecological interest during survey work. The results of the habitat survey are summarised in Figures 9.1 to 9.10 and in Section 9.3 below.

The habitat categories used in this survey method are based on dominant vegetation augmented with information on topographic and substrate features. This method results in a representative, but not exhaustive, list of species present on the site to be gathered, allowing the character of the site to be established and to allow the evaluation of the significance of any impact on the ecology from the proposed works. The aim of this survey was to produce current baseline information of the route and to identify all sites and areas of potential wildlife value and to identify those areas where specialist surveys would be required.

**Protected Species Surveys**

Two specialist surveys were undertaken for:

- Badgers (June, 2003).

For the badger survey, the survey area was walked between the 2nd and 5th June 2003 and locations of badger setts and other field signs noted. Areas were prioritised based on existing badger records held by the Edinburgh and Lothians Badger Group.

The most effective time of year to carry out a survey for the presence of setts is during the winter when vegetation is less dense. However, surveys of feeding areas and habitual runs are best carried out in the spring, summer and autumn as the animals are more active. Although setts were surveyed outside of the winter period, information provided by the Edinburgh and Lothians Badger Group indicated the known locations of setts within the survey area. It is understood that the information collated by the Group was last updated in winter 2002.

Known locations of badger setts within the survey area were checked for current level of activity. Land within the survey area that had not previously been checked for badger setts were also surveyed. Setts were classified according to categories given in *Problems with Badgers*, (RSPCA). They fall into four main categories: main setts; annexe setts, subsidiary setts and outlying setts. The geographical positions of the setts were recorded. Other signs of badger activity, including dung pits, latrines (groups of dung pits), foraging holes and paths/trails were noted.
Survey work was confined to daylight hours and therefore none of the setts were watched at night.

The geographical positions of the setts and other field signs were recorded using a hand-held 12 channel Geographical Positioning System (GPS), known as Garmin ‘eTrex’. The GPS determinations may have embodied an error of up to 30m due to the limitations of the equipment and the strength of the signal in positions where dense vegetation obscured the sky.

The results of these surveys are presented in Volume 5 of this ES. To ensure the safety of protected species this document is not available to the general public.

The otters and water vole survey was carried out on 9th November 2003. A search was made of two sections of the Gogar Burn and one section of the Water of Leith for all signs of activity of water voles and otters and in addition, habitat suitability assessed. With regard to water voles, signs searched for included burrows, lawns, runs, latrines, food remains and prints. For otters, holts and lying up sites, prints, spraints (droppings) and prey remains. Incidental sightings of other species were also noted.

9.2.3 Impact Assessment Methods

The stages in the impact assessment are outlined below. In summary the process involves

- Valuing ecological receptors.
- Identifying the types of impacts on these receptors that would occur.
- Describing the changes that these activities would have on receptors and the magnitude of this change.
- Identify the significance of the impact taking into account the effectiveness of mitigation measures.

Valuation of Ecological Receptors

For a full assessment it is necessary to have some concept of the value of the site as a whole and the ecological receptors that it comprises. The value of the site can be identified using recognised criteria. In determining the value of ecological receptors, note has been made of the conservation of genetic diversity and people’s enjoyment/understanding or health benefits from biodiversity among others

The levels of value are shown in Table 9.2 and are taken from the Draft Guidelines on Ecological Impact Assessment. The terms provided in the brackets to describe value are those contained within GOMMMS.

<table>
<thead>
<tr>
<th>Value of Resource</th>
<th>Selection Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High (International)</td>
<td>An internationally designated site or candidate site (SPA, pSPA, SAC, cSAC, and/ or Ramsar site) or an area that SNH has determined meets the published criteria for such designations, irrespective of whether or not it has yet been notified.</td>
</tr>
<tr>
<td></td>
<td>A viable area of a habitat listed in Annex I of the Habitats Directive or smaller areas of such habitat that are essential to maintain the viability of a larger whole.</td>
</tr>
<tr>
<td>Value of Resource</td>
<td>Selection Criteria</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>UK Red data book species or listed as occurring in 15 or fewer 10 km squares in the UK (categories 1 and 2 in the UK BAP), or of uncertain conservation status or global conservation concern in the UK Biodiversity Action Plan (BAP). A regularly occurring, nationally significant population/number of any internationally important species.</td>
<td></td>
</tr>
<tr>
<td>High (National)</td>
<td>A nationally designated site (e.g. SSSI, NNR, Marine Nature Reserve) or a discrete area that meets the selection criteria for national designation (e.g. SSSI selection criteria) irrespective of whether or not it has yet been notified. A viable area of a priority habitat identified in the UK BAP or of smaller areas of such habitat, which are essential to maintain the viability of the whole. Any regularly occurring population of a nationally important species that is threatened or rare in the regional or Council area. A regularly occurring, regionally or Council area significant population/number of any nationally important species. A feature identified as of critical importance in the UK BAP.</td>
</tr>
<tr>
<td>Medium – High (Regional)</td>
<td>Sites that exceed the Council area level designations but fall short of SSSI selection guidelines, where these occur. Viable areas of key habitat identified in the Regional BAP or smaller areas of such habitat, which are essential to maintain the viability of the whole. Viable areas of key habitat identified as being of Regional Value in the appropriate Natural Area profile. Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK or in a Regional BAP or relevant Natural Area on account of its regional rarity or localisation. A regularly occurring, locally significant number of a regionally important species.</td>
</tr>
</tbody>
</table>
| Medium (City of Edinburgh) | Council area sites and other sites that the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves selected on Council ecological criteria. Semi-natural ancient woodland greater than 0.25ha. A viable area of habitat identified in the Council area BAP. A regularly occurring, locally significant number of a Council area important species. Any regularly occurring, locally significant population of a
### Value of Resource Selection Criteria

<table>
<thead>
<tr>
<th>Value of Resource</th>
<th>Selection Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>species that is listed in a Council ‘red data book’ or BAP on account of its regional rarity or localisation.</td>
</tr>
<tr>
<td>Low – Medium</td>
<td>Areas of habitat identified in a Council BAP or in the relevant Natural Area Profile.</td>
</tr>
<tr>
<td>(Neighbourhood)</td>
<td>Sites/ features which are scarce within the Council or which appreciably enrich the Council habitat resource.</td>
</tr>
<tr>
<td></td>
<td>A population of a species listed in a Council BAP on account of its rarity in the locality or in the locality or in the relevant Natural Area Profile because of its regional rarity or localisation.</td>
</tr>
<tr>
<td></td>
<td>Semi-natural ancient woodland smaller than 0.25ha.</td>
</tr>
<tr>
<td></td>
<td>A diverse and/or ecologically valuable hedgerow network.</td>
</tr>
<tr>
<td>Low (Neighbourhood)</td>
<td>Areas of habitat considered to appreciably enrich the habitat resource within the context of the neighbourhood, e.g. species-rich hedgerow.</td>
</tr>
<tr>
<td>Negligible</td>
<td>No significant ecological value</td>
</tr>
</tbody>
</table>

**Identification of Proposed Activities**

Information on the proposed development activities was obtained from the Project Engineers. Detailed Alignment Plans would form part of the Parliamentary submission. This information is summarised in Chapter 2 of this ES. Generic activities which could take place and which have been considered include:

- Temporary disturbance to flora and fauna during construction, including the presence of construction workers and vehicles, fragmentation of habitats, lighting, noise, and dust.
- Permanent loss of habitat resulting from construction works and associated activities such as vegetation clearance.
- Permanent fragmentation of habitats.
- Permanent changes resulting from the proposed landscaping scheme.
- Changes in vegetation management practices resulting from the operation and management of the tram route.
- Procedures for dealing with environmental incidents and spillages.
- The increased presence of people and the trams themselves, leading to higher levels of disturbance.

**Effects of Proposed Activities on Ecological Resources**

In order to determine the impacts of the scheme on ecological resources, the changes on the site and in the surrounding area have been determined for both the construction and operational phase. The assessment of residual impacts is based on development on Day 1 of operation.
Consideration would also be given to the ‘with development in Year 15’ scenario, in order to consider the potential positive long-term effects of the scheme, largely in terms of the landscape mitigation proposals. Finally, an assessment of residual impacts has also been considered, taking into account mitigation measures.

In general terms, negative effects are defined as those considered detrimental to the conservation value and/or health/survival chances of particular components of the ecosystem. Positive effects are beneficial to those qualities of each component.

Direct effects are those that can be linked to some features of the development without the intermediary of a more immediate effect. An example would be the loss of a wooded area under new infrastructure. Where a feature of the development causes an effect that then causes a further effect, the further effect is termed indirect.

The magnitude of the impact on an ecological receptor is described as in Table 9.3 and is taken from the Draft Guidelines on Ecological Impact Assessment. The terms provided in the brackets to describe impact are those contained within GOMMMS.

**Table 9.3 Magnitude of Impact**

<table>
<thead>
<tr>
<th>Magnitude of Impact</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe/Major Negative</td>
<td>Landtake of a habitat or feature, if it occurs, may be greater than 20%. Where impacts are indirect, disruption of ecosystem functioning occurs, with loss of species and loss of diversity. Changes may be long-lasting or permanent, particularly if loss or major alteration of wildlife habitat occurs. Recovery, if possible, is likely to take more than three years.</td>
</tr>
<tr>
<td>Moderate/Intermediate Negative</td>
<td>Landtake of a habitat or feature, if it occurs is 5-20% of the area. Where impacts are indirect, qualitative change occurs. The abundance of some of the more sensitive species may be reduced. Changes in habitat may be longer lasting. Impact is reversible, or nearly so, although recovery of impacts other than landtake may take up to three years following cessation of impact.</td>
</tr>
<tr>
<td>Slight/Minor Negative</td>
<td>Landtake of a habitat or feature, if it occurs, affects less than 5% of the area. Where indirect impacts occur, some changes in species abundance may occur, but the impact is reversible. Full recovery is likely in the short term, probably within a year, following the cessation of impact.</td>
</tr>
<tr>
<td>Negligible/Neutral</td>
<td>With ecological receptors it is often not possible to state categorically that there would be no impact, but this category is used when the chance of any impact is very low and if it occurs it is well below the level of detection.</td>
</tr>
<tr>
<td>Positive</td>
<td>The change is likely to benefit the receptor in terms of its conservation status, but not so far as to achieve favourable conservation status.</td>
</tr>
<tr>
<td>Major Positive</td>
<td>The change is likely to restore an ecological receptor to favourable conservation status, or to create a feature of recognisable value.</td>
</tr>
</tbody>
</table>
**Impact Significance**

Determining the significance of an identified impact is somewhat problematic. The impacts of this scheme have been determined by considering the value of the resource affected and the magnitude or nature of the impact. To measure magnitude a quantifiable physical measurement should normally be used. Where possible this would be applied, such as the area or percentage of a habitat affected. However, for both positive and negative effects, the significance would also depend on the duration of the effect. For example, impacts over one and two breeding/growing seasons would have different ecological effects. Mitigation and enhancement measures may be applied to instigate or accelerate changes in scale of effect or site/component value and provide an indication of the residual impact.

The criteria used to define significance of impacts in this section are taken from the Draft Guidelines on Ecological Impact Assessment and are shown in Table 9.4. The table provides a range of possible impacts allowing the assessor to make judgements on a case-by-case basis.

The significance criteria are related to levels of importance, which are International, National, Regional, District/Borough and Neighbourhood level. These levels of importance apply to both sites and species.

**Table 9.4 Impact Significance Definitions**

<table>
<thead>
<tr>
<th>Impact</th>
<th>International (European)</th>
<th>National (Scotland/UK)</th>
<th>Regional (Lothians)</th>
<th>District/ (City of Edinburgh)</th>
<th>Neighbourhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Negative</td>
<td>Critical</td>
<td>Critical-Moderate</td>
<td>Major</td>
<td>Moderate – Minor</td>
<td>Minor - Moderate</td>
</tr>
<tr>
<td>Negative</td>
<td>Major-Minor</td>
<td>Major-Minor</td>
<td>Moderate – Minor</td>
<td>Moderate – Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>Major-Minor</td>
<td>Major-Minor</td>
<td>Major-Minor</td>
<td>Moderate – Minor</td>
<td>Minor</td>
</tr>
<tr>
<td>Major Positive</td>
<td>Critical</td>
<td>Critical-Moderate</td>
<td>Major-Minor</td>
<td>Moderate – Minor</td>
<td>Minor - Moderate</td>
</tr>
</tbody>
</table>

**Assumptions and Limitations**

Survey work was not possible in some locations where access could not be gained for health and safety reasons. These areas are identified in Section 9.3 e.g. railway land.

In addition to the assumptions set out in Section 3.5 of this ES, the ecological assessment was based on the following assumptions.

- For the purposes of the assessment, ecological conditions during construction (assumed to begin in 2006) and the opening year (2009) are assumed to be similar to those in 2003. However, it would be necessary for further ecological survey work to be undertaken prior to construction to confirm the ecological status of the area e.g. with respect to badgers.

- The assessment is based on the alignment shown on the Parliamentary plans and sections. See Section 3.5 for further information.

Other assumptions are set out in Section 8.2.4.
9.3 BASELINE SITUATION

9.3.1 Site Context

The habitats found in Edinburgh are heavily influenced by the geology of the City and its immediate environs and its coastal location. The area is a combination of rolling hills and steep rocky cliffs with alluvial plains and raised beaches. A series of burns, rivers and other waterways connect the areas of rural character with those that are highly urbanised. These waterways, allied with the major infrastructure components of road and rail, create valuable wildlife corridors providing a means for wildlife to move into the heart of the City.

9.3.2 Legal Context

Habitats

A variety of sites are designated in the UK, under various Conventions, Directives and Regulations, for their nature conservation importance and interest. The general aim of these designations is to conserve and protect ecological resources in addition to raising awareness and understanding. Other non-statutory sites are afforded some protection through local plans. Table 9.5 outlines the most common statutory and non-statutory designations.

Table 9.5 Statutory and Non-Statutory Designations

<table>
<thead>
<tr>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramsar Sites</td>
<td>Wetlands of international importance. Ramsar Sites are effectively protected, through the planning system, under the Wildlife and Countryside Act 1981, as amended, and the Countryside and Rights of Way Act 2000, through their notification as Sites of Special Scientific Interest (SSSI) and through other regulatory systems addressing water, soil and air quality.</td>
</tr>
<tr>
<td>Special Protection Areas</td>
<td>SPAs are the most important habitats for rare and migratory birds within the European Union. The Birds Directive, adopted by the UK in 1979, provides for the protection, management and control of all species of naturally occurring wild birds in the European territory of Member States, including the UK. The provisions of the Birds Directive are transposed into Scottish law by the Conservation (Natural Habitats &amp;c) Regulations 1994</td>
</tr>
<tr>
<td>Special Areas of Conservation</td>
<td>SACs are sites that are chosen to conserve the natural habitat types and species of wild flora and fauna listed in Annex I and II of the Habitats Directive. They are the best areas to represent the range and variety of habitats and species within the European Union. The provisions of the Habitats Directive were transposed into Scottish law by the Conservation (Natural Habitats &amp;c) Regulations 1994.</td>
</tr>
<tr>
<td>Sites of Special Scientific Interest</td>
<td>SSSIs are the best sites for wildlife, geological and geomorphological features in the UK. They are designated under the National Parks and Access to the Countryside Act 1949 and protected under the Wildlife and Countryside Act 1981, as amended and the Conservation (Natural Habitats &amp;c) Regulations 1994.</td>
</tr>
<tr>
<td>National Nature Reserves</td>
<td>National Nature Reserves or NNRs are nationally important areas of wildlife habitat and geological formations in Britain. NNRS are designated under the National Parks and Access to the Countryside Act 1949 and protected under the Wildlife and Countryside Act 1981, as amended.</td>
</tr>
<tr>
<td>Designation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Local Nature Reserves</td>
<td>Local Nature Reserves are similar to NNRs but they apply to the local context. They are sites of value to nature conservation and are designated under the National Parks and Access to the Countryside Act 1949.</td>
</tr>
<tr>
<td>Ancient Woodland</td>
<td>In Scotland Ancient woodlands are woodlands that have been established since or before 1750AD. They are non-statutory sites and are not legally protected but they are afforded some protection in, for example, structure and local plans.</td>
</tr>
<tr>
<td>Local Sites</td>
<td>These non-statutory sites are sites designated by a local authority as being of local nature conservation value but are not notified as SSSIs. They have a variety of titles dependent upon the designating authority and include: Sites of Importance for Nature Conservation and Urban Wildlife Site.</td>
</tr>
</tbody>
</table>

**Protected Species**

In addition to sites, a number of species have now become so rare that they are also afforded protection through international/European and national law. Other species are considered to contribute to our ‘quality of life’. Although these species do not benefit from legal protection, they can be key considerations in the planning process. Table 9.6 outlines the key forms of protection afforded to species.

**Table 9.6 Key Protection afforded to Species**

<table>
<thead>
<tr>
<th>Form of Protection</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Habitats Directive</td>
<td>Annex II of the Directive lists the European protected species that are afforded special protection under this Directive. The provisions of the Habitats Directive were transposed into Scottish law by the Conservation (Natural Habitats &amp;c) Regulations 1994. Schedule 2 of the Regulations lists the European protected species of animals whilst Schedule 4 lists the European protected species of plants.</td>
</tr>
<tr>
<td>The Birds Directive</td>
<td>Bird species listed in Annex I of the Directive regularly occur in Britain but are protected under EEC law. Member countries are required to classify as SPAs the most suitable sites for these species and also for all regularly occurring migratory species.</td>
</tr>
<tr>
<td>Wildlife and Countryside Act, 1981, as amended</td>
<td>Bird species listed in Schedule 1, animal species listed in Schedule 5 and plant species listed in Schedule 8 of the WCA 1981, as amended, are protected.</td>
</tr>
<tr>
<td>Protection of Badgers Act 1992</td>
<td>The legislation concerning badgers has largely arisen to protect this species against the practice of badger digging. The badger is too common to be included in Schedule 5 of the WCA, 1981, as amended.</td>
</tr>
</tbody>
</table>

The Wildlife and Countryside Act (WCA), 1981, as amended, The Protection of Badgers Act 1992 and the Conservation Regulations are the main legislative framework for protection of wild animals in the UK. Schedule 1 of the WCA covers birds, Schedule 5 covers other animals and Schedule 8 covers plants.

Bats, Otters and Great Crested Newts are fully protected under Schedule 5 of the Act and are also protected on Schedule 2 of the Conservation Regulations. Badgers are protected under their own Act: The Protection of Badgers Act 1992. Activities affecting protected species must usually be conducted under licence obtained from the appropriate body.

Proposed development must be able to show that all reasonable measures have been taken to ensure that protected species are not subject to disturbance. The habitats of all Schedule 2 species, WCA Schedule 1 and some WCA Schedule 5 species are also protected from disturbance and destruction. Again all reasonable precautions should be taken to ensure that this does not happen.
Other reference documents include:

- UK and Edinburgh BAPs – these ensure that national targets are transformed into effective action at a local level;
- Red Data Book Species - These species are nationally threatened. They range from species that are endemic to Britain to those that are geographically widespread and common on a worldwide scale; and
- Birds of Conservation Concern - the UK’s leading non-governmental bird conservation organisations have agreed the priorities for bird conservation after reviewing the status of all bird species in the UK, Channel Islands and Isle of Man.

**9.3.3 Planning Policy**

A summary of planning policy is provided in Chapter 4 of this ES. This includes national, regional and local policy objectives. With respect to wildlife it is the intention of planning policy that sites and species of nature conservation concern are to be protected from development. Where development is allowed that would harm such sites or species enhancement and benefit for wildlife should be included.

**Scottish Planning Policy Guidance**

The Scottish Executive has produced National Planning Policy Guidance 14: Natural Heritage (NPPG 14). NPPG 14 stipulates the Government’s policy approach for the conservation and enhancement of Scotland’s natural heritage. NPPG14 is to be reflected in development and local plans and provides guidance on the approach to be taken for statutorily designated sites of national and international importance, local and non-statutory designations as well as specifying the “importance of safeguarding and enhancing natural heritage beyond the confines of designated areas”. It should be noted that NPPG has implications for both rural and urban environments.

In addition, the NPPG 14 is supported by guidance contained in the Scottish Executive’s Planning Advice Note 60: Planning for Natural Heritage (PAN 60).

**Regional Planning Policy Guidance**

At a regional level natural heritage planning policy is detailed in the Lothian Structure Plan 1994 (approved 1997) and the Finalised Edinburgh and Lothians Structure Plan 2015 (Draft 2003). All regional policy documents contain guidance relating to the protection and enhancement of national natural heritage designations and locally designated sites including conservation areas, wildlife sites and local nature reserves. In keeping with NPPG14, all local plans also specify that in general all plant or animal species must be protected during construction works and opportunities for the creation new habitats would be encouraged.

**City of Edinburgh Council Policy**

As detailed in Section 4: Policy Context, at the local level five separate local plans covering the City have been produced, three of which are directly relevant to the natural heritage and Line 2 study area:

- Rural West Edinburgh Local Plan (Deposit 2003) (RWELP).
- West Edinburgh Local Plan (Draft 2001) (WELP).
- Central Edinburgh Local Plan (adopted 1997) (CELP).
In summary, key ecological policies issues set out in the local plans relate to:

- Development within or affecting Urban Wildlife Sites (as termed in the WELP and CELP) and Sites of Interest for Nature Conservation (as termed in the RWELP) would require appropriate mitigation measures to enhance or safeguard the nature conservation value of the site(s). The creation and appropriate management of new habitats would also be encouraged.

- Appropriate design and construction methods must be employed where proposals may harm protected plant or animal species and their habitat.

### 9.3.4 Biodiversity Action Plans

#### The UK BAP

Biodiversity encompasses the whole variety of life on earth. It includes the whole of the natural world from the commonplace to the critically endangered. However, the world is losing biodiversity at an ever-increasing rate as a result of human activity. In the UK, we have lost over 100 species during the last century. In 1992, the global community responded to biodiversity loss by publishing the Convention on Biological Diversity.

The UK Biodiversity Action Plan, published in 1994, sets out the UK’s response to Article 6 of this Convention. There are currently 391 Species Action Plans (SAP) and 45 Habitat Action Plans (HAP) that extend across the UK (The UK Biodiversity Action Plan: Review of the 2002 reporting round, JNCC, May 2003). The production of separate Action Plans for priority species and habitats setting out clear, measurable targets, was considered to be fundamental to the process. As noted in the Review:

> “These cover not only the rare and localised but also species and habitats, such as skylark, brown hare and lowland heathland, that were once much more widespread but have declined considerably in recent decades. Action is also being taken at a local level through 161 Local Biodiversity Action Plans”.

As the report goes on to note: “the UK BAP is implemented by national steering groups (coordinated by lead partners) and by local Biodiversity Action Plan (LBAP) partnerships. LBAPs exist to help achieve the targets for UK BAP priority species and habitats and to identify and deliver targets for locally distinct wildlife. They also play a major part in raising awareness of the need for conservation among the general public, educational establishments and the private sector, which is critical if the UK BAP process is to be sustainable”.

Local conservation action, engagement in public awareness, education and developing partnerships are stated as being vital actions that form a major part of the work of LBAPs and form an essential complement to the UK action plans. LBAPs are often organised at the unitary authority level, although they also exist for national parks and for other administrative areas such as districts. The LBAP for the scheme is the Edinburgh BAP (Ref:9.X).

Within the UK BAP, habitat loss and degradation (61%) emerged as the issue that affects most UK BAP priority species and habitats with pollution a distant second (18%). Looking in more detail at the underlying causes of habitat loss and degradation it is clear that agriculture is most important, followed by changing management practice and infrastructure developments. Land and freshwater pollution factors, particularly nutrient enrichment from agriculture and agro-chemical usage, contribute 11% of the total and were ranked higher than atmospheric pollution (5%) which includes impacts associated with global warming.
**Edinburgh BAP**

The Edinburgh BAP has identified 12 key habitats found in or around Edinburgh with Habitat Action Plans compiled for each. These are:

1. **Woodland** – Edinburgh, with only 6% woodland/tree cover, compares poorly with the Scottish average of 15%. Most notable areas of woodland include semi natural habitats found along the Water of Leith and River Almond, Historic policy woodlands whose locations include Dalmeny, Edmonstone and Dundas, Urban woodlands found at Corstorphine Hill and in Craiglockhart and tree shelter belts found in agricultural areas such as Gogar and the wider countryside.

2. **Farmland** – Edinburgh has around 52% of farmland. The Edinburgh BAP states that of this area 3/4 is managed for arable and vegetable crops. The remaining areas are predominantly improved and semi improved grassland.

3. **Urban Habitats** – These are the open spaces including golf courses, cemeteries, formal and private gardens and derelict areas that provide valuable wildlife habitat in an area of significant hard landscaping.

4. **Lochs and Ponds** - There are a number of man-made ponds of various sizes and design in Edinburgh however there are few of natural or semi natural origin.

5. **Coastal and Marine** – Edinburgh has a coastline covering approximately 26km. The coastline is a mosaic of mudflats, rocky cliffs and sandflats. There are limited sand dune, coastal grassland and saltmarsh.

6. **Semi Natural Grassland** – Grasslands cover a wide range of soil types that influence the biodiversity found. Salisbury Crags and Arthur’s Seat have rich plant communities while the grasslands at the fringes of the Pentland hills have been heavily grazed or modified with the result of improved grasslands that are species poor.

7. **Union Canal** – The Union Canal has a rich and diverse range of habitats with emergent vegetation, hedgerows and woodland all represented along the narrow waterway and towpath.

8. **Rivers and Burns** – There are many watercourses in Edinburgh that are now totally culverted and lost to wildlife. However, there are a few that although not as diverse as some rural burns and rivers, they are valuable in the urban context offering a diversity of character, habitats and species. These include The Water of Leith.

9. **Heather Moorland** – Much of the heather moorland in Edinburgh can be found in the Pentland hills with in the boundary of the Pentlands Regional Park.

10. **Rock faces** - The Edinburgh BAP state that for an urban area there are an unusual number of rock faces in Edinburgh. The most important areas have been designated as SSSIs including Castle Rock and Calton Hill.

11. **Mires: Bogs and Fens**- These include raised and blanket bogs as well as Fens. There is only one raised bog in the Edinburgh area, this being Red Moss near Balerno. Blanket bogs can be found in various area of the Pentland Hills. The most diverse and extensive area of Fen in Edinburgh can be found at Duddingston Loch.

12. **Wildlife Corridors**: wildlife corridors help connect the rural character areas of Edinburgh with the heavily urbanised heart of the City and allows the movement and dispersal of wildlife through out the City. Three types of wildlife corridor are included in the Edinburgh BAP; these being the disused railway line (approx 40km), the embankments and road side verges of the main roads into the City (approx 42km) and the four main railway lines running through the centre of the city (approx 79km).

National Priority species (species which are either globally threatened or rapidly declining in the UK) known to maintain populations in Edinburgh include, among others:

- Pipistrelle bat
- Bullfinch
- Great crested newt
• Skylark
• Nightjar
• Linnet
• Woodlark
• Tree sparrow
• Bullfinch
• Song Thrush
• Great crested newt
• Stag beetle

The following sections outline those sites and species that could be potentially affected by the proposals.

9.3.5 Designated Sites

**International/National and Regional Sites**

No national or international nature conservation designations are in place along the proposed tram route. However within the 2km corridor of the proposed tram route there are two national designated area, Castle Rock SSSI, which is part of Arthur’s Seat Volcano SSSI and Calton Hill SSSI. Non-statutory designated areas along the proposed route of the tram are shown on Figures 4.1 to 4.10. The identified areas are discussed below.

**Sites of Interest for Nature Conservation (SINC)**

SINCs are areas recognised by the City of Edinburgh Council as areas that are of local conservation interest. This interest may be due to flora, fauna, and geological or physiographical features. Three areas are noted as being SINCs, these being Gogar burn, Water of Leith and the disused railway network. Gogar Burn and Water of Leith are also designated as Urban Wildlife Sites. The proposed tram route crosses and runs adjacent to the Gogar Burn and crosses the Water of Leith. A delta junction, to facilitate connection with Tram Line 1, would be constructed in the disused railway line Urban Wildlife Site at Roseburn area of the route.

**Neighbourhood Nature Area**

These are sites that have been identified in the Edinburgh Urban Nature Conservation Strategy as being areas that may offer opportunities for the local community to create areas of wildlife interest. Carrick Knowe golf course is a designated Neighbourhood Nature Area.

**Ancient Woodland Inventory - Long Established (of plantation origin)**

Sites along the Tram Line 2 route are located at the sewerage works (Lochend), around Gogar Burn Golf Course (south of the A8) and Millburn Tower (south of the A8).

9.3.6 Protected Species: Desk Study Data

A summary of the information and data received from consultees and other relevant organisations within the search area is summarised below.
Plants

The Lothian Wildlife Information Centre searched records for notable plants within a 2km corridor of the proposed tram route. A total of eight species were identified. Table 9.7 summarises the information received.

Table 9.7 Notable Plants

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Distance and Direction from the Site</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draba muralis</td>
<td>Annual wall rocket</td>
<td>Within 700m North</td>
<td>Nationally notable</td>
</tr>
<tr>
<td>Helleborus Foetidus</td>
<td>Stinking hellebore</td>
<td>Within 700m North</td>
<td>Nationally notable</td>
</tr>
<tr>
<td>Scrophularia umbrosa</td>
<td>Green figwort</td>
<td>Within 250m* West</td>
<td>Nationally Scarce, Lothians - Very Local</td>
</tr>
<tr>
<td>Teesdalia nudicaulis</td>
<td>Shepherds cress</td>
<td>Within 250m* West</td>
<td>Nationally Scarce, Lothians - Very Local</td>
</tr>
<tr>
<td>Ceratocapnos claviculata</td>
<td>Climbing corydalis</td>
<td>Within 700m North</td>
<td>Lothians - Very Local</td>
</tr>
<tr>
<td>Viola hirta</td>
<td>Hairy violet</td>
<td>Within 700m North</td>
<td>Lothians - Very Local</td>
</tr>
<tr>
<td>Allium vineale</td>
<td>Crow garlic</td>
<td></td>
<td>Local</td>
</tr>
<tr>
<td>Potamogeton obtusifolius</td>
<td>Blunt leaved pond weed</td>
<td>Over 1km South east</td>
<td>Lothians - Very Local</td>
</tr>
</tbody>
</table>

*Found in a section of the Gogar burn that has since been culverted

Mammals

Information received from The Lothian Wildlife Information Centre and from the Edinburgh and Lothians Badger Group identified known badger activity within the Tram Line 2 corridor study area. A badger survey was subsequently undertaken in June 2003 by FaberMaunsell and the Lothians Badger Group. The results are contained within Volume 5 of this ES. In order to ensure the safety of badgers the results of this survey have been only briefly summarised in this chapter of the ES. The circulation of Volume 5 is restricted.

Birds

Information received from consultation indicates that there are no records available for the search area.

Invertebrates

Information received from The Lothian Wildlife Information Centre indicates that Ochthebius exsculptus (a small water beetle) and Cydia aurana (a small moth), which are notable invertebrate species, are found within the 2km search area although none are found along the immediate vicinity of the proposed tram route.

9.3.7 Survey Results

The route of the tram runs from St Andrew Square in the heart of Edinburgh to Newbridge to the west of Edinburgh airport through both highly urbanised and densely populated areas and areas that have a rural character with a mosaic of open fields, field boundaries and small woodlands. The habitats found along the proposed route of the tram are described under the following headings:

- City Centre (St Andrew Square to Haymarket).
Haymarket to Roseburn.

Roseburn to Murrayfield.

Murrayfield to Carrick Knowe.

Carrick Knowe to Bankhead Drive.

Bankhead Drive to Gogar Roundabout.

Gogar Roundabout to Edinburgh Airport.

Ingliston Park and Ride to Newbridge.

Areas of note are discussed below and should be read in conjunction with Figures 9.1 to 9.10. These figures provide Phase 1 Habitat Mapping with compartment numbers. Each compartment is summarised below. The assessment of the ecological value of each compartment is summarised individually in Table 9.8. Where compartments form part of a contiguous habitat an overall value has also been assigned (e.g. wildlife corridors).

**City Centre: St Andrew Square to Haymarket**

**Habitat**

Here the tram runs from St Andrew Square along Princes Street and Shandwick Place to Haymarket with all of the route on street. The areas of ecological interest are:

Compartment 1, St Andrew Square - A mixture of formal gardens with amenity grassland and scattered trees.

Compartment 2, Princes Street Gardens - This area is well used by the general public. The area is composed of formal gardens with amenity grassland and scattered trees. A railway line runs along the southern boundary of the site. Here the habitat comprises scattered broadleaf trees and introduced shrub.

Compartment 3, Atholl Crescent / Coates Crescent - These formal gardens consist of an area of amenity grassland with scattered trees enclosed by a hedge. The age structure of the trees on the site is mixed with both mature and young trees present. The northern area (adjacent to Coates Crescent) contains an area of improved grassland with scattered mature trees. The southern area is similar but with younger trees and saplings. There are a number of mature specimen trees.

**Species**

Species present in these habitats includes Elm, Wild cherry, Whitebeam Laburnum, Common lime, Sycamore, Alder, Horse chestnut, Willow, Norway maple, Hawthorn, Beech, Elder, Wych elm, Rowan, Hornbeam and Holly.

**Haymarket to Roseburn (Balbirnie Place)**

**Habitat**

Compartments 4 to 8. The proposed route tram runs between the main Glasgow/Edinburgh railway line and the flats of Balbirnie Place through compartments 6, 7 and 8. Of these compartments 7 and 8 are small plantation woodlands that have been created in recent times while the remaining areas form a mosaic of ephemeral/short perennial species, introduced shrub and areas of bare ground.

**Species**

The species found in the Plantation area includes a Beech hedge, Scots pine, European larch, Rowan, dog rose, Hawthorne, Jacobi birch, Cotoneaster, Field maple, Pendunculate oak and cherry.
The species found in the ephemeral /short perennial habitat is typical of such habitat and includes Groundsel, Annual meadow grass and the occasional buddleia.

**Roseburn to Murrayfield**

There are a number of compartments in this area with a mosaic of improved grassland, tall ruderal and broadleaf plantation woodlands.

Compartment 9 - a high wooden fence surrounds this habitat; consequently, access could not be gained. This area appears to be scattered scrub maturing into semi natural broadleaf woodland.

Compartment 10 - This compartment forms part of the disused railway line (UWS) and is a mosaic of improved grassland with areas of tall ruderal. A section of the slope has recently been set on fire with some Whin bushes being badly burnt.

Compartment 11. No access could be gained to this area with observations made from adjacent areas. The area appears to be a section of scrub that has matured into semi natural woodland.

Compartment 12. This is a broadleaf plantation woodland that is located between the main Edinburgh / Glasgow railway line and Murrayfield Stadium. Access could not be gained and observation was made from a distance only. The canopy age structure appears to be poor.

**Species**
The tree species present in these areas includes Sycamore, Rowan, Ash Goat willow, Silver birch, Buddleia, Hawthorn and Whin. A Lawson Cypress hedge is present. Ground cover species include Species present include Whin, Rosebay willow herb, Bramble, Elder and Creeping thistle

**Mammals**
No mammals of note were identified in this section.

**Murrayfield to Carrick Knowe**

The proposed route of the tram through this section follows closely the route of the Edinburgh/Glasgow railway line and comprises Compartments 13 to 24.

**Habitats**
Compartment 13 - Water of Leith. To the east of Murrayfield stadium the proposed route of the tram crosses the Water of Leith. The river here has been heavily modified by canalisation with reinforced banks. The water is of good quality and fast flowing over a gravel bed. Gravel beds are also visible on the western bank of the river. Litter, such as shopping trolleys, could be clearly seen in this area.

The habitat immediately to the west of the river is composed of introduced shrubs that form a screen for the adjacent rugby training pitches.

Compartment 14 – This is immediately adjacent to the water of Leith and is a tall ruderal habitat.

Compartment 15 – This is a broadleaf plantation woodland that separates the main Glasgow to Edinburgh railway line and adjacent properties. Access could not be safely gained and observation was from adjacent areas. A strip of land approximately 10m to 15m in width north of the nearest rail track and appears to be cleared of trees. Trees are located between the top of the steep embankment and the boundary fences of properties on Baird Drive. The age structure of this compartment appears limited with all trees appearing to be of a similar age range resulting in the trees all reaching maturity at around the same time. The broadleaf plantation woodland is dominated by Ash and Sycamore with occasion Elder, Poplar (species), Hawthorne, Field maple, and Privit, are also present. Ground
cover is very limited due to the dense canopy and includes Creeping thistle, Nettles, Yarrow, Perennial rye grass and Ribwort plantain.

Compartment 16 - This broadleaf plantation woodland is located on the southern edge of the railway line and is similar in composition and character to compartment 15. The age structure of this canopy is poor with trees being of a similar age range. Ground cover is limited.

Compartment 17 - This compartment is immediately adjacent to compartment 16 and is located to the south of the railway line. This area consisted of a number of garden allotments that have been closed and no longer worked. A privet hedge encloses the compartment. Although containing many garden escapees, the species diversity is high with succession taking place. Although classified as scattered scrub this is a habitat in transition changing from tall ruderal to scattered scrub.

Compartment 18 - This is plantation woodland with a cycle/footpath running through it. The woodland separates the nearby gardens and the railway line. The ground flora is inhibited in most areas by the dense canopy and shrub layer. Where present ground cover species include Yarrow and Bindweed. Brashing of branches has taken place with the cuttings being deposited under the canopy. Several trees have been damaged by this brashing or by vandalism.

Compartment 19 - An area of land has been removed from allotment use and is not managed and has reverted to improved grassland.

Compartment 20 - This compartment is small and separates the allotments from the golf course. It is used for the deposition of grass cuttings and other green wastes.

Compartment 21 - This compartment was part of the golf course but has now been fenced off and has reverted to improved grassland with scattered trees. There are also several areas where trees have been planted close together to form small copses. The area is well used by dog walkers and children with several small clumps of trees showing signs of vandalism.

Compartment 22 - Golf course – Immediately adjacent to compartment 21 is Carrick Knowe golf coarse. This area is primarily amenity grassland with scattered tree belts. Immediately adjacent to compartment 21 new broadleaf plantation has been planted.

Compartment 23 – This compartment is located on the southern side of the railway line and is tall ruderal. A number of immature trees have been planted around the edges of this site.

Compartment 24 – This is a small broadleaf plantation.

Species
The broadleaf plantation woodlands are dominated by Ash and Sycamore with occasion Swedish whitebeam, Crack willow Elder and Cherry. Other tree species found in these areas includes Lombardy poplar, Hawthorne, Field maple, Privit, and Japanese Larch. Ground cover species includes Creeping thistle, Nettles, Creeping buttercup, Meadow buttercup, Yarrow, Red clover, White clover, Laurel, Perennial rye grass and Ribwort plantain. Hard fern was found growing in the vicinity of the wall separating the railway line and the former golf course area.

Species found in the closed allotment area includes Whych elm, Ash, Sycamore, Yarrow, Nettles, Rosebay willow herb, Dog rose, Michaelmass daisy, Ladies mantle, Whin, Coltsfoot, Dock, Spearmint, Bindweed, Wild raspberry, Marjoram, Silver birch and tansy all identified.
Mammals
Badgers are found on the nearby Costorphine hill and may use the extreme northern area of the golf course for foraging. However no evidence of badger activity was found along this section of the route or in the immediate environs of the route. During the specialist survey, sign of otter was found along the Water of Leith in the vicinity of the proposed works. Other mammals identified as being present in this area include mink and brown rat with footprints identified adjacent to the Water of Leith.

Invertebrates
Small white and Small copper butterfly were identified in the former garden allotment area.

Carrick Knowe to Bankhead Drive

Once the tram route crosses the main Edinburgh/Glasgow railway line to the west of Carrick Knowe golf course it runs “of street” on amenity grassland and a small area of parkland habitat adjacent to the railway line. Compartments 25 to 32. The habitats found in this area are:

Compartment 25 – Located on the southern side of the railway line this is an area of parkland comprising improved and grassland with scattered trees and areas of tall ruderal.

Compartment 26 - Allotments - This area is classified as arable land and is currently used for garden allotments.

Compartment 27 - This section of the route passes along an area of extensive amenity grassland with very low species diversity. On the day of the site visit the grass was closely cropped and showed sign of scorching. Rabbit droppings are abundant around this area.

Compartment 28 - Very similar to Compartment 27.

Compartment 29 - Railway embankment. This compartment comprises the narrow railway embankment. This is a mix of scattered to dense scrub interspersed with semi-improved grassland and bare ground. Scrub becomes increasingly dense to the west.

Compartment 30 – This is a continuation of Compartment 29.

Compartment 31 – Ditch. This ditch runs parallel with the railway embankment and the amenity grassland. Significant disturbance has occurred with fly tipping of garden waste, household waste and building debris. On the day of the site visit three cars had also been dumped into the ditch. Water was observed at the bottom of the ditch but was overgrown in many places. Previous surveys indicate that the ditch showed increased water levels to the west of the ditch.

Compartment 32. This compartment is similar in character to the adjacent amenity grassland (Compartment 29). However there is significantly more fly tipping with soils, building rubble, household appliances and cars all dumped in this area. There are a number of garden escapees and a Beech hedge has been planted as have a number of standard size trees. However many of the trees and the hedge have been broken and vandalised.

Species
The species found along the railway embankment includes Elder, Hawthorne and tall ruderal species such as Rosebay willow herb, Nettles and Creeping thistle. The drainage ditch has Lesser reedmace, Un-branched bur reed, Broadleaf willow herb, Common duckweed, Soft rush, Hard rush Knappweed, Coltsfoot, Creeping thistle, Brambles and Meadowsweet among the species present.
The parkland habitat included Sycamore Yorkshire fog, False oat grass, Tufted vetch, White clover, Red clover, Meadow vetchling, Rosebay willowherb, Creeping thistle and nettle.

**Mammals**
A weasel was observed in area between the railway embankment and the drainage ditch and evidence of rabbits can be found along the amenity grassland areas.

**Bankhead Drive to Gogar Roundabout**
From Bankhead Drive the proposed tram route once more crosses the main Edinburgh/Glasgow railway line passing through an area that has been cleared of surface vegetation in readiness for construction. The tram route then passes “on road” through the Edinburgh Park development close to the man made ponds of the Gogar Burn. Compartments 33 to 34.

**Habitats**
Compartment 33 – Cleared land Edinburgh Park Development – This compartment has been cleared in preparation for construction purposes and has been classified as ephemeral/ruderal habitat.

Compartment 34 - Edinburgh Park – This area has been heavily landscaped with broadleaf tree belts and amenity grassland. The main focal point of ecological interest is the series of ponds. These ponds are part of the Gogar burn that runs in a culvert in several areas of the Edinburgh Park development.

The ponds are man made with marginal species planted. The ponds are continuing to mature and receive significant management. These ponds are a recognised wildlife corridor and part of the Gogar burn SINC.

**Species**
Species of the landscaped area is dominated by Rye grasses, Sycamore, Rowan, Ash, Beech and Horse chestnut. The ponds contain are dominated by Lesser reedmace and other marginal species.

**Gogar Roundabout to Edinburgh Airport**
From Edinburgh Park to Edinburgh airport the route of the tram is mainly “of road”. A large depot is proposed for the land immediately north of and adjacent to the Gogar roundabout. Compartments 35 to 47.

**Habitats**
Compartment 35 – Gogar roundabout. Due to excessive traffic levels this compartment was observed from adjacent areas. The habitat comprises an area of conifer plantation surrounded by improved grassland.

Compartment 36 – Raised Areas – This is an area of man made ground with steep sloping sides. The southern slopes are mixed plantation. The northern side of these mounds are in transition from improved grassland to tall ruderal. A stone wall separates this and adjacent habitats.

Compartment 37– This is an area of hard standing. It has been used as an unofficial dumpsite for various wastes including garden and household waste. A number of tyre dumps have formed around the area. A leggy Hawthorne hedge is present along part of the site. Rabbits are frequent on this site.

Compartment 38 – This compartment is arable land enclosed and separated from Compartment 36 on the southern edge by a stone wall. There is a wide boundary between the tilled area and the stone wall. Species diversity is very low with the filed boundary comprising agricultural grass species.
Compartment 39. This is a narrow tree belt of mixed plantation origin that runs along the unnamed road to Gogar Castle. There is limited age diversity within the compartment.

Compartment 40 – Arable land with limited species diversity. On the day of the site visit the crop had been recently harvested. Consequently only stubble remained with a few broad leaved weeds.

Compartment 41 – This compartment includes a number of derelict properties that have become overgrown with vegetation and classified as dense scrub. It is expected that if development continues, this compartment would develop into semi natural woodland.

Compartment 42 – This compartment is classified as tall ruderal and is dominated by a large expanse of Giant hogweed.

Compartment 43 - This is an area which may have been improved grassland but has become dominated by tall ruderal species.

Compartment 44 – Along this section of the Gogar burn the banks are lined by broadleaf plantation woodland which overshadows much of the water. Understorey is limited due to the dense canopy. Where the canopy is more open giant hogweed has become established.

Compartment 45 - Gogar Burn - This stretch of the Gogar burn is one of the few remaining sections to retain a semi natural alignment. It is a designated SINC and is considered to be a valuable wildlife corridor. The banks of the burn are well wooded with the trees overshadowing long sections of the burn. Where the canopy is dense and closed the ground flora is limited. The age structure of the woodland is varied.

Compartment 46 – This is an area of improved grassland of limited diversity. Isolated shrubs have started to colonise this compartment.

Compartment 47 – This compartment is a large arable field with limited species diversity.

Compartment 48 – This compartment forms the boundary between an area of improved grassland and an arable field and is a small stream/drainage ditch flowing towards the nearby Gogar burn. On the day o the site visit this contained water even though the weather had been dry for some time. Immediately adjacent to the drainage ditch was a defunct and leggy Hawthorne hedge.

Compartment 49 – This area of improved grassland has a low species diversity.

Compartment 50 – This area of improved grassland has a low species diversity.

Compartment 51 – This area of improved grassland has a low species diversity.

Compartment 52 – Similar to Compartment 44, the banks of the Gogar burn are lined by broadleaf plantation woodland which overshadows much of the water. Understorey is limited due to the dense canopy.

Compartment 53 – This is an area of dense scrub that has formed in a corner of improved grassland.

Compartment 54 – This area of improved grassland has a low species diversity.

Compartment 55 – Recently planted Broadleaf woodland. No understorey exists with bare soil present.

Compartment 56 - Gogar Burn – Edinburgh Airport - The Gogar burn runs immediately adjacent to the airport and has been heavily modified and canalised.
The river banks have been raised and reinforced with geotextile. The banks are steep and well wooded and the water overshadowed by the trees along much of the burns length. There are a number of bridges crossing the burn.

**Species**
The raised areas adjacent to Gogar roundabout has Rowan, dog rose, Scots pine and Snowberry present on the southern face whilst on the northern face creeping thistle is abundant.

The narrow tree belt found near Gogar roundabout includes Ash, Sycamore, Horse chestnut, Scots pine and Beech.

The woodland canopy of Gogar burn running near the RBS access works is dominated by Ash and Sycamore with occasional Beech. Giant hogweed dominates long stretches of the bank habitat with Himalayan also present. Other species identified includes Red campion, Cleavers, Herb bennet, Pineapple mayweed and Hedge bindweed.

The area of improved grassland has a low species diversity dominated by agricultural species including Timothy and Cocksfoot. Other species present include Soft rush, Common bent and Hard rush.

The embankments of the drainage ditch bounding the improved grassland area is dominated by agricultural grasses including cocksfoot. Tree species present include Crab apple, Beech, and Common lime.

The banks of the airport section of the Gogar burn has abundant Himalayan balsam with coltsfoot, Great willow herb Giant Hogweed, Hedge Bindweed, Alder, Crack willow, Butterbur, Spear thistle, White dead nettle and Nettles present.

**Mammals**
Badger, rabbit and otter are know to be present along this section of the proposed tram route. Although no holts or lying up areas have been identified Otter spraint has been found in a number of areas along the Gogar burn. Badgers are also present in this area.

*Ingliston Park and Ride to Newbridge*

From Edinburgh Airport to Newbridge the proposed tram route would run through agricultural land, land adjacent to the main Glasgow Edinburgh railway line as well as “on street” along existing surfaced roads. The baseline situation is detailed below.

**Habitats**
Compartment 57 – This is a narrow are of amenity grassland with very low species diversity.

Compartment 58 – This is an area used for parking of cars. No access could be gained but observation form adjacent areas indicated no vegetation present.

Compartment 59 - This area of improved grassland has a low species diversity. Compartment 60 – This is the Royal Highland Showground and was not surveyed due to any access. From adjacent areas it appears there are various habitats present including formal gardens, man made wetland and aquatic habitats as well as various types of woodland and introduced shrub habitats.

Compartment 61 – This is an arable field with low species diversity.

Compartment 62 – This compartment was not surveyed as it is a private garden. Observed from adjacent areas this compartment is an extensively landscaped garden of raised areas with mock standing stones in a woodland setting. There are large ornamental ponds with extensive planting and pumped water fall.
Compartment 63 – This area is an area of amenity/improved grassland that is used as a car park during large events at the nearby showground. There are isolated trees present but very limited species diversity.

Compartment 64 – This is a narrow broadleaf plantation that is in ecological continuum with the wildlife corridor running along the main Glasgow/Edinburgh railway line.

Compartment 65 – This is an arable field bounded on three sides by woodland habitat. The open northern boundary has a number of mature trees present along with occasional shrubs.

Compartment 66 – As with Compartment 65, this Compartment is Arable crops.

Compartment 67 – At present this compartment is classified as being scattered scrub. However it is unclear whether trees have been planted in this area at some time.

Compartment 68 – This broadleaf plantation woodland runs along side the main Glasgow/Edinburgh railway line and is in continuum with Compartment 64. The disused railway runs along the bottom of the embankment and significant disturbance has resulted from vandalism and fly tipping.

Compartment 69 – This is broadleaf plantation woodland planted as screening for the construction of the nearby road. The embankment is steep and has concrete retaining walls. Ground cover is sparse.

Compartment 70 - This area of improved grassland has low species diversity.

Compartment 71 – This is extensive broadleaf plantation woodland. There are a number of ponds that are remnants of quarry workings located in this compartment. However, due to health and safety issues these ponds where not surveyed. The age structure appears to be fairly diverse with a mix of younger trees and standing dead wood present.

Compartment 72 – Dense scrub has formed in the boundary between the adjacent road and the industrial units. The habitat is fenced and access could not be safely gained.

Compartment 73 – Plantation woodland has been established adjacent to industrial premises and the railway line. Due to fencing, access could not be gained.

Compartment 74 – An area of broadleaf plantation woodland planted to screen adjacent industrial units. Ground cover is poor with trees being planted very close together.

Compartment 75 – This is an extensive area of scattered scrub. There are signs of rabbit and fox present in this area with significant open grassland areas for foraging. A number of defunct hedgerows can be found in this compartment.

Compartment 76 – This compartment is indicated on maps as being open land. A number of industrial units have been built and no vegetation of note is present.

Compartment 77 – This is a small broadleaf plantation that has been planted adjacent to the motorway. Ground flora is mainly grasses with limited flora species diversity.

Compartment 78 – This compartment is the Scheduled Ancient Monument. The area is dominated by amenity grassland with strips of broadleaf plantation woodland. Vandalism of the trees has occurred with areas showing signs of fire damage around walls.
Species
Woodland species found along this section of the proposed tram route are dominated by Ash and Sycamore with Horse Chestnut, Whych elm and Beech being occasional. Ground cover and shrub layer species identified include Great willow herb, Rosebay willow herb, Ground ivy, Nettle, Coltsfoot, Teasel, Brambles, Common ragwort, Hogweed, Japanese knotweed.

Mammals
This section of the proposed route has rabbit present at several areas including the scheduled Ancient Monument in Newbridge and the grass parking area at Ingliston Showground. No evidence of badger activity was found.

9.3.8 Summary of Value of Habitats
Each of the compartments identified and described above has been assigned a value based on the criteria shown in Table 9.1. With the exception of SINCs and UWSs habitats along the route are of Low to Medium value. However, the overall value has been increased for habitats which link up to form wildlife corridors.

Table 9.8 Assessment of Value

<table>
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<tr>
<th>Compartments</th>
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**Bankhead Drive to Gogar Roundabout**

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**Gogar Roundabout to Edinburgh Airport**

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**Ingliston Park and Ride to Newbridge**

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9.4 CONSTRUCTION IMPACTS

A general overview of the construction works proposed for the scheme is provided in Chapter 2. The following section identifies impacts on ecological resources that would be caused by construction work.

Potential impacts of the works are described briefly and then mitigation measures proposed. The final section sets out residual impacts that would remain after mitigation had taken place. For the purposes of the assessment, it has been assumed that the areas required for construction would be returned to their initial condition once the construction works have been completed. However, where long-term impacts would occur these are assessed as permanent effects. Table 9.9 provides a summary of the residual construction impacts.

9.4.1 Potential Impacts

As explained in Section 3.4.2, for the purpose of this assessment construction impacts refer only to temporary activities associated with the construction process. Impacts occurring during construction that would have longer-term impacts (such as removal of vegetation) are covered within the Permanent and Operational Impacts section below. Potential impacts on ecological resources include:

- Dust, noise, and disturbance humans and machinery along the route corridor.
- Temporary use of land for construction compounds, and activities associated with compounds.
- Disturbance to water-courses resulting from the construction of bridges over the Gogar Burn and Water of Leith.
- Disruption of designated areas or habitats with high ecological value.

**Badgers**

Badgers are curious animals and would investigate pipes and containers left on site. They can also become trapped in large holes or injured or be accidentally killed or injured by plant. Toxic materials left in inappropriate locations has the potential to poison badgers if eaten. This could also result in badgers being killed. During construction the establishment of works compounds would reduce foraging areas. Inappropriate access routes would have the potential to disturb setts.

**Otters**

Otters, like badgers, can enter work sites and become trapped in excavations, pipes, containers or other such materials. They may eat toxic or other inappropriate materials, injuring or killing them. Works near or in watercourses have the potential to cause disturbance or temporarily block the free passage of otters along the route of the river.

**Aquatic Ecology**

Works near or in water bodies have the potential to cause pollution to the water body and result in the killing of micro and macro fauna.

9.4.2 General Mitigation

An Environmental Management System would be adopted for the route. This would include requirements to erect hoardings to restrict the working area, standards of dust and air pollution control to protect adjacent habitats, and suitable precautions to prevent entry of pollutants into any bodies of water. It would also include the following general principles:
Clearance and construction of the Tram route would be undertaken in stages, which would allow the escape of species along the corridor. If practicable, new planting and re-established habitats would be put in place on sections completed first in the building process before clearance of the final sections.

If practicable, clearance of vegetation along the corridor route would be undertaken during the months October to March. This would avoid the main breeding season for most species. Cleared vegetation would be stored in piles near the route for up to two days after clearance to allow animals to escape before final disposal.

Wherever wildlife habitats remain alongside working areas, provision would be made to prevent encroachment onto valuable ecological areas that are not essentially required for construction. This would include the provision of secure fencing where appropriate, including adjacent to the Gogar Burn and Water of Leith SINCs.

Unless otherwise agreed with CEC and SNH, work adjacent to ecologically valuable habitat, including the SINCs, would be constrained to the months between September and March when damage to the habitat would be minimised and there would be less likelihood of disturbance to sensitive species.

More specific mitigation measures are specified below.

9.4.3 Mitigation for Species and Groups of Species

Mitigation measures for selected species and groups of species are described below.

**Bats**
As far as possible the removal of vegetation along the corridor would be accomplished during the winter months when bats are not foraging. This would reduce the risk of potential disturbance. The rapid replacement of landscape planting as part of the Tram route would help to minimise the impact of bat populations being forced to migrate to other areas.

**Badgers**
Badger activity may well change between the time of the original survey and construction works beginning. It is therefore necessary that a full badger survey be undertaken immediately prior to construction to provide up-to-date information on badger activity, including setts, territory, numbers and badger routes.

In those areas where badgers have been identified, construction materials and structures would be held within badger secure compounds positioned well away from known sett locations when not in use. This would prevent badgers becoming trapped or injured or being accidentally killed or injured by plant. Badgers are curious animals and would investigate pipes and containers left lying and can also become trapped in large holes on site. Any large holes would be left with a means of escape for badgers and other species.

Badgers are powerful animals and creatures of habit. They would force their way thorough most types of wire fence. Consequently the specification of badger proof fencing would have to be agreed with SNH.

Access to the works would need to be planned in order that plant, materials and men are transported to the works areas whilst keeping clear of known badger setts.

Rapid new replacement of lost vegetation by new primarily native planting would enhance the foraging habitat for badgers along and adjacent to the route.
Birds
Increased noise and disturbance levels arising from the construction activities could result in birds seeking new territories, and during the winter birds would forage away from the route, for example in gardens. Displaced birds in spring and summer would increase competition in other areas. Clearance outside the breeding season would also minimise additional vulnerability to predators, as non-breeding birds are likely to be less vulnerable.

Herpetofauna
Reptiles and amphibians on site during the winter months would be unable to escape when clearance and construction begin. Therefore it is essential that vegetation heaps and other suitable habitat piles are carefully inspected for reptiles. Reptiles over-winter in hibernacula often comprising dead wood and vegetation where they can be very difficult to spot. The law requires that all reasonable precautions are taken to ensure that reptiles are not killed or injured.

A suitably experienced person would clear any reptiles found on site during the summer by hand if they are unable to escape. Individual animals can be easily transferred to surrounding non-urban land. However if substantial populations are encountered during construction it may be necessary to translocated the population to a suitable receptor site.

Invertebrates
Other than the staged clearance of habitat it is not possible to mitigate for the impacts of construction and clearance on invertebrates. However in most cases invertebrates would be sufficiently mobile to escape. New planting and rapid establishment using sections of retained turf would allow invertebrates to re-establish rapidly. Retention of piles of removed material for at least two days before final disposal would allow the escape of most invertebrates.

9.4.4 Residual Construction Impacts

It is likely that noise and dust from construction activities would occur leading to the disturbance of fauna along the route. There would also be disturbance to flora species as a result of access and the establishment of temporary works compounds. However, strict compliance with the Environmental Management System would ensure that residual impacts on the ecological resources of the area would be kept to a manageable level.

Disturbance, killing and injury are the greatest potential impacts to wildlife along the Tram Line 2 corridor. These may occur through the use of plant, destruction of foraging and or sheltering habitat, trapping and/or poisoning of animals by materials left on site and disturbance and disruption to successful breeding. Residual impacts on selected species and groups of species are assessed below.

Bats
While there are no known bat roosts along the tram corridor, bats are known to use land and waterways for foraging. Construction disturbance would occur all along the route corridor through temporary disturbance including the reduction in foraging habitat for bats. Construction activities would be carried out during daylight hours and as bats are nocturnal, feeding at dusk and dawn, disturbance would be temporary and intermittent in nature.

Badgers
It may be required to temporarily exclude badgers from one outlying sett. This depends on the final design and alignment of the tram. This would be necessary to prevent injury to the badgers during the construction of the tramline infrastructure. Noise of plant and machinery would result in disturbance to badgers.

Birds
There would be a loss of all nesting habitat and disturbance to birds during construction works along the entire length of the corridor. Indirect impacts of
construction could include pressure on other local bird populations as birds from the proposed tram route migrate to other areas of habitat. Other indirect impacts include the increased risk of predation of small birds by raptors and mammals as a result of loss of cover.

Herpetofauna
Reptiles may be present within the Tram corridor. All reptiles are protected species. Direct impacts would include the killing and/or injury of individuals, loss of suitable habitats along the route corridor and disturbance to animals during hibernation. Indirect impacts could include increased risk of predation of reptiles as a result of the reduction in cover. This impact could occur along the entire corridor for the duration of construction.

Invertebrates
A number of invertebrate species have been recorded within the Tram corridor. None of these are known to be protected but several of nature conservation concern have been recorded along the route. These may be affected by construction works.

Plants/Habitats
Much of the route corridor has a poor diversity of flora with no nationally scarce or Red Data Book Species known. Dust generated by construction works could affect plant productivity and survival along the course of the route for the duration of construction, however other than where noted this impact would be negligible.

Access to the proposed route of the tram for plant and materials would necessitate the removal of some vegetation and or trimming or tree branches. This would be temporary and as soon as works are complete access areas would be reinstated.

There are currently extended stands of giant hogweed in the vicinity of the proposed bridge. Giant hogweed out-competes native species for light, nutrients and space resulting in their exclusion. These areas are particularly dense with little or no ground cover. The proposed route of the tram passes through these stands and as such the Giant hogweed would need to be managed/removed.

The management/removal of the Giant hogweed would be a significant positive impact, as it would open up areas for recolonisation by native species and control the pervasive spread of this alien species.

Designated Sites
In this area no national or internationally designated areas are present along or immediately adjacent to the proposed tram route. However Castle Rock SSSI is located within 2km of the proposed route, although due to the distance between the proposed tram route and the SSSI boundary it is considered highly unlikely that direct or indirect impacts would affect this area. There are a number of other designations encountered along the route. These are detailed below.

Princes Street Gardens are an “Open Space of Outstanding Landscape Value”: The route of the tram is outwith but adjacent to this area and would have a negligible direct or indirect impact.

The Atholl Crescent / Coates Crescent gardens are recognised as being “Open Space of Outstanding Landscape Value”: These gardens are divided by a main through fare and as such the tram route is on street. As the route of the tram is on street along this section there would be no direct impacts on vegetation other than where street trees are encountered.

The Carrick Knowe golf course area is a Neighbourhood Nature Area. The direct and indirect impacts associated with this designation would be through disturbance of fauna species. However this area is already disturbed through both intensive management of the golf course and its users and those members of the public that frequent the adjacent area for dog walking and other activities.
The proposed tram route would cross the Water of Leith and The Gogar Burn UWS/SINC. Consequently there is the potential for impact. During construction there may be the need for plant to enter the water and as such cause disturbance to aquatic flora and fauna.

The necessity for temporary vegetation clearance as discussed below would impact on the integrity of the wildlife corridor by breaking the ecological continuum.

A bridge is required where the route crosses the water bodies. The proposed bridge would require the regrading of slopes, which would necessitate the clearance of vegetation including mature trees.

An indirect impact of the clearance of the surface vegetation and regrading of the slopes may be increase surface water run off and soil erosion. This would increase suspended solid loading of the Gogar Burn, which may have a significant negative impact on flora and fauna in the immediate vicinity as well as downstream of the works. This is detailed below.

**Aquatic Ecology**

Whilst operations in water bodies are being carried out dislodging of sediments and aquatic invertebrates would occur. Dislodging of invertebrates may result in changes to the food chain in the area of the works as well as down stream where increased predation on the invertebrates and competition with other invertebrates may occur. In addition, dislodging sediments may change the suitability of the area for invertebrates and plant species alike temporarily leading to changes in the biodiversity of the area.

In aquatic habitats the use of concrete for bridge foundations etc has the potential to temporarily change the chemical characteristics of soils and water to create alkaline conditions. This change, however temporary, can result in the death of alkaline intolerant flora and fauna species in both terrestrial and aquatic habitats for an indeterminate distance downstream.

### 9.4.5 Predicted Impact Significance

Taking the above issues into account, the predicted impact significance on the above noted receptors is summarised in Table 9.9 below.
Table 9.9 Construction Impacts

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<td>Minor Negative</td>
</tr>
<tr>
<td>Herpetofauna</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Invertebrates</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Plants/Habitats</td>
<td>Negligible to Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Designated Sites</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
</tbody>
</table>

9.5 PERMANENT AND OPERATIONAL IMPACTS

9.5.1 Potential Impacts

Potential permanent and/or operational impacts relate to long-term effects resulting from construction activities and the day-to-day functioning of Line 2 include the movement of vehicles and the maintenance of Tram infrastructure, such as:

- Permanent landtake and loss of habitat.
- Permanent habitat fragmentation.
- Changes in habitat management.
- Creation of new areas of habitat.
- Changes to access arrangements for sites of nature conservation and amenity value.
- Polluting matter, such as grease or oils, entering the Gogar Burn and the Water of Leith.

9.5.2 Mitigation

Mitigation of Designated Sites

The presence of Giant hogweed adjacent to the Gogar Burn SINC would need to be managed. This management would help reduce the spread of this invasive species resulting in a positive impact. Management would follow established guidelines to prevent indirect spread of this species.

Mitigation of Species and Groups of Species

Bats

Prior to felling or surgery on trees over 8m height and/or 30cm diameter or where buildings would require demolition, the Contractor would instigate a bat survey of the affected trees immediately beforehand, using an appropriately licensed surveyor, and would undertake any mitigation or protective measures that may be required by Scottish Natural Heritage should bats or their roosts be located.
Bats may roost in very small spaces in larger trees during the summer or winter. An expert opinion would be able to determine the likelihood of bats being present within the tree or building. If it is decided that bats could be roosting then a full inspection using an endoscope may be required. Should any bats be located, a licence from SNH would be required to proceed. To obtain this it would be necessary to provide details of measures to prevent harm to the nature conservation interest of bats.

Replacement shrub planting would proceed along the route to provide for the rapid re-establishment of a corridor for bat foraging and navigation. Maintenance along the route corridor would follow best practice to ensure that bats are not killed or injured during works. Best practice would ensure compliance with the law and involve the checking of all suitable trees and structure for bat roost before works. New structures along the route would accommodate ‘bat friendly’ features such as bat bricks and boxes. Bat boxes would be placed on suitable trees remaining along the route to encourage roosting and foraging activity.

**Badgers**

Prior to the commencement of the construction works a full badger survey would be carried out. This survey would form the basis of several mitigation measures such as the location of fencing and tunnels. The specification of the survey would be agreed with SNH but should include the need to establish territory, paths, location of latrines and foraging areas, the level of activity at each sett entrance and the number of badgers at the works location. Bait marking would be required.

It is imperative that badgers are prevented from gaining access to the tram line whilst permitting free access to foraging grounds. Consequently a combination of badger proof fencing and tunnels would be employed. Badger fencing would be of the appropriate standard (to be agreed with SNH). Tunnels would be installed at distances agreed with SNH. However, due to the expected level of disruption to the badger population in this area, it is expected that tunnels would be no more than 250m apart.

**Birds**

Clearance of all vegetation would be timed to occur outside the breeding season, March – September inclusive. If any clearance of vegetation is required during the breeding season then vegetation should be inspected for any nests beforehand, as all breeding birds are protected by law. Most species of bird would make use of the route during the breeding season for nest sites and during the autumn for foraging.

New scrub and grassland would primarily consist of native species, which would provide appropriate cover and foraging habitat for birds. Maintenance works involving tree and scrub management would be conducted outside of the breeding season (March to August inclusive).

**Herpetofauna**

New habitat piles and hibernacula could be placed along the Tram route corridor. Fencing preventing the public from gaining access to the route corridor would reduce disturbance and predation of any reptiles on site. Any piles of cleared vegetation would be inspected for reptiles before removal from site to ensure that reptiles are not present.

**Invertebrates**

New scrub and grassland would primarily consist of native species, which would provide appropriate cover and foraging habitat for invertebrates.

**Mitigation for Habitat and Flora**

**Aquatic Ecology**

Drainage would require to be carried out in such a way that potentially polluting matter such as grease and oils cannot enter water bodies.
Plants
The areas of scrub along the route are dominated by hawthorn and elder with some sycamore birch and ash also present. These species would be included in the native planting with the addition of several more native species. The new planting and natural scrub would re-establish within a few years.

Many of the larger trees along the route are sycamores and ash. These trees are not of a high value for animals and would shade out ground flora. Planting of new native species of proven Scottish providence would allow the development of such a ground flora.

The most significant long term/permanent impact of the propose tram would be the potential loss of varying forms of habitat. This would be mitigated through replacement/compensation planting as detailed below. This planting would be carried out following recognised ecological principles with flora species of Scottish providence and in conjunction with measures detailed in Section 8.5 describing Landscape mitigation measures.

Trees would be of differing age mix with transplants, whips and feathered trees used. Where broadleaf woodland would be planted, tree species would include Sessile oak and Ash. Mixed woodland species would comprise Scots pine, Sessile oak and Ash.

Where scrub habitat is to be replaced, small tree species such as Goat willow, Hawthorne and Blackthorn would be used.

Along the route of the tram line, greening of the tracks would be carried out. This would consist primarily of grass and flora species depending on the setting of the route. Wherever practicable plants and habitats within the route corridor would be managed sympathetically for the benefit of nature conservation.

9.6 RESIDUAL IMPACTS

Operational impacts would result from the maintenance of the tram route and management of landscaping and habitat and from the movement of the tram vehicles. The management regime is assumed to be sympathetic to conservation objectives and would have a key role in developing and maintaining habitat of ecological interest.

Herbicide use should be avoided wherever possible and not adjacent to sites of ecological value.

A residual disturbance impact of the tram operation would be the use of vehicles along those areas where vehicular disturbance is presently very low i.e. around Gogar area where only farm vehicles are used. It is considered that the impact on wildlife from the trams would be a minor negative impact at a local level along the entire route corridor.

As detailed in the flora/habitat mitigation measures detailed above and in conjunction with landscape mitigation (described in Chapter 8 and presented on Figure 8.3), there would be new planting resulting in a potential increase in the woodland habitat and woodland habitat connectivity. An increase in species diversity would also result. Consequently this would be a positive impact along the length of the tram route.

Designated Sites

As described above there are two nationally designated sites within the Tram Line 2 corridor. However due to the distance from the proposed tram it is considered highly unlikely that direct or indirect impacts would occur as a result of the operation of the tram route.
**SINC/UWS**

The proposed tram route crosses both the Water of Leith and Gogar Burn SINCs. Once the construction of the infrastructure has been completed and mitigation planting and/or recolonisation underway there would be a limited permanent and operational impact.

There are currently extended stands of giant hogweed in the vicinity of Gogar Burn. Giant hogweed is highly invasive and out-competes native species for light, nutrients and space resulting in the exclusion of other species. These areas are particularly dense with little or no ground cover. The proposed route of the tram passes through these stands and as such the Giant hogweed would need to be managed/removed as maintenance of the tram route. The management/removal of the Giant hogweed would be a significant positive impact, as it would open up areas for recolonisation by native species and control the pervasive spread of this alien species.

It is proposed that bridges cross both the Gogar Burn and Water of Leith. Both structures would require the regrading of slopes and the removal of vegetation, including mature trees. This would result, albeit temporarily, in the fragmentation of the habitats.

**Aquatic Ecology**

The construction of the tram infrastructure at Gogar Burn and the Water of Leith would result in negligible impact on aquatic ecology as the structures being proposed to cross the water would not require support columns in the water. Consequently the river flow patterns in these areas would remain unchanged. The Structures may have the potential to slightly reduce light levels below the bridges. This could have the effect of reducing plant productivity. However this is considered to be a minor negative impact.

**Habitats and Landtake**

As a result of the tramline being constructed there would be a permanent loss of habitat. These are discussed below:

**Haymarket to Roseburn**

As shown on Figure 9.1 to 9.10 the proposed route of the tram passes through compartments 6, 7 and 8. Of these compartments 7 and 8 are small plantation woodlands that have been created in recent times. The permanent impact on these compartments would be the loss of the approximately 20m of compartment 7 and the total loss of compartment 8.

These compartments are isolated islands and are of low ecological value. However, there is limited ecological resource in this area increasing the value of what is there. However, it is considered that due to the low ecological value of these habitats impact would be of low significance.

**Roseburn to Murrayfield**

A number of buildings may be demolished adjacent to or on the proposed route in the area of the Haymarket depot. These buildings may contain bat roosts and if roosts are present demolition would result in a severe negative impact. However this would require verification through roost survey prior to demolition.

With regard to habitat loss, an area approximately 650m$^2$ of broadleaf plantation woodland adjacent to Russell Road would be lost through the construction of the tram and associated infrastructure. However this habitat is isolated and although offering birds and bats a potential nesting and foraging area, the level of disturbance allied with the size of the habitat reduces the ecological value. Consequently the loss of this habitat is regarded as being of a moderate significance.
Murrayfield to Carrick Knowe
The route of the tram runs through compartment 12, which is a mature broadleaf plantation. The required permanent landtake would result in most if not the entire habitat being lost. Trees at the extreme edge of the site may be saved to reduce the potential significance. This is considered to be a major negative impact. However, it should be noted that although this area is part of the rail network wildlife corridor, this area is an isolated section not in ecological continuum with the Roseburn area or west of the Water of Leith.

As with the Roseburn to Murrayfield section of the route, the construction of the tram route in this section would result in significant habitat loss. The route is proposed to follow adjacent to the Edinburgh / Glasgow railway line and would pass through woodland compartments 15 and 18. The landtake required would result in most if not the entire habitat in these compartments being lost. Compartment 18 is particularly important as it links the cycle path corridor to the rail network corridor. The loss of this habitat, which viewed in isolation is of low ecological value but when viewed in terms of ecological connections is of high resource value, would result in a severe negative impact.

The proposed route also passes through Compartments 19 and 20 with compartment 20 being lost completely due to construction. This would however be of minor significance as the value of this habitat is low. Around 40% of compartment 19 would be lost. But this is also of low ecological value and as such the significance of the impact would be low.

Carrick Knowe to Bankhead Drive
The route of the tram passes through Compartments 23 and 25. It is considered that around 15% of the habitat would be lost. The value of this habitat is reduced due to its isolation. However, due to the species composition, it may provide suitable flora for butterflies. The potential impact of the loss of part of this habitat is considered to be minor.

The building on this site would also be demolished and may contain bat roosts. As such the loss has to be evaluated as such must be regarded as a severe negative impact until such times as the presence or absence of bats roots can be confirmed.

The route of the tram passes through compartment 25, which is classified as parkland. Here there are a number of mature trees. It is considered that depending on the exact final route, some trees may require removal. The impact is considered to be low to moderate depending on the number of trees to be removed.

The route passes through compartments 27 and 28 that are amenity grassland. Parts of these areas are reserved for the construction of the WEBS guided bus system, with work proposed to commence in the near future. The tram route would run along the line of WEBS with no increase on land take. The negative impacts exerted on this area would therefore be negligible.

Other indirect impacts would include a reduction in the amount of fly tipping. Currently this, and adjoining areas, receive a significant level of fly tipping with both garden waste and household appliances found in the ditch. On the day of the site visit there were also three carts dumped in the ditch. This fly tipping can cause pollution that can adversely affect flora and fauna. With the construction of the tram it is expected that the fly tipping would cease. This is considered to be a positive impact.

Overall it is expected that the construction of the tram in this area would have a minor negative impact on this habitat.

Bankhead Drive to Gogar Roundabout
This area has been heavily modified in recent years with the construction of Edinburgh Park. The area has been landscaped with the planting of trees and
hedges with extensive areas of amenity grassland. The Gogar burn passes through this area and where not in a culvert, forms a number of ponds (Loch Ross). The route of the tram runs approximately 30m from these ponds and it is unlikely that there would be direct impacts on the flora and fauna of these ponds.

Two plantation woodland habitats would be directly impacted. These are of low ecological value with one habitat, Compartment 34a being completely lost and around 7% of Compartment 34b being lost. Due to the low ecological value and the potential for mitigation it is considered that the impact in the impact of the loss of these habitats is considered to be of low negative significance.

The remaining habitat in this area where direct impacts would occur are amenity grassland areas with low ecological value and the significance of the negative impacts are therefore considered to be of low.

**Gogar Roundabout to Edinburgh Airport**

A tram depot is proposed for part of Compartment 36 and all of Compartment 37, both areas to the north of Gogar roundabout. The depot would cover an area approximately 115,000m² with all vegetation removed and the area re-graded. Consequently there would be a surplus of soil that would be used to form bunding around the perimeter of the site. This area is currently of low ecological value and heavily disturbed through fly tipping of various wastes including building rubble, garden and household wastes as well as vehicle tyres. Currently the area is of low ecological value with hard standing covering much of the site. There is a species poor hedge along part of the site that would be lost. This is a minor impact.

The extent and location of proposed bunding has not been finalised. If formed in the adjacent agricultural land it is expected that the field boundary would be lost along with an as yet undetermined area of agricultural land. Due to the lack of information, the significance of this impact cannot be assessed at this time but may be of moderate negative significance.

Compartment 36 is currently comprises an area of man-made bunding with the southern side of the bunds being mixed plantation woodland. It is considered that as the tram route is proposed for the southern side of the bunds and regrading of these bunds would be required, all of this vegetation would be lost during construction.

Compartment 38 is currently agricultural land with a narrow field boundary of improved grassland. The tram route passes through the southwestern edge of the compartment resulting in a loss of around 2% of the compartment. This would result in a minor negative impact.

The proposed tram route crosses the unnamed B class road to Castle Gogar. This road is currently flanked by mature broadleaf trees and is annotated as Compartment 39. A number of matures trees (less than 5% of the total compartment) would be lost. This would result in a minor negative impact. Part of Compartment 39 consists of the “Lodge” property. The building here would need to be demolished and may contain a bat roosts, however, this is considered unlikely and as such it is considered any impact on bats would be minor.

Compartment 40 is agricultural land with narrow improved grassland boundaries. The tram route would entail approximately the loss of less than 5% of the total area of the compartment. This would result in a minor negative impact.

Compartment 43 consists of a number of derelict properties that are over grown by scrub vegetation. The proposed tram route would result in loss of around 3% of this habitat. This results in a minor negative impact.

Compartment 42 is to the west of the Gogar Burn (Compartment 40) and is agricultural land bounded by the unnamed B class road to Gogar Mains to the west, the A8000 to the south and an area of Improved grassland to the south east (Compartment 41 also adjacent to the Gogar Burn). Less than 2% of the
compartment would be lost through the construction of the tram route and it is therefore considered that a minor negative impact would arise.

Compartment 44 is agricultural field and less than 1% of the compartment would be lost through the construction of the tram route and infrastructure. Consequently it is considered that this would be a minor negative impact.

The tram route would cross a number of field boundaries, which in the Gogar area consist mainly of improved grassland with some defunct and leggy species-poor hedgerows. It is considered that construction of the tram route through these areas would result in a minor negative impact.

Gogar Burn – Adjacent to Edinburgh airport
This section of the Gogar burn is not included in the SINC and has been canalised, with the river banks being raised and strengthened using geosynthetics. The river is over-shadowed along much of this section and has areas of invasive alien species. The proposed route of the tram is proposed to run adjacent to the embankment next to the airport roads. As such it is considered highly unlikely direct impacts on the nearby Gogar Burn would arise.

Indirect impacts are also unlikely as the raised embankment physically separates the construction works and the river and riverside habitat. Consequently it is considered that works such as the cutting back of overhanging branches may be required exerting only minor negative impacts on the adjacent habitat. Other impacts would result from the disturbance to fauna including nesting birds and species using the Gogar Burn as a wildlife corridor. It is considered that the disturbance would result in a minor negative impact.

The need for continuous management of habitats along the Tram corridor to keep the route clear would have an impact on the habitats present within the route corridor after construction. This impact could be positive or negative depending on the type of management regime employed.

Proposals in the landscape strategy for shrub and tree planting along the edges of the route and planting would lead to a beneficial impact if the management involved included prescriptions for the benefit of nature conservation as well as Tram maintenance.

Maintenance for nature conservation benefit would incorporate rotational coppicing of shrubs, pollarding of trees, minimal and late mowing of grassland and the removal of arisings, retention of deadwood piles on site and the minimal use of herbicides including spot treatment. All main works should be carried out in seasons unlikely to interfere with breeding populations. Such a regime could increase the wildlife value of the route corridor providing a beneficial impact at the local level along the length of the route.

Common route maintenance techniques, which do not take into account nature conservation concerns, involving spring to autumn mowing, widespread use of herbicides, chain flailing of shrubs and tree felling and any spring to summer vegetation clearance, would favour the establishment of ruderal species and the loss of species rich grassland. Such a regime, if implemented, would be a direct negative impact.

Ingliston Park-and-Ride to Newbridge
The proposed tram route passes through Compartment 59, an area of low species diversity improved grassland. Approximately 10% of the compartment would be lost. However as this compartment is of such low value the impact significance would be minor.

From Compartment 59 the tram route would be on street and follow the A8. Along this section the centre reservation, consisting of very low value amenity grassland, would be lost. This is a minor impact.
The proposed tram route infringes on the north-western corner of Compartment 62. Here a number of trees would require removal and a slope regraded.

The tram route would then pass through Compartments 65 and 66, both of which are agricultural habitat, with less than 5% of the habitat lost in the compartments. However the habitat would be fragmented but this is of minor significance and may allow the establishment of new hedgerows or boundary habitat. The impact on these Compartments would be minor.

Compartment 68 is broadleaf plantation woodland adjacent to the main Glasgow/Edinburgh railway line and a disused rail line to the south of Ratho Station. The construction of the tram infrastructure would result in a 10m wide strip of woodland being lost. This in itself is a small percentage of the total habitat but the compartment would be fragmented with around a 250m long stretch to the east isolated. The level of damage and disturbance currently exerted on this area from fly tipping and vandalism is very high and it is considered that the construction of the tram would allow a clean up of this section to take place. It would also prevent further tipping. Consequently a minor negative impact would result.

From Compartment 68 the tram route would pass through open ground before joining Harvest Road where it would run on street. Where the tram joins Harvest Road a very small corner of Compartment 69 would be lost. This would amount to less than 1% and would be a minor adverse impact. From where the tram joins Harvest Road to the Newbridge P&R the route would be “on street” and the impact on habitat would be negligible.

**Species**

**Bats**

Operation of the Tram Line 2 route is unlikely to have a significant impact on bats. Bat populations would be able to make use of the re-established corridor for navigation and foraging. There is little potential for bats to be killed or injured by tram operation along the route.

Non-sensitive management for maintenance, as noted above, could have a negative impact on bats, either by preventing the establishment of roosts or by damaging roost and killing bats where they do become established. Any such impacts on bats would be of Major significance at the national level along the whole route corridor.

**Badger**

Badger movement across and through the route would be partly restricted by fencing, but aided through the construction of underpasses. However, it may be necessary to close off setts that are established during operation where they interfere with the operation of the Tram. There is potential for road kill of badgers during the operation of the route. This impact is likely to be of minor significance due to mitigation.

**Birds**

Management for nature conservation benefit would include the establishment of foraging habitat and cover along the route. The movement of vehicles along the Tram route is not expected to disturb birds.

**Herpetofauna**

Operation of the tram could result in mortality to reptiles basking on the tracks and from disturbance during management clearance. The impact may vary with the season, with casualties more likely in early spring when reptiles are less likely to move out of the way with sufficient rapidity.

Management of habitats for reptiles would produce a positive impact, i.e. where habitat piles and hibernacula are left or constructed along the route. A positive impact could result from the reduced access of the public and their dogs, which would reduce disturbance and predation.
Plants
Management of plants and plant communities would change to accommodate route operation. The current lack of management along the route corridor and the nature of the substrate have led to the development of several types of plant community.

Areas of ruderal species and sycamore have a lower biodiversity and ecological value.

Species rich grassland and native trees and scrub would be established along the route. Management with a nature conservation component would promote the survival and establishment of the higher value diverse communities of increasing value. With sufficient time (one to two decades) such communities could potentially exceed the ecological value of those currently present. This would represent a direct positive impact of Moderate regional and Major local significance along the entire route corridor.

9.6.1 Predicted Impact Significance

The predicted impact significance on the above noted receptors is detailed in Table 9.10 below.

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Ecological Value</th>
<th>Impact Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bats</td>
<td>High</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Badger</td>
<td>High</td>
<td>Moderate Negative</td>
</tr>
<tr>
<td>Otter</td>
<td>High</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Birds</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Herpetofauna</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Invertebrates</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Plants/Habitats (Loss)</td>
<td>Negligible to Medium</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Plants/Habitats (Habitat creation)</td>
<td>Negligible to Low</td>
<td>Minor Positive</td>
</tr>
<tr>
<td>Designated Sites</td>
<td>Medium</td>
<td>Minor Negative</td>
</tr>
</tbody>
</table>

9.6.2 15 Year Assessment

As noted in above it is necessary to assess the baseline situation with development in year 15. It is noted that as a result of the construction of the tram infrastructure, there would be unavoidable permanent habitat loss in a number of areas.

The habitat lost would range from ephemeral habitat with negligible ecological value to woodland habitat with a higher ecological value. However, it should be noted that the existing woodland habitats found along the route of the tram are of low value with poor age structures and low species diversity.

Mitigation measures proposed include habitat creation with extensive planting proposed for many areas of the route. This proposed planting would increase species and age diversity and would also increase the quantity of woodland habitat.
The proposed planting would increase the connectivity on several smaller areas of woodland leading to the creation and enlargement of wildlife corridors. These measures would result in a positive impact.

Other measures to promote wildlife issues, including bat bricks, etc., should increase the potential for wildlife colonisation. However, the success of these measures cannot be assessed at this time. It is however regarded that such measures would result in a positive impact.

In the vicinity of Bankhead Drive there are significant problems with fly tipping creating both an environmental and health problem. The construction of the tram with associated planting would reduce the potential for fly tipping in this area. This would result in a net positive impact.

In conclusion it is considered that the construction and operation of the Line 2 Tram, with associated mitigation measures, would result in a positive environmental impact along the proposed tram route.

9.7 SUMMARY

No national or international nature conservation designations are in place along the proposed tram route. However, within the 2km corridor of the proposed tram route there are two national designated areas, Castle Rock SSSI and Calton Hill SSSI. Non-statutory designated areas along the route include the Disused Railway Urban Wildlife Site (UWS), Water of Leith UWS, Gogar Burn Site of Interest for Nature Conservation (SINC) and UWS. In addition, Carrick Knowe Golf Course is a Neighbourhood Nature Area (NNA).

Through consultation with various consultees including the Lothian Wildlife Information Centre, a total of eight notable flora species were identified in the 2km wide route corridor. However, of these species none are encountered along the actual route of the tram. Protected mammal species known to be present within the route study area include badgers, bats and otters. A number of habitats are found along the proposed route including extensive areas of low value amenity and improved grassland, tall ruderal, introduced shrub, arable land and field boundaries have been identified along the tram route. Habitats of note include:

- Woodland – Various classifications of woodland have been identified along the tram route. These include broadleaf woodland of plantation origin, mixed woodland of plantation origin along with scattered and dense scrub. No Ancient Woodland or long established woodland of plantation origin has been identified along or immediately adjacent to the tram route.

- Watercourses – Two main watercourses are present along the route of the tram. These being the Gogar Burn and the Water of Leith. The Gogar Burn has been modified and extensively culverted with little of the semi natural alignment left. Both areas are regarded as being important wildlife corridors.

9.7.1 Summary of Impacts

Several areas of habitat would be lost including sections of the wildlife corridor adjacent to the Glasgow/Edinburgh railway line. The Gogar Burn SINC and Water of Leith UWS would be affected by the construction of bridges. Badgers at Gogar area in particular would be affected during construction and operation. Minor negative impacts are predicted for effects on UWS and SINC, although Moderate to Neutral impacts are assessed from loss of habitats along the entire routes. Impacts on wildlife corridors are assessed as Minor. Impacts on bats and otters are assessed as Minor, although effects on badgers may be Moderate to Major negative impact.
Table 9.11 Summary of Residual Impacts on Ecology

<table>
<thead>
<tr>
<th>Area/Species Affected</th>
<th>Impact</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>The disused railway UWS</td>
<td>Slight loss of habitat</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Water of Leith UWS</td>
<td>Temporary disturbance</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Gogar Burn SINC</td>
<td>Temporary disturbance</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Entire route</td>
<td>Loss of habitat along various sections of the route, ranging from loss of amenity grassland and isolated low value, to introduced shrub, to loss of broadleaf plantation woodland. New planting would create new habitats, which would increase ecological interest in some locations.</td>
<td>Range from Neutral to Moderate negative impact. Minor beneficial</td>
</tr>
<tr>
<td>Railway line Haymarket to Bankhead drive)</td>
<td>Loss of habitat, including woodland</td>
<td>Minor/Moderate negative impact</td>
</tr>
<tr>
<td>Badgers</td>
<td>Disturbance during construction and operation</td>
<td>Moderate to Major negative impact</td>
</tr>
<tr>
<td>Otters</td>
<td>Disturbance during construction</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Bats</td>
<td>Disturbance, loss of foraging areas during construction.</td>
<td>Minor negative impact</td>
</tr>
</tbody>
</table>
10 Surface Water

10.1 INTRODUCTION

This section of the Environmental Statement is concerned with the impacts on the quality and hydrology of surface waters. Rivers, burns and large ponds have been included in the assessment. Potential impacts on groundwater and the ecology associated with aquatic features are addressed in the Geology, Soils and Contamination, and Ecology and Nature Conservation sections respectively and reference has been made to these sections as necessary.

10.2 METHODS

10.2.1 Information Sources

A baseline desk study of the surface water environment along the route was undertaken that incorporated the following:

- The river classifications from the Scottish Environment Protection Agency (SEPA) for water bodies within 500m of the proposed route. Classifications reflect the status of the watercourse in terms of chemical, biological, aesthetic quality and toxicity assessment.

- Information on flooding and land drainage within the area of the proposed route through discussion with CEC.

- No monitoring has been carried out as part of the assessment. However, a walkover survey was undertaken to visually inspect sites of potential interest along the route.

It has been assumed that stretches of the watercourses are currently used as receiving watercourses for discharges and surface water abstractions.

10.2.2 Consultations

Liaison with SEPA, CEC and Scottish Water has been carried out to assist in establishing the likely impacts of Tram Line 2 and agree the approach to mitigating potential impacts.

10.2.3 Assessment Methods

Impacts on surface water have been evaluated by reference to statutory and non-statutory requirements and guidelines. The assessment has drawn on the guidance set out in the DMRB Volume 11: Environmental Assessment within which Part 10 addressed Water Quality and Drainage. Effects have been assessed by predicting the changes that would be caused by the construction and operation of Tram Line 2.

The assessment also considers the possible impacts of an unplanned incident such as a spillage of hazardous substances. The evaluation considers a number of factors such as the sensitivity of the water body and the dependent receptors of water, etc. The significance of impacts on surface watercourses has been assessed using the impact definitions as discussed in Section 10.2.4. The methodology used to assign impact scores has been largely based upon a qualitative subjective assessment approach.
10.2.4 Significance Criteria

The evaluation of impacts has been determined through the use of significance criteria. The criteria have been derived on the basis of the extent to which an environmental attribute deviates from the normal baseline situation. Impacts have been considered in terms of whether they are short or long term, adverse or beneficial, direct or indirect and permanent or temporary. Mitigation measures have been considered as part of the impact assessment and residual impacts, i.e. those that cannot be mitigated against, have been ranked as Major, Moderate, Minor and Negligible in order to give a clear indication of the significance of the scheme’s potential effects on the surface water environment.

Criteria for determining the significance of an impact are shown in Table 10.1

Table 10.1 Criteria for Determining the Significance of Adverse Impacts

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rating Definition 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Quality</strong></td>
<td>Change in surface water quality to render it unsuitable for its current use, resulting in a reduction of one or more class</td>
</tr>
<tr>
<td><strong>Aquatic Ecology - Macroinvertebrate Habitats</strong></td>
<td>Loss or damage to macro-invertebrate habitats resulting in a reduction of one or more biological quality class</td>
</tr>
<tr>
<td><strong>Watercourse characteristics (Hydrology &amp; geomorphology)</strong></td>
<td>Major change to existing river flow and/or major change in channel or bank form and/or flooding</td>
</tr>
<tr>
<td></td>
<td>Moderate change to existing river flow and/or moderate change in channel or bank form and/or flooding</td>
</tr>
<tr>
<td></td>
<td>Minor change to existing river flow and/or Minor change in channel or bank form and/or flooding</td>
</tr>
</tbody>
</table>

Notes:
1 “Negligible” omitted as this definition is self-explanatory

The above definitions are for adverse impacts. Any area where there is potential for an improvement in the quality of the surface water environment this has been identified within the ES as a beneficial effect.

10.3 BASELINE SITUATION

There are three main watercourses that could potentially be affected by Tram Line 2, these are: the Water of Leith, Gogar Burn and the River Almond.
The following paragraphs describe the waterbodies which are less than 500m from the proposed route of the scheme. The text describes the features starting from the City Centre in the east to Newbridge at the western end of the proposed route.

**City Centre (St Andrew Square - Haymarket)**

There are no significant surface water bodies or watercourses in the vicinity of the City Centre stretch of the proposed route.

**Haymarket to Bankhead Drive (Edinburgh Park Station)**

The Water of Leith flows in a north-easterly direction through Edinburgh. The river flows along the western edge of the Scottish Rugby Union Grounds at Murrayfield. The proposed Tram Line 2 route would run immediately to the south of Murrayfield alongside the existing railway corridor. The route would require a new crossing of the Water of Leith immediately to the west of the complex. Based on 2001 data for SEPA’s River Classification Scheme (SEPA, 2000) the Water of Leith is Class B (Fair) at this location. Water of Leith flows in north easterly direction to join the Firth of Forth at the Port of Leith.

The proposed route would run adjacent to the northern boundary of the railway line crossing the area of land that is occupied by sports pitches between the eastern bank of the Water of Leith and the stadium. An approximate length of 150m of extra track for stabling would be constructed alongside the tracks at this location. This area of land and the area immediately to the north of the stadium are both “Areas of Importance for Flood Control”. These areas are identified by the City of Edinburgh Council (CEC, 2001) and are important for the following reasons:

- Currently of value for water storage in the event of flooding; and
- Not currently occupied by built development.

Extensive areas of land to the south of Murrayfield and along the western bank of the river have been inundated with flood waters in the past, most recently in the flood events occurring during April 2000. In order to alleviate these problems CEC has prepared a Flood Prevention Order - “The Water of Leith Flood Prevention Scheme” (CEC, 2003) the proposals have been through a public consultation period and a decision will shortly be made as to whether or not a Public Inquiry will take place.

Between Balgreen Road and Edinburgh Park Station the proposed route does not encounter any significant surface watercourses.

**Edinburgh Park - Gogar Roundabout**

From the proposed stop at Edinburgh Park Station the route turns in a north-westerly direction to Edinburgh Park. The proposed stop at Edinburgh Park lies close to the recently constructed series of ponds called Loch Ross, which has been formed along the line of the Gogar Burn. The route continues in a northerly direction alongside this water feature. The Gogar Burn emerges from the northern pond.

Under SEPA’s River Classification scheme in 2001 this stretch of Gogar Burn was Class B (Fair). The proposed route for Tram Line 2 continues north crossing the A8 and turning towards Gogar roundabout.

**Gogar Roundabout (including depot) – Airport terminal**

A depot is proposed immediately to the north of the Gogar Roundabout. From the Roundabout the proposed route continues in a general westerly direction before turning north at the Royal Bank of Scotland office complex. The proposed route passes close to Gogar Burn, which is Class B (Fair) quality over this stretch. A new
crossing of the burn would be required at the location at which the route turns and continues in a westerly direction towards Ingliston Park and Ride. Before reaching the Park and Ride the proposed route crosses a small un-named watercourse.

Prior to reaching Eastfield Road the proposed route to Edinburgh Airport branches off in a northerly direction. The proposed route would cross an Area of Importance for Flood Control associated with the Gogar Burn before running northwards between Gogar Burn and Airport car parks. The Gogar Burn is Class C (Poor) water quality over this stretch. The Gogar Burn then passes under the runway in culvert and meets the River Almond.

**Ingliston Park and Ride to Newbridge**

Between the Ingliston Park and Ride and Newbridge North (near the M9/A8 junction) the proposed route follows Harvest Road and passes close to ponds associated with a disused quarry to the south of the road. The River Almond flows in a north-easterly direction approximately 100m west from the terminus of the route at Newbridge North.

### 10.4 CONSTRUCTION EFFECTS AND MITIGATION

#### 10.4.1 Construction Effects

The construction of Tram Line 2 would involve works, such as bridge construction and temporary disturbance, which would have a direct temporary impact on the channel and banks of the Water of Leith and Gogar Burn.

It would also be necessary to construct a culvert over a minor unnamed watercourse, which is a tributary of the Gogar Burn, in addition to a number of ditches near Edinburgh Airport. There would also be a number of land based activities associated with the construction works which could potentially have an impact on surface waters in the vicinity. These include the following:

- Site clearance.
- Earthworks, including the construction of embankment and cutting.
- Demolition activities.
- Construction of Tram Line 2 and associated facilities and services.
- Construction materials handling, including the storage and use of fuels and oils and other potentially polluting construction materials.
- Handling of potentially polluting silt-laden run-off and excavation dewatering from construction activities, site compounds and contaminated land sites.
- Spillage or uncontrolled release of potentially polluting material such as cement, concrete, diesel, hydraulic fluid or paint.

Silty water can arise from earthworks, exposed ground, water collecting in excavations, stockpiled materials, plant and wheel washing facilities and site roads. As such there is potential for polluted drainage from the construction activities to enter watercourses, particularly during the earthworks.

Other pollutants, such as construction chemicals or fuel, may be carried in the drainage. Unless managed appropriately the pollutants, including sediment, could be washed into surface water sewers and from there into a watercourse or soakaway causing contamination. Sediment deposited in the sewer system can
result in the constriction of sewer pipes and reduction in flow capacity and possibly causing blockage.

Soil compaction can occur as a result of construction vehicles and plant passing over previously undeveloped land. Soil compaction results in a reduction in the volume of water permeating into the ground thus increasing run-off. The run-off would normally contain suspended silt as the compacted ground would be susceptible to erosion in the absence of vegetation. The areas at particular risk from compaction include:

- The site for the proposed depot north of the Gogar Roundabout,
- The length of Tram Line 2 route along the sections adjacent to the Water of Leith, and
- The section of route between the Royal Bank of Scotland complex and the proposed stop at Inglisston West, which crosses the minor watercourse and Gogar Burn.

In addition, compaction may occur in the vicinity of the Contractors’ compounds that would have to be prepared to enable construction of the line.

The residual impacts on the surface water environment expected during the construction of Tram Line 2, i.e. those remaining after the implementation of mitigation measures, are detailed in Section 10.4.3 below. Appropriate mitigation measures are described below.

### 10.4.2 Mitigation Measures during Construction

#### General Measures

The construction of Tram Line 2 would take place in accordance with all relevant legislation for the protection of surface and groundwater, codes of good practice and best practice guidance for works on or near water, such as Pollution Prevention Guidelines prepared by SEPA. The following Pollution Prevention Guidelines (PPG) are of particular relevance to construction site activities:

- PPG1: General guide to the prevention of pollution.
- PPG2: Above ground oil storage tanks.
- PPG5: Works in, near or liable to affect watercourses.
- PPG6: Working at demolition and construction sites.
- PPG21: Pollution incident response planning.

SEPA has specified that the appointed Contractor would be required to submit a method statement for preventing pollution during the construction phase. This would form the basis for the construction Environmental Management System.

#### Placement of Temporary and Permanent Crossings of Watercourses

During the detailed design phase temporary and permanent works would be designed so as to minimise disruption to flows and disturbance to the watercourse’s bed, channel and banks.

#### Temporary Site Drainage

All untreated contaminated drainage from site compounds and construction areas (including pumped water from excavations) would be prevented from entering
rivers, burns, surface water drains or sewers. Provision would be made to collect and treat the drainage from all construction areas and compounds and to remove any sediment and other contaminants before discharging the clean water under an appropriate consent.

All drainage would be passed through settlement lagoons or a similar system to remove suspended sediment. A floating oil boom would be placed on the surface of the settlement lagoon to prevent discharge of any traces of oil and fuel that may have entered the drainage system. This would serve as a contingency measure: the adoption of good site practices for the prevention of pollution should prevent any fuel or oil entering the drainage system.

All the necessary consents for land drainage works, drainage discharge and other authorisations would be obtained from the appropriate body, SEPA or Scottish Water.

Any increases in run-off caused by soil compaction would be accommodated in the temporary site drainage system and drainage would be attenuated so as not to present an increased risk of flooding in the Water of Leith, Gogar Burn or overload the public sewer network.

**Prevention of Pollution from Plant and Machinery**

In order to prevent materials leaking from static plant, such as pumps and generators, contaminating the ground and being washed into the drainage system, static plant would be placed on drip trays.

Facilities for washing plant and equipment contaminated with concrete or other chemicals would be provided. Washwater from the facilities would be managed so as to prevent pollution of surface water and groundwater.

If on-site batching facilities are required they would be operated under the conditions of the appropriate authorisation.

**Storage and Use of Chemicals, Fuel/Oil and Other Construction Material**

Chemicals would be stored in secure designated, (bunded where necessary) storage areas and in accordance with the appropriate regulatory requirements, including the Control of Substances Hazardous to Health Regulations 1994. Refuelling of vehicles and machinery would be undertaken in accordance with a specified procedure that could include the designation of refuelling areas. Spill contingency plans would be drawn up and included in the procedures.

Stockpiles of dry materials would be stored in locations that prevent contamination of surface waters. They must be located at least 10m away from the banks of the Water of Leith, Gogar Burn or any other controlled watercourse. Materials would not be stockpiled within Areas of Importance for Flood Control.

Emergency procedures to be adopted in the event of a spillage or leakage of any polluting material such as fuel, oil or silt-laden drainage would be in place on-site. Provision for containment and clean-up of the material would be made. The procedure would follow the recommendations in PPG21: Pollution Incident Response Planning.

10.4.3 **Residual Impacts from Construction**

Table 10.2 below describes the potential residual impacts from the construction of Line 2.
Table 10.2 Residual Impacts on Surface Water from Construction

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Impact Rating</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>Minor</td>
<td>Slight change in water quality for a temporary period during works affecting the channel and banks of watercourses including the Water of Leith and Gogar Burn. The change would be due to an increased loading of sediment which would be mobilised during the temporary works directly affecting the channel and banks of watercourses during the construction of new crossings. Pollution control measures would be incorporated into the works so as to minimise the temporary deterioration in water quality.</td>
</tr>
<tr>
<td>Aquatic Ecology – macroinvertebrate habitats</td>
<td>Minor</td>
<td>Slight temporary changes to macroinvertebrate habitats of the stretch of watercourse directly affected by the temporary works at locations where new crossings would be required over the Water of Leith, Gogar Burn and minor unnamed watercourses. Changes would not result in a reduction in biological class.</td>
</tr>
<tr>
<td>Watercourse Characteristics (Hydrology and Geomorphology)</td>
<td>Minor</td>
<td>Slight change in hydrology and geomorphology of the stretch of watercourse directly affected by the temporary works at locations where new crossings would be required over the Water of Leith, Gogar Burn and minor unnamed watercourses. During the detailed design the temporary works would be designed so as not to exacerbate flooding and to minimise the disruption to the flow regime and geomorphology of the watercourse corridor.</td>
</tr>
</tbody>
</table>

Overall there would be a potential slight adverse impact from construction of Tram Line 2. The activities posing the highest risk to deterioration in the surface water environment would be the temporary works associated with the construction of watercourse crossings including those of the Gogar Burn and the Water of Leith.

10.5 PERMANENT AND OPERATIONAL EFFECTS

10.5.1 Potential Effects

Permanent and operational effects to the surface water environment would occur as a result of the following:

- Modification to watercourse channel, bed and banks to accommodate permanent crossings of watercourses.
- Minor potential for accumulated contaminants being washed into drainage system and receiving watercourses, particularly at the depot site.
- Increases in the volume of surface water run-off caused as a result of an increase in impermeable surfaces.
- Placement of structures and an increase in impermeable surfaces in the floodplain potentially reducing floodwater storage.
- Possible effects of herbicides used in vegetation control impacting on water quality.

The potential operational impacts on water quality should be minimal. Vehicles are likely to emit small amounts of pollutants that could accumulate on track surfaces and would be washed into the drainage system during rainfall. The majority of the route is in the urban area of Edinburgh, thus runoff would be largely via hardstanding to storm sewer, rather than direct to watercourses. SEPA has specified that drainage from areas where trams are parked and maintenance work is carried out should be connected to foul sewer.
The increase in the area of impermeable surface would create an increase in the volume of surface runoff generated in some areas, particularly where grassed areas have been acquired for the alignment and depot sites. There is also likely to be limited capacity in receiving watercourses to accept additional volumes of drainage.

As described in Chapter 2 Tram Line 2 would require a new crossing of the Water of Leith and would cross approximately 200m of an Area of Importance for Flood Control at the Murrayfield Rugby complex. A section of approximately 150m in length would be three tracks in width, the third track being required for stabling. In addition, a 200m section of the route would cross an Area of Importance for Flood Control associated with Gogar Burn. The potential impact of this would be to reduce the volume of available storage for floodwater within the areas that could lead to an increase in the extent and severity of flooding after the scheme was in place.

The placement of structures such as embankments could also impede the movement of floodwater within Areas of Importance for Flood Control. Section 10.5.2 describes the mitigation that has been incorporated into the scheme design in order to minimise the impact of increases in run-off and the impact of development in Areas of Importance for Flood Control, changes in run-off regime and contaminated drainage.

10.5.2 Mitigation

The drainage system for the alignment and depot sites would incorporate Sustainable Urban Drainage Systems (SUDS) features that would assist in achieving the following:

- Minimising any increase in the volume of surface water run-off from new areas of hardstanding reaching surface water drains and watercourses – this could be achieved through the use of permeable hard surfacing materials or swales.

- Attenuation of run-off during rainfall events – basins, ponds and wetlands could be incorporated into system.

- Removal of contaminants in the run-off

Reference would be made to CIRIA C521: SUDS – Design Manual for Scotland and Northern Ireland during the detailed design. Opportunities for habitat enhancement would also be maximised through the design of SUDS.

Adequate pollution control would be incorporated into the drainage system in order to prevent deterioration of the quality of the water environment. These would include the installation of oil/petrol interceptors where necessary. During the operation of Tram Line 2 the protection measures described in the SEPA guideline PPG23: Maintenance of Structures over Water, would be adhered to when maintaining the crossings of watercourses, such as bridges over the Water of Leith and Gogar Burn.

Crossings of watercourses including the proposed bridge crossing of Gogar Burn and Water of Leith would be designed so as not to impede the flow, obstruct the movement of floodwater or exacerbate erosion of the channel and banks.

In order to minimise the possible impacts of placement of structures within the Area of Importance for Flood Control associated with the Water of Leith at Murrayfield the scheme would be constructed on columns, i.e. a viaduct along this section. This would reduce the uptake of storage volume to a minimum. Likewise the proposed scheme would be designed so as not to interfere with the flood alleviation measures proposed for that area.
The alignment of the Tram Line 2 crossing the Area of Importance for Flood Control south of Gogar Burn near the Airport, would be designed in such a way as to replace lost floodwater storage from the flood control area. Provision for the movement of floodwaters to and from either side of the structures would also be made and incorporated into the detailed design.

At the detailed design stage a flood risk assessment in accordance with National Planning Policy Guidelines (NPPG) 7 – Planning and Flooding or Scottish Planning Policy 7, which would supersede NPPG 7 in the future, would be carried out. The flood risk assessment would be undertaken in accordance with criteria set down under SEPA Policy 41 and address the effects of development within the corridors of the Water of Leith and Gogar Burn and the associated Areas of Importance for Flood Control. The flood risk assessment would take into consideration flood defence proposals City of Edinburgh Council intend to implement in the near future such as those proposed for Murrayfield.

10.5.3 Residual impacts

Table 10.3 below describes the potential permanent residual impacts from the operation of Line 2.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Impact Rating</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td>Negligible</td>
<td>The impacts resulting from the operation of Tram Line 2 on water quality would be negligible. There would be minor potential for accumulated pollutants to be washed from the track areas to permanent drainage system. Pollution control measures would be incorporated into the drainage system wherever necessary such as from the depot. Sustainable Urban Drainage Systems (SUDS) would be integral to the drainage system designed during the detailed design phase.</td>
</tr>
<tr>
<td>Aquatic Ecology – macroinvertebrate habitats</td>
<td>Negligible</td>
<td>There would be no permanent effects on macroinvertebrate habitats therefore the impacts resulting from the operation of Tram Line 2 on biological quality of the watercourse would be negligible and would not result in a reduction in biological class.</td>
</tr>
<tr>
<td>Watercourse Characteristics (Hydrology and Geomorphology)</td>
<td>Moderate</td>
<td>There would be an overall increase in the area of impermeable surface which would create an increase in the volume of surface runoff generated, particularly where grassed areas have been acquired for the alignment and depot. With the incorporation of Sustainable Urban Drainage Systems the effects would be minimised to a slight impact.</td>
</tr>
</tbody>
</table>

It is uncertain at this stage whether or not the possible impact of Line 2 crossing the Area of Importance for Flood Control associated with Gogar Burn could be entirely mitigated. The flood risk assessment that would be carried out during the detailed design stage would establish the required mitigation in detail. Provided adequate mitigation resulting from the flood risk assessment and the detailed design process is in place the permanent effects associated with the operational phase of the
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Impact Rating</th>
<th>Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>proposed Tram Line 2 would be Minor impacts. However, given that a degree of uncertainty exists at this stage a residual impact of moderate has resulted from the assessment.</td>
</tr>
</tbody>
</table>

Overall there would be a potential Minor to Moderate adverse impact from the operation of Line 2. The Moderate impact results from uncertainty relating to the mitigation of the impacts which could occur from development within the Area of Importance for Flood Control associated with Gogar Burn.

10.6 SUMMARY

In summary the potential impacts associated with the construction of Tram Line 2 would be Minor impacts largely due to the temporary works associated with the construction of two new crossings of the Water of Leith and Gogar Burn.

In general the permanent impacts during operation of Tram Line 2 would be Negligible to Minor, however an overall rating of Moderate has resulted from the assessment. This is due to there being uncertainty at this stage as to whether or not the possible impact of Line 2 crossing the Area of Importance for Flood Control associated with Gogar Burn could be entirely mitigated. Further assessments during the detailed design stage would establish the required mitigation in detail. Mitigation would involve the provision of adequate compensatory floodwater storage volume equal to that taken up by the placement of the embankment and Line 2 infrastructure in the Area of Importance for Flood Control.
11 Archaeology and Heritage

11.1 INTRODUCTION

This chapter considers the likely effects on cultural heritage interests of the construction and operation of the proposed Tram Line 2, intended to run from St Andrew Square to Edinburgh Airport and Newbridge. The route section between St Andrew Square and Roseburn would share its alignment with the proposed Tram Line 1. For that route section this chapter incorporates data and assessments conducted by ERM Ltd as part of the preparation the Tram Line 1 Environmental Statement (ERM 2003, Chapters 8 & 11), verified, adapted and edited as appropriate.

The specific objectives of the cultural heritage study were to:

- Establish the cultural heritage baseline within the assessment area.
- Consider the proposed development route in terms of its archaeological and historic environment potential.
- Assess the potential impacts of the construction and operation of the proposed development on the cultural heritage resource, within the context of relevant legislation and planning policy.
- Propose measures, where appropriate, to mitigate any predicted adverse impacts.

The assessment has considered the development proposals described in Chapter 2 and shown on Figure 2.1. The main features of the proposed scheme relevant to this assessment are:

- The proposed track-bed.
- Tram vehicles.
- Stops with shelters and associated fixtures and fittings.
- Overhead line equipment – conductor wires, support poles, cables and fixings.
- Signalling equipment and signs.
- Tram depot at Gogar Roundabout.
- Alterations to existing structures and road junctions.
- Fourteen potential construction compound locations.

This topic overlaps in several respects with the landscape and visual assessment (Chapter 8), particularly where the townscape setting of the Edinburgh New Town is assessed, and also in the consideration of historic gardens and designed landscapes.
11.2 METHODS

11.2.1 Scope of Assessment

The assessment of the impacts of the proposed scheme on cultural heritage in and adjacent to the scheme has considered:

- Scheduled Ancient Monuments.
- Other sites and areas of archaeological significance.
- Listed Buildings and other features of architectural or historic interest.
- Conservation Areas and other important historic townscape features.
- Historic Gardens and Designed Landscapes and other significant historic landscapes.
- Edinburgh World Heritage Site.

Heritage resources potentially include features ranging from the earliest Holocene human occupation, approximately 10,000 years ago, through to 20th century buildings and townscapes.

The assessment was conducted within the context of the legislative and planning framework designed to protect and conserve heritage resources. Legislation includes:

- The Town and Country Planning (General Development Procedure) (Scotland) Order 1992 (relating to designated Historic Gardens and Designed Landscapes).

The obligations of the 1997 act are also explained in the Memorandum of Guidance on Listed Buildings and Conservation Areas 1998 (Memorandum).

National planning policy relating to archaeology is set out in National Planning Policy Guideline 5, Archaeology and Planning (NPPG 5), supported by guidance and advice provided in Planning Advice Note 42, Archaeology (PAN 42). PAN 42 indicates that the principle that should underlie all planning decision-making is preservation of archaeological resources, in situ where possible, and by record if destruction cannot be avoided. It is recognised in that document that preservation may not always be possible, and where damage is unavoidable various mitigation measures may be proposed.

Government policy relating to the conservation of the historic environment, including Listed Buildings, Conservation Areas, World Heritage Sites and Historic Gardens and Designed Landscapes, is stated in National Planning Policy Guideline 18, Planning and the Historic Environment (NPPG 18).

Regional planning policy relating to the protection and enhancement of heritage resources and the historic environment is stated in:

Relevant Local Plan policy is stated in

- The Central Edinburgh Local Plan (1997), Policies CD 1-2, 4-5, 8-9.
- The finalised draft Rural West Edinburgh Local Plan (1999), Policies E 14, 30-31, 33, 36.

Further policy information is provided in Chapter 4.

11.2.2 Baseline Survey

Approach

The study was undertaken with reference to the Institute of Field Archaeologists’ Code of Conduct and appropriate Standards. Recording and assessment were conducted according to established CFA Archaeology Ltd methods.

Baseline survey was undertaken as part of Tram Line 2 assessment for the route section between Roseburn and Newbridge. For the route section between St Andrew Square and Roseburn, ERM Ltd conducted baseline survey as part of the Tram Line 1 Environmental Impact Assessment. The data relating to that route section are included within this document, verified, edited and adapted as appropriate. The two studies, for St Andrew Square – Roseburn and Roseburn – Newbridge, adopted somewhat differing approaches to baseline survey. However, the variable character of the townscape / landscape influenced the width of the baseline survey corridor examined along the proposed tram route corridor, and thus the variation between the two sections does not preclude consistency of approach to assessment.

Desk-based Study: Roseburn to Newbridge

To inform the assessment, information was collated on the locations of archaeology and heritage features present within 200m of the proposed tram route between the proposed junction with Tram Line 1 at Roseburn and Gogar Roundabout. The corridor was expanded to the south of Roseburn, taking into account the location of a potential construction compound (which was not included in the finalised design proposal).

West of Gogar Roundabout the search area for designated sites was increased to 500m to either side of the proposed tram route. This reflects the more open nature of the landscape and allowed an assessment of the potential effects of the proposed scheme upon the settings of designated features in the vicinity. The search area for undesignated sites was retained to within 200m of the proposed route.

Information was obtained on the locations of cultural heritage sites with statutory protection and non-statutory designations within the study corridor. Information on Scheduled Ancient Monuments was obtained from Historic Scotland. Details of Listed Buildings were obtained from the Statutory List of Buildings of Special Architectural or Historic Interest and the National Monuments Record of Scotland (NMRS). The Local Plans contain information on the extents and character of Conservation Areas. Information on Historic Gardens and Designed Landscapes was obtained from An Inventory of Gardens and Designed Landscapes in Scotland (Inventory).

Information on previously recorded archaeological sites and monuments within the study corridor was obtained from the NMRS. The City of Edinburgh Council Archaeology Service (CECAS) provided additional information on certain archaeological sites, and made available interim reports on the results of recent archaeological work conducted in the Gogar and Newbridge areas.
Bibliographic references were consulted to provide background and historical information. These included the cultural heritage chapters of the Environmental Statements relating to the formerly proposed City of Edinburgh Rapid Transit development (ERM 1995), which considered a similar route corridor between Roseburn and Edinburgh Airport, and the ongoing redevelopment of the Gogarburn Hospital site as the new headquarters of the Royal Bank of Scotland (RPS, 2002). No attempt was made within the remit of this study to conduct detailed historical analysis.

An assessment was made of vertical aerial photograph collections held by The Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS). Sorties dating from 1946 to 1990 were available for examination. Ordnance Survey maps and other early maps held by the Map Library of the National Library of Scotland were examined, to provide information on sites of potential archaeological significance. The cartographic and aerial photographic analysis was restricted to a narrow corridor c 100m wide centred upon the proposed development locations.

**Desk-based Study: St Andrew Square to Roseburn**

Baseline cultural heritage information was collated for sites and monuments lying within a study corridor defined on the engineering drawings of the proposed route. The study corridor comprises the proposed tram route and a buffer zone to either side. The buffer zone is defined by the limits of deviation for the proposed scheme. Where no limits were identified at the time of assessment the buffer zone was assumed to include a 5m corridor either side of the proposed tram route, except where a building frontage lies within 5m, in which case the frontage was regarded as the limit of the buffer zone.

Information was also collated on Listed Buildings with a frontage on the route or in its immediate vicinity, and Conservation Areas and Historic Gardens and Designed Landscapes intersected by the proposed tram route.

Baseline information was collated from various sources including NMRS, historic maps and the Inventory.

**Consultation**

Consultations and site meetings were held with representatives of City of Edinburgh Council (City Development (Planning) and Archaeology Service), Historic Scotland and, by the Tram Line 1 team, the World Heritage Trust to gain professional opinion on the likely impacts of Tram Line 2 and to agree an approach to mitigating impacts.

**Field survey**

A reconnaissance field survey was undertaken along the accessible sections within the limits of deviation of the proposed scheme between Roseburn and Newbridge to:

- Locate and record the current condition of known archaeology and heritage features and any further features not detected from the desk studies.
- Identify areas with the potential to contain unrecorded, buried archaeological remains
- Assess the potential impact of the development and ancillary works on these features and areas, and their settings where appropriate.

Those areas where field survey was not possible are identified in the baseline description below. Designated heritage features and areas elsewhere in the
assessment corridor were visited where possible to assess potential indirect impacts.

Between St Andrew Square and Roseburn the route was inspected with the aim of verifying the baseline data and assessments conducted by ERM Ltd.

11.2.3 Assessment Methods

The type of impact of the proposed development on archaeology and heritage interests is assessed in the following categories:

- **Direct**, where there would be a physical impact on a site caused by the proposed development. Direct impacts may be caused by a range of activities associated with the construction of proposed development features. Direct impacts on cultural heritage features are normally adverse, permanent and irreversible.

- **Indirect**, where the setting of a site may be affected. Indirect impacts may relate to new development reducing views to or from cultural heritage features with important landscape settings or fragmenting historic landscapes, or may result from increased noise or vibration. Such impacts often would arise during the construction phase of the development and persist through the operational phase.

- **Uncertain**, where there is a risk that the works may impinge on a site, for example where it is not clear where the location or boundaries of a site lie or where the baseline condition of a site cannot be established satisfactorily.

Potential impacts, direct and indirect, were assessed in terms of their longevity, reversibility and nature (beneficial / neutral / adverse). Beneficial effects are those that contribute to the value of a receptor through enhancement of desirable characteristics or the introduction of new, positive attributes. Neutral effects occur where the development can be accommodated comfortably by the receiving environment while neither contributing to nor detracting from the value of the receptor. Adverse effects are those that detract from the value of a receptor through a reduction in or disruption of valuable characterising components or patterns, or the introduction of new inappropriate characteristics.

The assessment of significance of impacts took into account the importance of receptor and the magnitude of effect. The importance of archaeological and heritage resources has been assessed principally according to the criteria published in NPPG 5 and the Memorandum. The main thresholds of archaeological importance defined in NPPG 5 are National Importance, Regional and Local Importance, and lesser Importance. The Memorandum states that Category A listed buildings are of national or international importance, Category B buildings are of regional or more than local importance, and Category C(s) structures are of local importance. Inventory status Historic Gardens and Designed Landscapes are considered to be nationally important. Table 11.1 summarises the relative importance of key cultural heritage resources.

**Table 11.1 Definitions of Importance of Cultural Heritage Resources**

<table>
<thead>
<tr>
<th>Importance</th>
<th>Site types</th>
</tr>
</thead>
<tbody>
<tr>
<td>International/</td>
<td>Scheduled Ancient Monuments</td>
</tr>
<tr>
<td>National</td>
<td>Sites of schedulable quality</td>
</tr>
<tr>
<td></td>
<td>Category A listed buildings</td>
</tr>
<tr>
<td></td>
<td>Inventory status Gardens &amp; Designed Landscapes</td>
</tr>
<tr>
<td></td>
<td>World Heritage Site</td>
</tr>
<tr>
<td></td>
<td>Outstanding Conservation Areas</td>
</tr>
<tr>
<td>Regional</td>
<td>Archaeological sites and areas of distinctive regional importance</td>
</tr>
<tr>
<td></td>
<td>Category B listed buildings</td>
</tr>
</tbody>
</table>
### Importance

<table>
<thead>
<tr>
<th>Site types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
</tr>
<tr>
<td>Archaeological sites and areas of local importance</td>
</tr>
<tr>
<td>Category C(s) listed buildings</td>
</tr>
<tr>
<td>Conservation Areas</td>
</tr>
<tr>
<td>Lesser</td>
</tr>
<tr>
<td>Other archaeological sites; findspots</td>
</tr>
<tr>
<td>Undesignated buildings and townscapes of some historic or architectural interest</td>
</tr>
</tbody>
</table>

Magnitudes of impact are assessed in the categories imperceptible, low, medium or high, and are described in Table 11.2.

#### Table 11.2 Definitions of Magnitude of Impact

<table>
<thead>
<tr>
<th>Level of magnitude</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Major impacts fundamentally changing the baseline condition of the receptor, leading to total or major alteration of character or setting.</td>
</tr>
<tr>
<td>Medium</td>
<td>Moderate impacts changing the baseline condition of the receptor materially but not fundamentally, leading to partial alteration of character or setting.</td>
</tr>
<tr>
<td>Low</td>
<td>Minor detectable impacts which do not alter the baseline condition of the receptor materially.</td>
</tr>
<tr>
<td>Imperceptible</td>
<td>A very slight and barely distinguishable change from baseline conditions, approximating to a “no change” situation.</td>
</tr>
</tbody>
</table>

Table 11.3 combines these criteria to provide an assessment of whether or not an impact is considered to be significant in terms of the *Environmental Impact Assessment (Scotland) Regulations 1999*.

#### Table 11.3 Matrix for Assessing Significance Of Impact

<table>
<thead>
<tr>
<th>Magnitude*</th>
<th>Lesser</th>
<th>Local</th>
<th>Regional</th>
<th>National / International</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Minor</td>
<td>Moderate</td>
<td>Major</td>
<td>Major</td>
</tr>
<tr>
<td>Medium</td>
<td>Negligible</td>
<td>Minor</td>
<td>Moderate</td>
<td>Major</td>
</tr>
<tr>
<td>Low</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Minor</td>
<td>Moderate</td>
</tr>
<tr>
<td>Imperceptible</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Negligible</td>
<td>Minor</td>
</tr>
</tbody>
</table>

* Effects falling within the shaded boxes are considered to be significant.

These assessment methods differ from those employed in the Tram Line 1 Environmental Statement (Chapter 11), including for the route section between St Andrew Square and Roseburn. They also differ from those used in the STAG2 assessment. However, the levels of impact significance assessed for individual features are comparable.

### 11.3 BASELINE SITUATION

#### 11.3.1 General

273 archaeological and heritage sites have been identified within the assessment corridor (Figures 11.1/1-10). Appendices 1-3 provide detailed information on the character and baseline condition of each site. Numbers in bold and in brackets in the following sections refer to site numbers identified on Figures 11.1/1-10 and listed in the Appendices.

The 273 sites comprise:
• 3 Scheduled Ancient Monuments (S1-3).
• 36 other sites and areas of archaeological interest (A1-36).
• 173 Listed Buildings (L1-173).
• 54 other sites of architectural interest (B1-54).
• 3 Outstanding Conservation Areas (C1-3).
• 3 Inventory status Historic Gardens and Designed Landscapes (D1-3).
• 1 World Heritage Site.

Of the 36 sites of archaeological interest (A1-36), 25 sites are recorded in the NMRS, 7 were recorded from historic maps and documentary sources, 2 were discovered through consultation with CECAS, and 2 were discovered from analysis of vertical aerial photographs. Field survey did not lead to the discovery of any previously unrecorded sites of archaeological significance.

The baseline conditions of the cultural heritage resource are considered below in more detail, divided into 10 sections ordered from east to west. The route corridor passes through three distinct townscape / landscape character areas, which have a considerable influence on the character, extent and importance of the cultural heritage present. These are:

• St Andrew Square – Haymarket: the Edinburgh New Town townscape of international historic and architectural importance (Sections 1-3 below);
• Haymarket – Gogar Roundabout: a townscape of predominantly 20th century housing and industrial developments on the west side of Edinburgh (Sections 4-8 below); and
• Gogar Roundabout – Newbridge: a semi-rural landscape considerably fragmented by major transport corridors, Edinburgh Airport, housing and industrial development at Newbridge (Sections 9-10 below).

Section 1 – New Town: St Andrew Square (Figure 11.1/1)

Between Princes Street and Queen Street the tram would run on the street on a single track to either side of St Andrew Square. The northbound trams would run up South St David Street, along the west side of St Andrew Square, and down North St David Street, turning east onto Queen Street. Southbound trams would run up North St Andrew Street, along the east side of St Andrew Square and down South St Andrew Street. Tram stops would be built on South St David Street and South St Andrew Street, between St Andrew Square and Meuse Lane.

This route section lies entirely within the designated areas of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape (D3) and the New Town Outstanding Conservation Area (C1). Most of the streets within this route section, with the exception of the west side of North St David Street and the east side of North St Andrew Street, are lined by Listed Buildings (L34-62, L75).

St Andrew Square is a formal tree-lined square bounded by railings. It is a key element of the formal grid layout of James Craig’s design for the First New Town, development of which commenced in 1767, although its original residential character is obscured by more recent commercial development. It marks the end point of George Street, itself the central axis of the First New Town. The square is surrounded by buildings with a diverse range of architectural styles dating from the 18th century to the 21st century Harvey Nichols building. On the north side is a four-storey Georgian frontage (L40-45), with most elements being Category A listed. The east side contains the Royal Bank of Scotland headquarters built 1771 (L47).
and monument to John 4th Earl of Hopetoun (L49), the Bank of Scotland building of 1851 (L51-2), and Royal Bank of Scotland building (L54), all listed Category A. These buildings reflect the historic importance of St Andrew Square as a banking centre. On the west side the Listed Buildings include the Guardian Royal Exchange building (L53) and the comparatively modern 9-10 St Andrew Square, built in 1962 to a Basil Spence design (L59), both listed Category A. The late 19th century buildings forming the south façade of the square are also listed Category A or B (L55-58). There are decorative cast iron railings and/or lamp standards along the front of some of the façades. The central garden of St Andrew Square is formed by a formal square bounded with a low wall and decorative iron railing, which contains at its centre the 41m high Melville Monument, erected in 1823 (L48).

Listed Buildings on South St Andrew Street (L60-62) include the St Andrew Hotel building and the former YMCA building, both Category B.

Queen Street is the most northerly of the main east/west axes of the First New Town. Between North St David Street and North St Andrew Street the Category A listed Scottish National Portrait Gallery, built 1895 (L36) dominates the south façade of the street, with the Category B listed York Buildings (L35) present opposite. Two highly decorative lamp standards are present beside the road outside the entrance to the Portrait Gallery (L36). At the junction of Queen Street and North St Andrew Street are Category A and C(s) Listed Buildings (L38-39), and opposite these is the eastern end of the southern boundary of East Queen Street Gardens (a key component of D3), defined by Category B listed railings and gates (L37). At the junction of North St Andrew Street and York Place, a street largely completed in 1804, is the Category A listed 1-3c York Place and 15-19 North St Andrew Street (L34).

There are important vistas relating to this part of the New Town. These include principally the view eastwards along George Street to St Andrew Square focussed on the Melville Monument (L48) and the Royal Bank of Scotland (L47); and southwards down South St David Street to the Scott Monument (L74). There are views from North St David Street over East Queen Street Gardens (L37), but intimate views into the gardens from the proposed tram route are substantially screened by hedging beside the boundary railing.

Section 2 – New Town: Princes Street (Figures 11.1/1-2)

The tram would run in a straight line along Princes Street between South St Andrew Street and Lothian Road. A tram stop is proposed just east of the junction with Castle Street. Details of the proposed new traffic flow arrangements and alterations to footways and junctions are provided in Chapter 2.

This route section lies entirely within the designated areas of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape (D3) and the New Town Outstanding Conservation Area (C1). There are a considerable number of Listed Buildings beside Princes Street or in Princes Street Gardens (L63-74, L76--126), and other items of street furniture have been recorded (B52-54).

Princes Street forms the southernmost of the three principal east-west axes of the First New Town. The north side of Princes Street has a façade of buildings 3-6 storeys high, broken by seven cross streets from South St Andrew Street to Hope Street. There has been continual redevelopment within the façade over the past 200 years, and the current streetscape is characterised by an eclectic mix of Georgian, Victorian and 20th century constructions of varying architectural interest. The original residential design of Princes Street has been transformed into mostly commercial usage, and the street is now Edinburgh’s principal shopping street. Category A Listed Buildings include 30 Princes Street, formerly Forsyth’s (L70), 47-52 Princes Street, Jenners (L75), 61-2 Princes Street, Romanes and Paterson (L78), 84-87 Princes Street, incorporating the New Club (L91), 94-96 Princes Street (L95) and 139-140 Princes Street / 5 Hope Street Lane (L123). The majority of the Listed Buildings are Category B (L66-67, L69, L71-72, L77, L81-84, L86, L92, L96,
As a result of the Parliamentary Act of 1816 the south side of Princes street has very few buildings above ground level, those present including Scott Monument built 1840-4 (L74), the Royal Scottish Academy (L85) and St John’s Church (L120), all listed Category A, and the Category B listed Balmoral Hotel (L63). Other listed structures present on the south side of the street include two Category B listed police call boxes, one beside the Royal Scottish Academy (L80) and the other close to St John’s Church (L116).

The south side of Princes Street, between Lothian Road and Waverley Bridge, is defined by Princes Street Gardens. These gardens are the largest open element of the New Town Gardens Designed Landscape (D3), at 12.8 hectares. They were laid out in the early 19th century, but have been much modified since. The gardens form the setting for a considerable number of statues, memorials and other civic monuments, most of which are Listed Buildings. Several of these are present on the northern edge of the gardens, and were situated to be viewed from Princes Street. In East Princes Street Gardens these comprise the statues of Dr Livingston (L73), Adam Black (L76) and Professor Wilson (L79), and the Scott Monument (L74), all Category A listed. In West Princes Street they are the Category A listed Allan Ramsay monument (L88) and the Category B Royal Scots Greys Monument (L97), Scottish American Memorial (L100), Thomas Guthrie Monument (L105), and the Sir James Young Simpson Monument (L118). Decorative iron railings define the northern edge of the Princes Street Gardens (B53-54). Other listed structures are present on the lower lying ground in West Princes Street Gardens, including the Category A Ross Fountain (L108) dating from the 1860s; the Category B shelters (L109), statuary group (L93), and Royal Scots Memorial (L90); and the Category C(s) gardener’s cottage (L89).

There are several important vistas relating to this part of the New Town. Extensive views can be obtained from Princes Street across Princes Street Gardens to Edinburgh Castle (itself protected as Scheduled Ancient Monument) and the Old Town skyline. The most open views occur between Castle Street and Hanover Street; to either side of this section the views are partly obscured variously by trees or buildings. Important views can also be obtained westwards along Princes Street to Calton Hill, southwards down Castle Street and Frederick Street to Edinburgh Castle, and southwards down Hanover Street to the Royal Scottish Academy façade (L85). There are also extensive elevated views across the New Town from Edinburgh Castle.

Section 3 – New Town: West End (Figure 11.1/2)

The tram would run from Princes Street on-street along Shandwick Place and West Maitland Street, and across Haymarket junction to Haymarket Terrace. Tram stops would be built on Shandwick Place between Coates Crescent and Atholl Crescent, and on Haymarket Terrace. Footways would require to be set back to accommodate the Shandwick Place tram stop, involving moving back the boundaries of the crescent gardens by up to 2m.

This route section lies entirely within or on the boundaries of the designated areas of the Edinburgh World Heritage Site, New Town Gardens Designed Landscape (D3) and the New Town and West End Outstanding Conservation Areas (C1-2). There are a considerable number of Listed Buildings along the whole route section (L127-173).

The West End forms an architecturally coherent extension of the New Town between Haymarket and Princes Street, and was developed from the early 19th century until around 1880. The principal characteristics of the street are its formal arrangement and symmetry. Three and four storey classical tenements with front basements line most of the street, with shop-fronts projecting forward to the pavement line on both Shandwick Place and West Maitland Street. Midway along, Atholl Crescent and Coates Crescent step back to create a central oval open space,
with the main road passing between almost symmetrical garden enclosures. Haymarket is a busy transport interchange surrounded by buildings displaying a wide variety of architectural styles. There are no iconic views of the New Town along this route section, although the view along West Maitland Street to the frontage of Haymarket Station (L171) forms a significant vista.

At the eastern end of this route section the Listed Building stock includes the Category A listed Caledonian Hotel (1899-1903) (L127) and Rutland Hotel (1830-1840) (L130), and the Category B Berkeley Casino building (L131). The Listed Buildings to either side of the eastward end of Shandwick Place are designated Category B or C(s) (L132-145). These were mostly built as residential blocks, apart from St George’s Church (L142). The buildings around Coates Crescent and Atholl Crescent are all listed Category A (L146-148, L150-152), as is the Gladstone Memorial present within the garden crescent on the north side of Shandwick Place (L149). The crescent does not form an important component of the New Town Gardens Designed Landscape (D3), as is demonstrated by the fact that the boundary of the designated area passes through the centre of the crescent. The tenemented properties on either side of West Maitland Street are listed variously Category A (L153) and Category B (L154, L161-166, L168), whereas those on Clifton Terrace have a non-statutory C listing (L169, L172).

Haymarket Station (L171) was built in 1840 as the original western terminus of the Glasgow-Edinburgh Railway, and is the oldest Scottish railway station surviving mostly in its original state. Adjacent Listed Buildings include Ryrie’s public house (L170) and the Caledonian Alehouse (L173), both Category C(s) listed. Within the centre of the Haymarket road interchange is the Category C(s) listed Heart of Midlothian War Memorial (L167). Other Listed Buildings on Torphichen Street, Torphichen Place and Morrison Street (L155-160) would also have views of the proposed tram route.

Section 4 – Haymarket Terrace to Roseburn (Figures 11.1/2-3)

Between Haymarket Terrace and Russell Road the tram route would run through an area of modern office buildings as far as Balbirnie Place, thereafter following the existing railway line to Roseburn.

There are no sites or areas of cultural heritage interest along the preferred alignment. To the north are the Coltbridge and Wester Coates Outstanding Conservation Area (C3), Category C(s) Listed Buildings on Kew Terrace (L1) and Hampton Terrace (L2), and a range of other sites of architectural interest, mostly within the Conservation Area, recorded in the NMRS (B1-7). None of these cultural heritage features would be intervisible with the preferred tram line (see also Figure 8.4).

Section 5 – Roseburn to Murrayfield (Figure 11.1/3)

This section of the route would run on a new bridge over Russell Road, then along the northern side of Haymarket rail depot, through an area of modern industrial units, before crossing on a new bridge over Roseburn Street to run on the south side of Murrayfield Stadium. Potential construction compound sites have been identified within the industrial estate and in Murrayfield playing fields.

This route section is bounded to the north by recent residential development on the east side of Russell Road and industrial premises on the west side, and to the south by the Glasgow-Edinburgh railway. Field survey in this area was restricted to public rights of way (Roseburn Street, Russell Road and cycleways); access to the various industrial properties was not possible, although it is considered highly unlikely that field survey in those areas would have led to any discoveries of cultural heritage significance being made.

No features of cultural heritage interest have been identified along the preferred scheme alignment. Several sites are located within the wider search area, comprising five listed buildings (L3-5, L32-33), two areas of archaeological interest
The five listed buildings comprise two schools, a residential building, a railway bridge, and a municipal building. Roseburn Primary School (L4) is a Category B listed Renaissance School built in 1893, fronting on to Roseburn Street opposite commercial and industrial properties. Tynecastle High School (L33) is an extensive Free Renaissance school built 1910-11, listed Category B. It is located beside the high embankment of the former Caledonian Railway now used as the West Approach Road, with no views to the proposed tram route (see also Figure 8.4).

Roseburn House (L5) is a Category A listed burgess’s tower, built in 1582 but with 17th and 18th century additions. Its former policies are much reduced, and modern housing largely obscures views of the house from Roseburn Street, in the direction of the proposed tram line. The 3-arch viaduct bridge carrying the West Approach Road over Russell Road is a Category B Listed Building (L3). It was built as part of the Caledonian Railway, opened in 1842. The Category B listed former Public Works Office building on McLeod St is an H-plan tenement block erected in 1897 (L32). This building is still in use, forming part of a high frontage on the east side of Mcleod Street, opposite Tynecastle High School. It has no views to the proposed tram route (see Figure 8.4).

The other sites of architectural interest recorded in the NMRS relate to records of demolished buildings, existing buildings, and townscapes. The demolished buildings comprise the former Roseburn or Heriot Brewery on Russell Road (B10) and garages on Roseburn Street (B13-B14), all now replaced by modern housing. A Royal Mail sorting office occupies the former Waverley Rubber Works site (B17), and new industrial buildings occupy a former factory site on Westfield Avenue (B24).

Extant buildings recorded by the NMRS include the British Telecom depot and former District Works Office on Russell Road (B15-16); part of a tenement block and commercial garage on Roseburn Street (B12, B20); the Blandfield Chemical Works and distillery on Wheatfield Road (B8, B51), Murrayfield Stadium (B22); and the Haymarket Station engine sheds and railway (B18-19). General townscape records comprise photographs of Roseburn Street (B21), Russell Road (B11) and Westfield Road (B9), and aerial photographs of Gorgie (B23).

There are no visible traces of the two sites of archaeological interest. A Roman coin (A1) was found in 1979 on the ground at the Corporation Centre on Russell Road (probably B16). Given the context of the findspot, the coin may well have not been an ancient loss at this location. Robertson (1963, 154) has suggested that a good proportion of the Roman coins found in large conurbations such as Edinburgh and Glasgow may reflect modern losses. A natural grass-covered mound to the west of Roseburn House marks the site of a former dovecot (A2); it lies at some distance from the proposed tram route and has no views of it (see Figure 8.4).

Section 6 – Murrayfield to Carrick Knowe (Figures 11.1/3-4)

Leaving Murrayfield, this route section would cross over the Water of Leith on a new bridge, run in a cutting between the railway line and the properties on the south side of Baird Drive, before crossing Balgreen road at grade and running along the southern edge of Carrick Knowe golf course (beside which a new cycleway and footpath would be built), and finally crossing over the railway on a new bridge. Field survey was carried out along the line west of Balgreen Road but, due to access constraints, not along the Baird Avenue section or within the grounds of Murrayfield Stadium. Potential construction compound sites have been identified between Pansy Walk and the railway line, and adjacent to the Royal Air Cadets Hall off Stenhouse Drive.

Two sites of cultural heritage interest, part of the listed Jenners Depository (L6) and a former field boundary (A3), lie within proposed development locations. The
Category B listed Jenners Depository complex on Balgreen Road (L6) was built 1925-6. It comprises a 5-storey warehouse with a garage range to the south and a lodge building to the east, adjacent to the entrance from Balgreen Road. The gatepiers, wrought iron gates and iron railings bounding the site are also listed. The buildings remain in use.

Archaeological field evaluation was conducted in 1999 along the proposed tram route section through Carrick Knowe golf course, during the assessment of the formerly proposed CERT project. That work revealed little of archaeological significance, although the buried traces of cultivation remains and a field boundary ditch were revealed. The boundary ditch (A3) contained 18th-20th artefacts, and can be equated with a 19th century landscape feature first depicted on the second edition Ordnance Survey map of 1895 (Edinburghshire, sheet III.10).

Sites located within the wider search area include an artefact findspot (A4) and five sites of architectural interest (B25-29). A prehistoric cup-marked stone was found c1896 in a dyke at an unspecified location near Saughtonhall (A4; not annotated on Figure 11.1/4). It is not known whether or not the findspot lay within the assessment corridor. Architectural records held by the NMRS comprise postcards dating to c 1930 of Baird Drive, Baird Terrace and Baird Grove (B26-28), and photographs of Balgreen Primary School and Library (B29). The NMRS also notes Westfield Railway Bridge (B25), carrying the Glasgow-Edinburgh railway over the Water of Leith, although it holds no related collections. The primary school and railway bridge remain in use, whilst Baird Drive, Terrace and Grove are residential streets.

**Section 7 – Carrick Knowe to Hermiston Gait (Figures 11.1/4-6)**

This route section would run along landscaped grassland south of the Glasgow-Edinburgh railway, at first between Stenhouse Drive and Saughton Mains Street, then crossing Saughton Road and running north of Broomhouse Drive, before crossing Broomhouse Road and running to the north of Bankhead Drive as far Hermiston Gait. Five potential construction compound sites have been identified along this route section (see Section 2.5.3), including one between Broomhouse Drive and the railway, opposite the Saughton House HMSO buildings.

The embankment of the Glasgow-Edinburgh railway restricts views north from the proposed route (see Figure 8.4). To the south of the proposed route the immediate townscape comprises, from east to west, residential housing at Stenhouse, the HMSO buildings on Broomhouse Drive, residential housing at Broomhouse, the Bankhead and Sighthill Industrial Estates (all with busy roads in the foreground) and the Hermiston Gait retail park. Field survey assessed the whole of this proposed section of tram route.

One area of archaeological interest, located in what is now a landscaped verge on the west side of Saughton Road, would be intersected by the tram route and also contains a potential construction compound site. This land formerly contained the northern end of a series of tree-lined boundaries and paths forming a rectangular, compartmented designed landscape surrounding the former Old Saughton House (A8). This landscape is recorded in some detail on the first and second edition Ordnance Survey maps (Edinburghshire: sheet 2, 1855; sheet III.9, 1895), and in less detail on earlier maps published by e.g. Adair (1735), Laurie (1763) and Kirkwood (1817). There are no coherent visible remains of this former landscape where crossed by the proposed tram route. A lone mature sycamore tree may have formed part of one of the internal avenues, and other areas of solid ground appear to mask other tree stumps possibly defining the northernmost boundary of the former landscape. Several trees are visible in this area on vertical aerial photographs taken in 1961.

Other features present within the wider search area include three features of archaeological interest (A5-7) and six sites of architectural interest recorded in the NMRS (B30-35). The second edition Ordnance Survey map of 1895 (Edinburghshire, sheet III.9) depicts two buildings (A5-6) on the north side of
Saughton Mains Street that are no longer extant. The site of one building (A5) lies within a level grassy area and, although demolished, it is possible that buried foundations survive. The location of the other building (A6) is now occupied by a car scrapyard, although a pier of masonry forming its south-east corner may have formed part of the earlier building to have occupied the site.

Saughton Junction railway station (A7) formerly stood at the junction of the Glasgow-Edinburgh and Fife railway lines, on the east side of Saughton Road. The NMRS holds photographic collections relating to Forrester Secondary School (B34) and the HMSO buildings on Broomhouse Drive (B31), and considerable quantities of architectural records relating to the Forrester Park housing estate (B35). It also contains entries, but no collections, relating to the cottage at 76 Saughton Mains Street (B30) and the Broomfield Crescent and Broomside Terrace streetscapes (B32-33).

Section 8 – Edinburgh Park to Gogar Roundabout (Figures 11.1/6-7)

This route section would run from the retail park at Hermiston Gait, crossing over the Glasgow-Edinburgh railway, then running northwards through Edinburgh Park, at first across currently undeveloped ground and then between modern office buildings as far as the Gyle Roundabout. Thereafter the route would cross the South Gyle Broadway and traverse The Gyle shopping centre car park, before crossing the A8 road a little to the east of Gogar Roundabout. This route section lies within a landscaped setting of modern office, industrial and retail buildings and major transport corridors (Edinburgh-Glasgow railway, A720 Edinburgh City Bypass, A8 Glasgow Road). The undeveloped ground has been heavily modified by the dumping of considerable quantities of soil across much of the area; some of the material has since been extracted, leaving open quarry pits. A potential construction compound site is located within the undeveloped land north of the railway line, within c 65m of the proposed Tram Line 2 centre line, with a second potential compound located in The Gyle shopping centre car park. Field survey assessed the whole of this route section.

Only one identified feature of cultural heritage interest is likely to intersect with the proposed development locations. The former Gogar Loch (A19) once lay around the area now occupied by The Gyle shopping centre. Early maps record the loch as an area of open water, but in 1786 Laurie mapped the loch as an area of marshy ground named ‘Corstorphin Meadow’. It is absent from more recent maps examined. Although its former location and extent cannot be mapped in any detail from early published maps, it is likely that the proposed tram route intersects its location in the area around the Gyle Roundabout, particularly as one of the archaeological sites excavated in the early 1990s (A16; below) was found to lie on the very edge of the loch.

Several areas of archaeological interest (A9-A18) and features of architectural interest recorded in the NMRS (B36-B40) have been identified within the wider search corridor. Little or no trace of the archaeological sites will survive, as a result of either their excavation and/or the development of Edinburgh Park. A programme of archaeological work conducted 1990-2 in advance of the construction of Edinburgh Park led to the discovery and excavation of several features of archaeological interest. These include prehistoric structures (A12, A16) and field system remains (A15), medieval cultivation marks (A13), and other undated features (A14).

Part of a Roman temporary camp (A17) formerly extended into the west part of the study corridor, although not as far east as the preferred tram route. The Roman camp was partly investigated in the 1980s, prior to the construction of the Edinburgh City Bypass, but was not re-located during the 1990-2 excavations. Buried remains of part of the Roman camp survive to the west of the City Bypass, but the portion formerly extending into the search corridor was most probably destroyed with the construction of the Edinburgh Park buildings that now occupy that area. Aerial photographs record a linear cropmark of unknown date and function (A18) cutting across the Roman camp (A17) to the west of the Edinburgh City Bypass. It may
have once continued eastwards into the search corridor, but if so any trace is likely
to have been destroyed with the construction of Edinburgh Park.

The farms of Redheughs (A10) and Gogar Green (A11) once lay at locations now
occupied by buildings within Edinburgh Park. Redheughs is recorded on maps
back as far as the 17th century, although medieval artefacts found in its vicinity
during the 1990-2 excavations suggest a considerably earlier origin for that
settlement (J Lawson, pers comm). By contrast, the earliest examined map
recording Gogar Green dates to the early 19th century (Knox 1812). Further to the
south-east, recent excavations at Cultins Road recorded a double-ditched
enclosure and other features of 19th century date (A9), possibly associated with
Culton farm recorded at this approximate location on early 19th century maps. What
had been identified previously from aerial photographs as a prehistoric enclosure at
that location was proved by excavation to be a natural feature of no archaeological
interest.

Records of architectural sites held by the NMRS include photographs of The Gyle
shopping centre (B36), a 1930s police call box at Maybury roundabout (B37;
located outside the mapped area on Figure 11.1/7) and Gogar Roundabout (B40).
The NMRS holds 1930s architectural drawings and photographs of the former
Gylemuir works (B39), and makes reference to a factory on Turnhouse Road (B38).

Section 9 – Gogar Roundabout to Airport Terminal (Figures 11.1/7-8)

This route section would run on the north side of the A8 Glasgow Road between
Gogar Roundabout and the Gogar Burn, through land currently mostly used as
arable or screening bunds on the north side of Gogar Roundabout. The route would
then head northwards for c 300m along the east bank of the Gogar Burn, before
turning west to cross the burn and head across arable fields to East Mains of
Ingliston. A little east of the main approach road to Edinburgh Airport (Eastfield
Road) the route would turn northwards and head towards the airport terminal
building, at first across fields and then along the west side of the canalised Gogar
Burn within developed and landscaped grounds. A depot would be constructed in
an arable field immediately north of Gogar Roundabout. Three potential
construction compound locations have been identified: at the Gogar Burn crossing
north of Gogar Church, north of the Ingliston Park and Ride stop, and surrounding
the proposed Airport stop. Field survey assessed the whole of Section 9.

Cultural heritage features identified within the study corridor for this route section
can be divided into five categories:

- Castle Gogar, associated buildings and its relict designed landscape and
  archaeological remains (L8-11, A22, A24), which would be crossed by the
  proposed tram route;
- Other listed buildings and associated designed landscapes present within
  the wider search corridor, at Gogar Park (L7, B41-42), Gogarburn House
  (L24), Gogar Mount (L25), and Millburn Tower (D1);
- Buried archaeological remains, including a Scheduled Ancient Monument
  (S1, A20-21, A35);
- The site of a Cromwellian skirmish around Gogar (A23); and
- Airport-related constructions (A25, B43).

Castle Gogar, listed buildings and relict designed landscape

The tram route would traverse the relict designed landscape (A22) associated with
Castle Gogar (also known as Gogar House). Castle Gogar (L10) is a 4-storey
baronial style mansion built in 1625, with later additions. It replaced an earlier
building of 14th century origin. The mansion, along with a cottage of early 18th
century origin, gate house, stables, outbuildings, gates and gatepiers are listed Category A. Castle Gogar is largely screened from the proposed tram route by a plantation, deliberately designed to create privacy for the mansion, when viewed from the south. However, its west elevation is visible in the middle distance from the proposed route around East Mains of Inglisston.

Early maps indicate that Castle Gogar (L10) stood within a landscape of tree-lined enclosures, although the sources (e.g. Adair 1735, Laurie 1766, Knox 1812) record considerably different extents to the enclosures. Figures 11.1/7-8 depict the likely maximal extent of the designed landscape within the search corridor (A22), following Knox (1812). The first edition Ordnance Survey map (Edinburghshire, sheet 1, 1855) shows little of the landscape, reflecting its replacement by improved arable fields. A possible clump plantation and the remains of a tree-lined boundary are mapped within the search corridor, to the south of Castle Gogar.

Surviving designed landscape features include a tree-lined avenue leading to Castle Gogar from the A8 Glasgow Road. The avenue spans the Gogar Burn on a Category B listed bridge (L9), comprising a single span, rubble bridge built 1672 with later additions. At the end of the avenue a single-storey L-plan lodge, gates and gatepiers are Category B listed (L8). The lodge building appears to have replaced an earlier lodge on the opposite side of the avenue recorded on the second edition Ordnance Survey map (Edinburghshire II.15, 1895), now demolished and its site largely beneath the A8 dual carriageway. The gatepiers date to c 1900, and may be contemporary with the extant lodge, but incorporate earlier masonry. The gates are of late 17th century date and are reputed to have been moved to Gogar from Caroline Park, Granton. The listed lodge building has a very secluded setting within the trees lining the west side of the avenue, and is largely obscured from view from a relatively short distance to the north along the avenue (20-30m).

Also associated with Castle Gogar is the former settlement of Nether Gogar (A24), focussed on the former Gogar Parish Church (L11). A village with a population of 300 once stood at Nether Gogar (Bonnar 1891, 12), on the east bank of the Gogar Burn. Early maps indicate several buildings to be present. Sharp et al (1828) recorded the settlement in ruins, and thereafter buildings were mostly restricted to a succession of cottages fronting onto Glasgow Road. The first edition Ordnance Survey map (Edinburghshire, sheet 5, 1855) depicts two roofed buildings present to the west of the track leading to the church from the south: these no longer survive. Vertical aerial photographs show what may be remains of structures and cultivation rigs in the field south-east of the church, and two rectangular structures (probably of comparatively modern origin) to the north of the church.

Gogar Parish Church and Graveyard (L11) form the main visible elements of the settlement, and are protected as a Category B Listed Building. A chapel was first established in 1167 (ERM 1995, J10). The standing church building, now used as a cabinet-maker’s workshop, was restored 1890-1, incorporating within its south transept the chancel of an earlier 16th century church, and went out of use in 1954. The walled graveyard is raised above the surrounding ground level and the floor level of the church, and contains earlier and mid 18th century grave monuments. Mature trees present around the west side of the graveyard provide a relatively secluded aspect to the church and graveyard when viewed from the west. The land immediately west of the churchyard is waste ground. Disused cars and vans are present immediately north of the graveyard.

Apart from the church and graveyard there are no visible remains of pre-19th century settlement in this area. Traces of the medieval settlement were discovered during recent archaeological excavations conducted in advance of the construction of a flyover associated with the Royal Bank of Scotland headquarters at Gogarburn, currently under construction (A24a). The excavated remains may represent the plough-truncated remains of domestic and agricultural activity associated with the core of the medieval settlement, which probably lay a little further east, focussed on Gogar Church. Traces of a mill lade were identified further downslope, towards the Gogar Burn (Morrison 2003). CECAS has identified two areas within which buried
remains of Nether Gogar can be expected to survive, and these are depicted on Figure 11.1/7 (A24b).

Other listed buildings and designed landscapes

Gogar Park (L7), an early 19th century villa, is a Category C(s) listed building. The villa and surrounding landscaped grounds are recorded on Knox’s map of 1812. Two lodge buildings (B41-42) are present beside the A8 Glasgow Road. The extent of parkland is shown on Figure 11.1/7. These features were not visited during field survey, as they lie within private grounds. However, views into the grounds from the proposed tram route are heavily screened by mature trees growing within the policies along the south side of the A8 road.

Gogarburn House (L24) is a Category B Listed Building. This Scots Renaissance house was built 1893 and added to in 1896, with later additions associated with its conversion to a nurses’ home within the former Gogarburn Hospital. The stable block, walled garden, coach house, and external walls and gateway associated with Gogarburn House all form part of the listing (RPS, 2002). Gogarburn House lay within landscaped grounds, which were later substantially infilled with the construction of Gogarburn Hospital. The grounds and buildings are currently being redeveloped as the new Royal Bank of Scotland headquarters, and were not inspected. Mature trees along the south edge of the A8 screen Gogarburn from the proposed tram route.

Millburn Tower and associated designed landscape (D1) was established in the early 19th century, and is recorded on Kirkwood’s map of 1817. The Inventory classifies the landscape as having little scenic value, as it is well screened by shelterbelts set in agricultural land. The designed landscape is not intervisible with the proposed tram route (see also Figure 8.4).

The Category B listed North Lodge of Gogar Mount (L25) lies within the assessment corridor but outside the area of mapping on Figure 11.1. This building is an early 19th century lodge with later additions, facing east. The associated boundary walls, ashlar gatepiers and wrought iron gates form part of the listing. Views of the proposed tram route to the north are obscured by trees surrounding the property and by the rising topography to the north, although it is possible that the upper parts of poles and wires may be visible in the middle distance.

Archaeological remains around Castle Gogar

Aerial photographs show the cropmarks of a fort, palisaded enclosure and a field system on the west bank of the Gogar Burn (S1), which together are protected as a Scheduled Ancient Monument (extent shown on Figure 11.1/7). All the features are probably broadly Iron Age in date. There are no surface traces of these sites in what is currently an arable field, although buried remains of these and other features not detectable from the air will survive.

What may be the buried remains of a length of a prehistoric pit alignment on an east/west alignment, close to the preferred tram route, is visible on vertical aerial photographs in an arable field between Castle Gogar and East Mains of Ingliston (A35). Two other similar features are visible in the vicinity on the same photographs.

Archaeological field evaluation in 1999 along the proposed CERT line revealed the remains of two V-shaped ditches, possibly forming part of a prehistoric double-ditched enclosure, and nearby a coal-fired hearth and medieval pottery (A20-21). These features are preserved as buried remains in arable fields to either side of the Gogar Burn. The hearth (A21) lies on the preferred tram route.

Cromwellian Skirmish

A skirmish took place around Gogar in 1650 between the armies of Oliver Cromwell and General Leslie. The latter appears to have camped in the area around Gogar
Church and what is now Gogar Park, although the precise locations of these activities are not known (A23; not annotated on Figure 11.1/7). No structural traces of this battle are visible or can be expected to survive within the assessment corridor, although it is possible that artefactual evidence of the skirmish may survive in the soil, for example in the form of spent musket balls, other artefacts or soldiers’ graves.

Airport-related Structures

RCAHMS recorded from a 1946 vertical aerial photograph a pillbox located at the south-west edge of the former RAF Turnhouse airfield (A25), and close to the preferred tram route. Field survey confirmed that the pillbox survives as a roofless, brick-built structure c 3m across, set within a fenced enclosure and surrounded by hawthorn trees, scrub and overgrown with brambles. The NMRS holds photographic collections of Edinburgh Airport (B43).

Section 10 – Ingliston to Newbridge (Figures 11.1/8-10)

This route section would run west from Ingliston, crossing Eastfield Road and airport car parking areas, before joining the A8 at the Ingliston road end. The route would then run along the A8 carriageway for c 0.8km before heading south-west across arable fields and subsequently following the north side of the Glasgow-Edinburgh Railway south of Ratho Station village. It would then follow Harvest Road and Cliftonhall Road, before running along a road through Newbridge Industrial Estate. The final length would run along Old Liston Road, adjacent to Huly Hill, before crossing a grassy area adjacent to Newbridge Roundabout and terminating on the north side of Edinburgh Road. Field survey assessed all of this route section.

Cultural heritage features within the assessment corridor of this section include 18 Listed Buildings (L12-23, L26-31) and seven other architectural sites recorded in the NMRS (B44-50), an Inventory status designed landscape (D2), two Scheduled Ancient Monuments (S2-3) and ten other areas of archaeological interest (A26-34, A36). Of these, the preferred development route would intersect the site of Ratho Station (A29), run around part of the perimeter of the Huly Hill Scheduled Ancient Monument (S2), and terminate within an area where prehistoric archaeological remains have been revealed by recent archaeological field evaluation (A33). Several listed buildings (L12-17, L22) and a potential archaeological site (A36) lie adjacent to the preferred route.

Listed Buildings and other architectural features

There are four listed buildings within the former policies and landscaped grounds of Ingliston House, on the north side of the A8, in what is now the Royal Highland Showground. Ingliston House (L26), now the headquarters of Royal Highland and Agricultural Society, is a baronial style mansion erected in 1846 to replace an earlier building, and is Category A listed. The principal elevation faces east. There are open views south from the building, although the A8 road, along which the proposed tram would run, is partly screened by the policy walls and trees. A picturesque lodge (L12) was built at the same time, although it has later additions to the rear. The lodge, along with the adjacent four gatepiers and boundary walls, are Category B listed. It stands on the north side of the A8, and faces towards the proposed tram route, although views from the building are partly restricted by the boundary walls.

A little north-east of Ingliston House is the Stables and Gardener’s House (L27), built 1900/1902. There are glimpsed views of the proposed tram route from the south elevation of this building, with screening provided by trees, hedges and buildings. To the west of Ingliston House, the 18th century West Mains Of Ingliston farmhouse (L18) is a Category C(s) Listed Building. The original steadings has been demolished and replaced by modern office buildings. The farmhouse exists within this setting of more recent buildings, and views to the proposed tram route are substantially screened.
Several listed buildings are present within the Norton Estate lands on the south side of the A8 road. A row of early and mid 19th century single-storey cottages fronting onto the A8 at Middle Norton are mostly Category C(s) listed (L13-16). Open views of a section of the proposed tram route can be obtained from the front elevations of these buildings. Further south, the early 19th century Norton Mains farmhouse, steadings and garden walls are Category C(s) listed (L28). This property was not visited, although it appears to lie largely out of view of the proposed tram route (see also Figure 8.4).

Further west are several listed and other buildings associated with Norton House, now in use as the Norton House Hotel. The house itself, along with nearby stable block and walled garden, were built in the years around 1840 and are listed Category B (L19-20, L29). A kennels building and a keeper’s cottage forming part of this complex are also recorded by the NMRS (B45-46). No views of the proposed tram route can be obtained from these buildings (see also Figure 8.4).

The former west lodge (now a residential property named Demijohn Cottage) is Category C(s) listed (L21), along with its adjacent boundary walls and gatepiers. Trees enclose the property, and little or no view of the proposed tram route can be obtained (see also Figure 8.4). The North Lodge (L17), apparently currently unoccupied, lies on the south side of the A8 at the end of the northern drive to the Hotel. The lodge is a single-storey mid-19th century construction and, along with the adjacent late 19th century ashlar gatepiers and policy walls, is listed Category C(s). Open views of a section of the proposed tram route can be obtained from this building.

Two listed buildings at Newbridge fall within the assessment corridor. The Newbridge Inn, founded in 1683 and still in use as a public house, is listed Category C(s) (L23). A distant view of a short section of the proposed tram route would be visible beside Newbridge Roundabout, looking down Bridge Street, but would form a very minor addition to the townscape. The New Bridge over the River Almond, built c 1800 and repaired 1992, is B listed and now closed to vehicular traffic (L31). This structure is not intervisible with the proposed tram route (Figure 8.4).

The later 19th century villa named Hillwood House (L22) overlooks the proposed tram route at the former Ratho Station site. Along with its coach house and stables, Hillwood House is listed Category C(s). The east elevation of the villa forms the main façade of the building. The upper part of its north elevation looks down over the Glasgow-Edinburgh railway and the adjacent proposed tram route, in this area currently fenced waste ground and a railway compound reusing the former Ratho Station (A29).

The NMRS lists other unlisted architectural features, including the Royal Insurance Stand, Ingliston (B44), Beechbank at Newbridge (B47), a Newbridge townscape (B48), a proposed community hall location at Newbridge (B49), and a service station on Edinburgh Road at Newbridge (B50). The NMRS holds no records or collections relating to these sites.

**Designed Landscape**

Newliston designed landscape was laid out in the 1720s (D2). The *Inventory* classifies the landscape as having some scenic value, with its shelterbelts screening the park from outside but providing a woodland contrast to the surroundings that makes some contribution to the scenery. There is little or no intervisibility between the landscape and the proposed tram route (see also Figure 8.4).

**Archaeology**

Newbridge is an area of high archaeological sensitivity. The prehistoric burial mound and standing stones at Huly Hill, afforded protection as a Scheduled Ancient Monument (S2; extent of scheduling shown on Figure 11.1/10) appear to have formed a focal point for prehistoric and later burial and settlement activity. Three
standing stones are present around the barrow, although in the 1790s 12 appear to have been present (RCAHMS 1929, 95, no 131). The visible features stand within open grassy ground, partly screened by trees and bushes on all sides but the east, in which direction Newbridge roundabout, the A8 road and various modern commercial buildings and lampposts are visible, as well as Arthur’s Seat in the far distance. From the summit of the burial mound warehouses are visible over the screening to the south; houses and industrial buildings are partly visible to the north-west; and a shale oil bing is visible prominently in the distance above the screening to the west.

The only other visible archaeological monument in the vicinity of Huly Hill is the scheduled Lochend standing stone (S3). This stone may have formed part of an avenue leading to Huly Hill, of which all other above-ground traces have been removed. A modern industrial building obscures the view of the proposed tram route from this standing stone, and also the visual connection between the stone and Huly Hill.

Several recent archaeological excavations around Huly Hill have demonstrated that undeveloped land in the vicinity contains a concentration of buried archaeological remains of considerable significance.

To the south an archaeological evaluation (Discovery Excav Scot 1992, 54) and more recent excavations (Discovery Excav Scot 2001, 44-5) within the area now developed as Newbridge Industrial Estate discovered prehistoric features including an enclosure, pits, post-holes, a human cremation, a group of ring-ditches and an Iron Age cart burial. Medieval pits and cultivation remains were also identified (A30). As a result of its development, this area of land is considered as no longer archaeologically sensitive.

To the north of Huly Hill recent archaeological evaluation has revealed the plough-truncated remains of a small ring-gully, ditches, pits and a stone structure (Heawood 2003). This land has not been developed, and buried remains of these and other, as yet undiscovered, archaeological remains will survive (A33). To the east, a watching brief conducted in 1999 revealed nothing of archaeological significance (A31) and the results of ongoing archaeological work at Lochend (A34) are not known.

Newbridge is the reputed site of a battle (A32) that took place c AD 995 between the armies of Malcolm II, commanded by his brother Kenneth, and Constantine, the usurper (Hutchison 1868, 191). The battle is said to have ranged between Huly Hill (S2) and the Catstane (Edinburgh Airport). No certain physical remains of the battle are known, and hence its location is not annotated on Figures 11.1/9-10.

Little of archaeological significance has been discovered elsewhere along this route section. Long cist burials were found at Ingliston prior to 1868; the exact findspot is uncertain but probably lay within what is now the Royal Highland Showground (A26). Cormack (1971, 290-1) recorded that a weathered Roman carved stone (A27) was built into a wall of the stead ing at West Mains of Ingliston farm (L18). The original location of discovery of the stone is not known, although it could have derived from an undiscovered Roman site in the vicinity, or possibly from the Roman military and civilian complex at Cramond.

Vertical aerial photographs taken in 1973 show a curvilinear ditched soil mark and a penannular ditched feature in an arable field east of Ratho Station village (A36). These could be the buried remains of prehistoric features, although excavation would be required to test this hypothesis. There are no surface traces of these features.

The presence of a fermtoun at Norton was first recorded in 1290 (J Lawson, pers comm; A28). It was presumably removed to make way for the construction of Norton House and associated buildings and landscape in the years around 1840. The precise location of this site is not known. The proposed tram line would run through the site of the former Ratho Low Level Station, opened 1842 and closed
The station buildings have been demolished, although a raised platform is preserved, revetted by a c 1m high sandstone wall.

### 11.3.2 Assessment of Importance of Cultural Heritage Features

Using the criteria detailed in Section 11.2.3 and Table 11.1, Appendices 1, 2 and 3 contain an assessment of the importance of each cultural heritage site listed.

The World Heritage Site, New Town Gardens Designed Landscape (D3) and the New Town and West End Outstanding Conservation Areas (C1-2), which encompass the route section within the Edinburgh New Town (Sections 1-3 above), are considered to be of International Importance. The Listed Buildings within this route section (L34-173) are individually of National (Category A), Regional (Category B) or Local (Category C(s) Importance; non-statutory C), although they collectively form parts of a historic townscape of International Importance. Non-designated sites are of Local (B53-54) or Lesser Importance (B52), although the former comprise distinctive components of the New Town Gardens Designed Landscape.

Elsewhere between Haymarket and Newbridge, Scheduled Ancient Monuments (S1-3), Category A Listed Buildings (L5, L10, L26-27), Outstanding Conservation Areas (C3) and Inventory status Historic Gardens and Designed Landscapes (D1-D2) are considered to be of National Importance. Category B Listed Buildings are assessed as being of Regional Importance (L3-4, L6, L8-9, L11-12, L19-20, L24-25, L29-33), and Category C(s) Listed Buildings are of Local Importance (L1-2, L7, L13-18, L21-23, L28).

The sites and areas of archaeological interest are of varying levels of importance:

- Historic Scotland and CECAS consider the site of the medieval and later village of Nether Gogar (A24) to be of potentially schedulable quality. As such this site is classified as being of National Importance, although that part of the site already excavated (A24a) is of Lesser Importance since the archaeological interest in that area has been removed.

- The surviving archaeological remains around Huly Hill (A33) are of at least Regional Importance due to their likely association with the Scheduled Ancient Monument (S2).

- Several sites are of Local Importance. The site of a former dovecot at Roseburn (A2) is locally important due to its association with the listed Roseburn House. The fragmentary surviving designed landscapes associated with Old Saughton House (A8) and Castle Gogar (A22) are locally distinctive features, but are not considered to be of greater significance due to their poor quality of preservation. Gogar Loch (A19) once formed a locally distinctive landscape feature and, although it is uncertain how much has survived modern developments, it may contain deposits of palaeoenvironmental importance providing a context for the prehistoric remains excavated recently in the vicinity (A12-16). The Cromwellian skirmish at Gogar (A23) forms a distinctive feature of the history of that area. The pillbox at Ingliston (A25) relates to the earlier history of Edinburgh Airport.

- Several sites are of Lesser Importance. These include the field boundary discovered during archaeological excavations at Carrick Knowe (A3), and the former buildings that stood beside Saughton Mains Road (A5-6). The former railway stations at Saughton Junction (A7) and Ratho Station (A29) form elements in the transport history of West Edinburgh but are poorly preserved. Several sites destroyed as a result of their archaeological excavation and subsequent land developments (A9, A12-17, A30-31) are of
Lesser Importance, although had they survived they would be of greater importance (as is e.g. A33). Other sites within the assessment corridor have been destroyed without archaeological recording (A10-11, A18, A26). Findspots of artefacts are also of Lesser Importance (A1, A4, A27).

The level of importance of some sites is uncertain, as insufficient baseline information exists. The archaeological discoveries made in 1999 along the CERT line at Gogar (A20-A21) are likely to be of at least Local Importance, although their full extent, antiquity and complexity are not known. There are no known physical remains of either the Newbridge battle site (A32) or the Norton fermtoun (A28), and it is unknown if and where any buried remains survive. The results of recent archaeological work at Lochend are not known (A34). Two sites discovered from analysis of vertical aerial photographs (A35-36) may be of archaeological significance, but excavation would be required for a reliable assessment of their importance to be made.

Most of the architectural sites of interest recorded in the NMRS are considered to be of Lesser Importance. The exception are those unlisted properties that lie within the Coltbridge and Wester Coates Conservation Area (B1-5) and the lodges associated with the listed Gogar Park (B41-42), which are of Local Importance, and the kennels and keeper’s cottage at Norton House Hotel (B45-46), which are associated with a group of Category B listed structures and can be considered as being of Regional Importance by association.

11.3.3 Assessment of Archaeological Potential of the Study Area As a Whole

The potential for the proposed development locations to contain buried and as yet undetected remains of archaeological interest varies considerably between, and in some cases within, the limits of deviation of each route section (Table 11.4).

Table 11.4 Assessment of Archaeological Potential By Route Section

<table>
<thead>
<tr>
<th>Section</th>
<th>Potential</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Negligible</td>
<td>Heavily developed and landscaped.</td>
</tr>
<tr>
<td>6</td>
<td>Negligible / Low</td>
<td>Landscaped around Murrayfield Stadium and beside Baird Avenue; areas of negligible potential. Archaeological trial trenching along the route through Carrick Knowe golf course revealed little of archaeological interest (A3); area of low archaeological potential.</td>
</tr>
<tr>
<td>7</td>
<td>Low</td>
<td>Mostly landscaped road verges. Preservation of buried remains most likely to occur around the Old Saughton House designed landscape (A8).</td>
</tr>
<tr>
<td>8</td>
<td>Negligible / Moderate</td>
<td>Mostly heavily developed and landscaped, with negligible potential. Buried land surfaces may be sealed beneath the dumped overburden between Edinburgh Park and the railway, with moderate potential for archaeological remains being present.</td>
</tr>
<tr>
<td>9</td>
<td>High / Negligible</td>
<td>Arable land between Gogar and Ingliston is highly sensitive in archaeological terms, as indicated by records of known sites. The airport zone is heavily developed and landscaped, with little archaeological potential.</td>
</tr>
</tbody>
</table>
### Potential Discussion

<table>
<thead>
<tr>
<th>Section</th>
<th>Potential</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>High / Negligible</td>
<td>Arable land between A8 and Ratho Station has good potential to preserve buried remains. The route section between Old Liston Road and the proposed Newbridge terminus, around Huly Hill, is also highly sensitive. Elsewhere, the proposed line crosses areas of developed land, or follows existing roads, with little or no archaeological potential.</td>
</tr>
</tbody>
</table>

#### 11.3.4 Predicted Baseline Conditions in 2009

It is not possible to predict future baseline conditions of most cultural heritage features accurately. Assuming that no land development takes place, baseline conditions of archaeological sites are likely to remain broadly unchanged. The conditions of listed buildings and other buildings of architectural interest may change as a result of alteration, extension or demolition. Planned or ongoing developments that may affect the cultural heritage baseline include the development of the Gogarburn Hospital site and the construction of the WEBS guided busway.

#### 11.4 CONSTRUCTION EFFECTS

##### 11.4.1 Potential Impacts

**Construction of Tram Route and Ancillary Features**

Most construction impacts upon cultural heritage resources, that involve e.g. ground-breaking works that would cause direct impacts on heritage features, or the erection of development features that would cause indirect, visual impacts, are permanent in nature. Such impacts are considered in the Permanent and Operational Effects section below. However, certain construction effects may be temporary in nature and affect the settings of cultural heritage receptors. These relate, for example, to the effects of increased visual intrusion (e.g. through the presence of construction works or the erection of temporary structures), dust, construction noise and vibration upon receptors in the immediate vicinity of the development works. The erection of safety fencing around the construction works would form one of the most visible elements of the construction phase, particularly where erected along the New Town streets (Sections 1-3) where views and vistas would be temporarily blocked or obscured.

Based upon the Limits of Land to be Acquired or Used (LLAU) defined for the route, the following receptors are most likely to undergo indirect construction effects:

- The Edinburgh New Town, St Andrew Square to Haymarket (C1-2, D3, L34-173), within the World Heritage Site
- Jenners Depository (L6).
- Castle Gogar lodge (L8), Castle Gogar (L10) and Gogar Church (L11).
- Ingliston House lodge (L12), Middle Norton cottages (L13-16), Norton House Hotel North Lodge (L17).
- Hillwood House (L22).
- Huly Hill Scheduled Ancient Monument (S2).
**Construction Compound Sites**

Fourteen potential construction compound locations have been identified. Only two of these are located in areas of known cultural heritage significance. The potential site opposite the Saughton House HMSO buildings would have a direct impact upon any surviving buried remains of the relict designed landscape associated with Old Saughton House (A8), but otherwise lies within an area of low archaeological potential. The proposed Gogar Burn compound lies within an area of known archaeological features (e.g. A21), where direct impacts on buried archaeological remains might occur. Direct impacts could occur on currently unidentified buried archaeological remains at the other potential compound sites, although of these only those at Edinburgh Park and Ingliston Park and Ride lie in areas of moderate or high archaeological potential, whereas the rest lie in areas of low or negligible archaeological potential (Table 11.4).

**11.4.2 Mitigation**

General comments regarding mitigation strategy are provided in the Permanent and Operational Effects section below.

**Construction of Tram Route and Ancillary Features**

At this stage the nature of the proposed construction works and schedules are not known in any detail, restricting the extent to which mitigation can be proposed.

There may be some potential for controlling the construction works in such a way that visual effects in the New Town (Sections 1-3) are reduced, e.g. by the erection of fencing along limited lengths of street at any one time, leaving breaks from which views can be obtained.

Elsewhere (Sections 4-10), it may be appropriate to erect temporary screening during construction works to prevent problems arising from increased dust and noise levels occurring at certain properties adjacent to the route (e.g. Castle Gogar lodge (L8), Castle Gogar (L10) and Gogar Church (L11)). The effects of vibration on sensitive receptors located adjacent is discussed in Chapter 13 of the ES.

**Construction Compound Sites**

A watching brief would be conducted during any ground-breaking works associated with the formation of construction compounds located in areas of currently undeveloped land in Sections 7-9 to identify and record any buried archaeological remains present. No mitigation would be required at the other potential sites.

**11.4.3 Residual Impacts**

**Construction of Tram Route and Ancillary Features**

The construction works within the World Heritage Site (Sections 1-3) are likely to have Moderate or Major adverse temporary effects, particularly where important views or vistas are blocked or obscured.

Elsewhere (Sections 4-10), the construction works might cause minor and temporary indirect impacts upon the settings of certain Listed Buildings present close to proposed development locations (e.g. L6, L8, L10, L11). It is considered unlikely that the temporary construction effects would lead to significant or irreversible adverse impacts occurring on cultural heritage interests.

**Construction Compound Sites**

Utilization of the potential Saughton House site could have a partial and material effect on the surviving remains of the Old Saughton House designed landscape (A8). The impact would be of uncertain magnitude and significance, since the extent of survival of buried remains of this site is not known. It is not possible to
assess the impact of the proposed development upon any other currently unidentified buried archaeological remains present at this or any other proposed construction compound location.

11.5 PERMANENT AND OPERATIONAL EFFECTS

The potential impacts of the proposed development upon the cultural heritage baseline are assessed by route section. In what follows the potential direct impacts of fixing the overhead line equipment to Listed Buildings, and other non-listed buildings within Conservation Areas, are not assessed, as the indicative scheme design is not specific as to which buildings could be affected.

11.5.1 Potential Impacts

Sections 1-3 – St Andrew Square to Haymarket Terrace

Potential direct effects may occur on a range of Listed Buildings and other features of architectural interest within this route section. The following assessment is based upon the limits of deviation assumed above (Section 11.2.2); adjustments to the preferred route or limits of deviation would require reassessment of those features that might be directly affected.

At Haymarket the Category C(s) listed Caledonian Alehouse (L173) would require to be demolished to accommodate the tram line through a realigned Haymarket transport interchange. It may also be necessary to alter or demolish the steps and lamp standard associated with the Category A listed Haymarket Station (L171). The Category C(s) listed Heart of Midlothian War Memorial (L167) might also require re-siting locally. Elsewhere, 15 Listed Buildings might be wholly or partly directly affected by the proposed scheme. The potentially affected features mostly comprise historic street furniture (decorative iron railings and/or lamp standards) associated with Listed Buildings, located mainly around St Andrew Square (L34, L39-40, L46-47, L51-52, L54-55, L57) but also at St John’s Church (L120) and at the West End (L153-154). The Monument to John, 4th Earl of Hopetoun (L49) and a police call box at West Princes Street Gardens (L116) might also be affected. Three unlisted railings might be affected (B52-54).

Alterations would be required to the garden areas to either side of Shandwick Place, located within the crescent formed by Atholl Crescent and Coates Crescent (and partly within the New Town Gardens Designed Landscape (D3)), involving setting back the roadside pavements and garden boundary walls by up to 2m.

Potential indirect, visual effects would occur on the setting of the World Heritage Site, New Town Gardens Designed Landscape (D3) and New Town and West End Outstanding Conservation Areas (C1-2). Potential visual impacts would occur on many of the 140 Listed Buildings (L34-173) present within the frontages beside the proposed route and within adjacent open spaces, such as Princes Street Gardens and St Andrew Square. The effects would arise mainly through the introduction of the overhead line equipment, signage and signalling equipment, and tram stops into the streetscapes. This would be particularly significant where there are no existing permanent vertical elements in the street, such as along Princes Street.

As the Listed Buildings form components of an extensive townscape of international historic and architectural importance, potential visual effects on their settings are more appropriately assessed collectively by street or area, rather than individually. However, the presence of these new built features would potentially adversely affect some key views and vistas of cultural heritage significance, such as:

- Edinburgh Castle and the Old Town skyline seen from Princes Street.
- Edinburgh Castle seen from Castle Street and Frederick Street.
- The Royal Scottish Academy (L85) seen from Hanover Street.
• The Scott Monument (L74) seen from South St David Street.
• Along Princes Street to Calton Hill.
• Along George Square to St Andrew Square.
• The Scottish National Portrait Gallery (L36) viewed along Queen Street.

Sections 4-5 – Haymarket Terrace to Murrayfield

There are no known receptors at proposed development locations, and the archaeological potential of this route section is negligible; thus no direct impacts are predicted. The proposed development route is not intervisible with the Colstoun and Wester Coates Conservation Area (C3). Of the Listed Buildings identified, four (L1-2, L32-33) are not intervisible with the proposed tram route and no indirect impacts would occur. Russell Road railway bridge (L3), Roseburn Primary School (L4) and Roseburn House (L5) may receive very minor indirect, visual and noise impacts. No setting issues arise in relation to the other sites of architectural interest (B1-24, B51); these either are not intervisible with the proposed development, do not have settings that include proposed development locations, have been demolished, or are of minimal cultural heritage significance. The archaeological site and findspot (A1-2) do not have settings that would be affected by the proposed development.

Section 6 – Murrayfield to Carrick Knowe

A direct impact would occur from the construction of a footway at the proposed Balgreen Road tram stop across the line of the listed boundary fence defining the southern side of the Jenners Depository (L6). The proposed development would also affect the Depository's setting.

The construction of the tram alignment across the buried remains of a field boundary in Carrick Knowe Golf Course (A3) would have a direct impact on that feature. A direct impact would also occur on any buried and undetected remains present at proposed development locations through Carrick Knowe Golf Course. There would be no impact on the remaining sites identified along this route section – the findspot of the cup-marked stone (A4) is unknown, and the other sites (B25-B29) are of minimal heritage significance.

Section 7 – Carrick Knowe to Hermiston Gait

Any surviving buried remains of the northern end of the Old Saughton House designed landscape (A8) would be directly affected by the construction of the tram line and proposed Saughton Road North tram stop. All other identified sites lie outside proposed development locations, and would not receive any impact. The archaeological sites (A5-7) do not have important settings that would be affected by the proposed development.

Of the sites of architectural interest noted by the NMRS, most (B32-35) lie north of the embankment of the Glasgow-Edinburgh railway line and are not visible from the proposed development locations (see also Figure 8.4). The tram route and Saughton Road North tram stop would be visible from the 76 Saughton Mains Street (B30) and the HMSO Offices on Broomhouse Drive (B31), but the settings of those properties do not extend into the proposed development locations.

Section 8 – Edinburgh Park to Gogar Roundabout

Several archaeological sites were formerly present in this area (A9-18), although none lay within proposed development locations; all were destroyed with the construction of the buildings and associated landscaping within Edinburgh Park, most with prior archaeological recording (A9, A12-17) but some without (A10-11, possibly A18).
The proposed route may cross part of the former Gogar Loch (A19), although it is not known what has survived the development of Edinburgh Park and how any surviving remains might be affected by the proposed construction of the tram route. There would be no indirect impacts on the architectural sites recorded by the NMRS in the vicinity of the proposed route (B36-40). Direct impacts could occur on any buried, undetected archaeological remains surviving in the area of undeveloped ground between the Glasgow-Edinburgh railway and the buildings of Edinburgh Park to the north.

Section 9 – Gogar Roundabout to Airport Terminal

Potential direct impacts would occur on five sites as a result of the development of this section of tram route. The route would intersect the tree-lined avenue forming part of the relict Castle Gogar designed landscape (A22), a little north of Castle Gogar lodge (L8); the suspected site of the medieval and later settlement of Nether Gogar (A24); and the remains of a hearth discovered during previous archaeological field evaluation along the CERT route (A21). A potential pit alignment (A35) and a WWII pillbox (A25) lie within the limits of deviation, and may be directly affected. Direct impacts would also occur on any buried, as yet undetected, archaeological remains present elsewhere within the route section.

Potential indirect, visual and noise effects could occur on a range of receptors present in the vicinity of the proposed route. These include the Castle Gogar lodge, bridge and mansion (L8-10), the former Gogar Church (L11), Gogar Park and associated grounds (L7, B41-42), Gogarburn House and associated grounds (L24), and Gogar Mount North Lodge (L25). Of these, Castle Gogar lodge and Gogar Church lie closest to the development route and would be likely to undergo the greatest magnitude effects.

The remaining sites in the wider vicinity of the proposed development route would not be affected. They variously would not be intervisible with the proposed development (D1); are buried remains with no demonstrable wider setting (A20); have no known physical remains (A23); or are of minimal cultural heritage significance (B43).

The setting of the Gogar Mains Scheduled Ancient Monument (S1) is very localised and focussed upon the scarp above the Gogar Burn, and does not extend to the proposed development locations.

Section 10 – Ingliston to Newbridge

Potential direct impacts would occur on four sites identified along this route section. The route would run along part of the perimeter of, or within, the scheduled area of Huly Hill burial mound and standing stones (S2). It is likely that buried archaeological remains associated with the visible monuments are preserved within the limits of deviation of the proposed scheme, although it is not possible to be precise about where. The construction of the terminus of the tram line would disturb part of a suite of buried prehistoric remains recently identified during an archaeological evaluation (A33).

Other undeveloped land around Huly Hill is also highly likely to contain buried archaeological remains that would be affected by the construction of the tram. Elsewhere, the potential buried archaeological site east of Ratho Station village (A36), revealed through analysis of vertical aerial photographs, lies within the limits of deviation, and associated remains may extend across the indicative tram route. The tram line would also be aligned through the former site of Ratho Station (A29), now mostly demolished. Ground-disturbing works have the potential to disturb buried, as yet undetected, archaeological remains in zones of archaeological survival (Table 11.4).

A potential indirect, visual impact would occur on the setting of Huly Hill (S2), through the addition of overhead line equipment to the existing developed and
landscaped surroundings of the monument. Several listed buildings would also receive indirect impacts (L12-18, L22-23, L26-28). Elements of Norton House Hotel, North Lodge (L17) lie within the limits of deviation, and these listed structures may be directly affected.

The remaining receptors would undergo no impact. In several cases this is because there would be little or no intervisibility between proposed development features and receptors (L19-21, L29-31, B45-46, D2, S3, A28). In other cases the sites have been destroyed or have no known physical remains (A26, A28, A30-32, A34), have no wider setting (A27, B47), or are of minimal cultural heritage significance (B44, B48-50).

11.5.2 Mitigation

The preferred mitigation strategy is to preserve in situ and in an appropriate setting all cultural heritage resources. The preferred alignment has been designed to avoid direct effects wherever possible and to minimise potential indirect effects. Site-specific mitigation measures are proposed to avoid, reduce or offset some of the remaining potential impacts detailed above, based upon the indicative design.

Except where otherwise stated, all archaeological mitigation works would take place prior to the commencement of development construction works, and would be detailed in a Written Scheme of Investigation (WSI) approved in advance by CECAS and/or Historic Scotland as appropriate. The WSI would make provision for appropriate post-excavation analyses and dissemination of the results of the mitigation works, as well as for archiving of the project materials and records. Certain works would require the prior granting of Scheduled Monument Consent (ie at Huly Hill, S2) or Listed Building Consent (eg Jenners Depository, L6; Caledonian Alehouse, L173).

Sections 1-3 – St Andrew Square to Haymarket Terrace

In general terms the mitigation for impacts is to design the tram system well, so that it fits comfortably into the historic townscape as far as possible. A Design Manual is being progressed for Tram Line 1 by tie that sets out the principles of design and detailing to be followed in the final design, including the whole of the World Heritage Site. Points in the Design Manual that are specifically intended to reduce the visual impact of the scheme upon the cultural heritage include:

- Careful design of the overhead line equipment to simplify the layout and minimise the size of the wiring.
- Use of visually appropriate methods of overhead line equipment support.
- Integration of the overhead line equipment supports with other vertical elements in the street (lighting and signing poles) as far as possible.
- Simple alignment of the tram track to avoid as far as reasonably possible the need for complex overhead line equipment, including straight alignments along the streets to respect the formality of the New Town urban design. At Haymarket, for example, this would reduce the visual impact of the scheme on the designed vistas looking westwards along Shandwick Place / West Maitland Street.
- Location of tram stops and support poles to avoid disrupting key axial views and vistas, eg down the cross streets connecting with Princes Street. The Princes Street stop would be located so that it would not affect the view across to Edinburgh Castle from Castle Street, and the stops in St Andrew Square would be sited so as not to impact on views of the square from George Street.
Mitigation responses have been proposed for all sites within this section that might undergo potential direct effects. Detailed standing building and photographic survey, both internal and external, to RCAHMS standards is proposed in relation to the Caledonian Alehouse (L173) in advance of its demolition. Any elements of the Haymarket Station to be altered or removed (L171) should be similarly recorded by photographic and standing building survey, as should the Heart of Midlothian War Memorial (L167) if it cannot be preserved or relocated. Monitoring of demolition works would also be undertaken, to allow recording of any other features and fittings that came to light and to retrieve and conserve representative examples of architectural and decorative elements of the fabric of these structures. It may be appropriate to monitor any further groundworks beneath the structures to allow the identification and recording of any buried remains of archaeological or historical significance.

Detailed standing building survey is proposed should a direct impact on the police box at West Princes Street Gardens (L116) be unavoidable, although it may also be possible to relocate the structure into an appropriate alternative setting. For all other sites within the limits of deviation where direct impacts may occur a detailed photographic record is proposed in the event of physical impacts being proposed, although depending upon the nature of the development works further mitigation responses might be necessary, such as detailed standing building survey, salvage works during demolition operations, or documentary research.

Sections 4-5 – Haymarket Terrace to Murrayfield

No mitigation is necessary.

Section 6 – Murrayfield to Carrick Knowe

The southern boundary of the Jenners Depository site would be carefully relocated northwards by c. 3m to accommodate the route of the walkway at the proposed Balgreen Road tram stop. The boundary feature would be dismantled and rebuilt to the highest standards, to ensure that the integrity and setting of the listed complex is not compromised. A photographic record would be made of the site before and after the modifications were effected. Other identified sites require no mitigation. A watching brief would be conducted during ground-breaking works along the Carrick Knowe section of the route, in order to identify and record any buried archaeological remains present, including the relict field boundary (A3).

Section 7 – Carrick Knowe to Hermiston Gait

A watching brief would be conducted along those sections of the proposed tram route which have the potential to preserve buried archaeological remains, including the area of the Old Saughton House designed landscape (A8). Further investigation would be required to establish precisely which areas would be suitable for archaeological monitoring, as it is possible that substantial lengths of this route section may have been disturbed in the recent past during activities such as laying services (as indicated by e.g. the gas governor and electricity sub-station on the east side of Broomhouse Road) or landscaping. Other identified sites require no mitigation.

Section 8 – Edinburgh Park to Gogar Roundabout

It is recommended that any geotechnical cores obtained during engineering site investigation works in the area around the Gyle Roundabout and Lochside Crescent be retained for examination by a palaeoenvironmental scientist, along with any borehole and trial pit records. This would allow professional opinion to be obtained as to whether there are any preserved remains of the Gogar Loch (A19) present, and would allow their level of importance to be assessed, enabling it to be established how the remains might be impacted by the proposed construction works. This information would permit further mitigation responses to be developed as appropriate in consultation with CECAS.
Other identified sites require no mitigation. Further consultation would be required to establish whether or not a watching brief would be required during ground-breaking works in the area of undeveloped land north of the Glasgow-Edinburgh railway. Further details of the proposed construction and landscaping proposals would be required to establish whether ground-breaking works would penetrate to the likely levels at which archaeological deposits may survive (i.e. currently sealed beneath a considerable depth of dumped modern overburden).

**Section 9 – Gogar Roundabout to Airport Terminal**

The crossing point of the Castle Gogar avenue (A22) should be constructed in a way that minimises the removal of trees. The vertical elements of the overhead line equipment should be designed to minimise their visibility when viewing along the avenue from north or south. This would also reduce the level of indirect, visual impact of the development upon Castle Gogar lodge, gates and gatepiers (L8). It may be appropriate to introduce sensitively designed additional planting or screening to reduce the visual and noise impact of the scheme on the lodge and strengthen the avenue of trees as a landscape feature, and thus retain as far as is possible the currently very secluded setting of the lodge. It is inevitable that tram signalling and signage at the crossing point of the avenue would require to be visible to traffic using the drive to Castle Gogar. Maximising the distance between the listed structures (L8) and the tram route as built would also assist in reducing the level of impact on the setting of the lodge.

A mitigation strategy has been agreed with CECAS that would ensure the survival *in situ* of the suspected buried remains of the Nether Gogar settlement (A24). The tram route would be built on made ground above the existing ground level without requiring any excavations below the present ground surface, hence avoiding a direct impact on the archaeological resource. An archaeological field evaluation would be conducted at an early stage to establish the nature, depth and fragility of the archaeological remains of this settlement present at proposed development locations. This would establish what thickness of made ground would be required, and hence an engineering solution, to ensure that the construction and operation of the tram would not compress or distort any buried remains. The finalised design would need to avoid causing additional adverse impacts upon the setting of the adjacent Gogar Church (L11).

An archaeological field evaluation would be conducted elsewhere along this route section (but not within the already developed land at Edinburgh Airport). Machine trial trenching would examine a minimum of 5% of the proposed development areas. This work would be undertaken prior to the commencement of construction works, to establish the presence, extent, depth, date, function, condition and quality of any buried archaeological remains present within those areas, including any buried remains of the relict Castle Gogar designed landscape (A22), the potential pit alignment (A35), and the hearth discovered during previous archaeological evaluation along the formerly proposed CERT line (A21). It would allow further mitigation responses to be developed as appropriate, such as set-piece excavations, or conducting watching briefs during construction works. Entirely negative results might require no further archaeological response, although previous evaluation work carried out along the CERT line indicates that discoveries of archaeological significance can be expected in this area (cf. A20-21). If the WWII pillbox (A25) cannot be preserved *in situ*, an appropriate record should be made of the remains of this structure, through standing building recording and excavation, prior to its destruction.

There is limited scope for reducing the indirect impacts of the proposed tram on the settings of key receptors in the vicinity. The arrangement of overhead line equipment where the route passes Gogar Church (L11) should be designed to minimise its visibility when stood in the graveyard looking outwards to the west (e.g. by maximising the spacing between poles within technical limits). Notwithstanding the need to preserve the suspected buried remains of the Nether Gogar settlement (A24), the earthwork supporting the tram should be designed such that it is not prominently visible from the graveyard. It may be possible to reduce visual and
noise impacts through the sensitive screening of the tram route as it passes the church. Mitigation for reducing the indirect impact on Castle Gogar lodge (L8) is considered above. Reduction of the potential indirect visual and noise effects on Castle Gogar (L10) could be achieved by the introduction of appropriate screening along the tram route, e.g. between the line and the southern perimeter of Castle Gogar, and on the east side of the line at East Mains of Inglisston, where the west elevation of the building would be visible in the middle distance as the tram line heads northwards towards Edinburgh Airport.

For other receptors in the vicinity mitigation is not necessary (L9, L7/B41-42, L24-25). Other sites not mentioned would receive no impact, and require no mitigation.

Section 10 – Ingliston to Newbridge

A programme of archaeological mitigation works would be undertaken along any areas to be developed on the north side of Old Liston Road and to the east of Huly Hill Scheduled Ancient Monument (S2), as far north as Edinburgh Road. The precise nature of the archaeological works would depend upon the finalised development design and proposed ground level changes, but would be likely to include prior archaeological evaluation and excavation, and/or a watching brief during construction works. The aims of this work would be to identify and fully record any archaeological remains present within the proposed development areas.

A programme of archaeological excavation and recording would be undertaken within proposed development locations to the north of Edinburgh Road, Newbridge (A33). This work would be undertaken prior to construction works commencing, and to a specification and sampling strategy agreed with CECAS. A photographic record should be made of the current condition of Ratho Station (A29). An archaeological field evaluation would be conducted elsewhere along this route section where the potential exists for buried archaeological remains to survive, including the putative enclosure site east of Ratho Station (A36) (Table 11.4). The aims, methods and potential consequences of this work are set out in relation to Section 9 above. It is recommended that the positioning of poles immediately in front of those Listed Buildings (L12-17) beside the A8 route section be minimised, and preferably avoided. Screening may assist in reducing noise and visibility. If direct effects on Norton House Hotel, North Lodge (L17) cannot be avoided, an appropriate level of photographic and standing building recording would be conducted on those features to be impacted, and in accordance with any Listed Building Consent conditions. No mitigation is proposed in relation to the other Listed Buildings that would undergo indirect effects.

11.5.3 Residual Impacts

Table 11.5 summarises the residual impacts of the proposed development upon sites that would be affected along the preferred route, taking into account mitigation measures. Other potential but currently unquantifiable direct effects, where features are located off-line but within the limits of deviation, are considered below, but are not included in Table 11.5.

Sections 1-3 – St Andrew Square to Haymarket Terrace

Only one site within this section would certainly receive a direct impact. The Caledonian Alehouse (L173) would require to be demolished to make way for the tram line to approach the proposed tram stop on Haymarket Terrace. This would constitute a high magnitude effect upon a resource individually of Local Importance, which would result in a Moderate adverse effect occurring.

Potential direct effects could occur on a range of Listed Buildings and other features of architectural interest, although the nature and magnitude of impact cannot be predicted at this stage. Direct effects upon the Category C(s) listed Heart of Midlothian War Memorial (L167) or the Police Box at West Princes Street Gardens (L116) may cause significant adverse effects, although if the structures could be sensitively relocated to an appropriate setting then the impacts could be neutral in
effect. Direct effects upon the Monument to John, 4th Earl of Hopetoun (L49) or historic street furniture associated with various Category A listed buildings around St Andrew Square (L34, L39-40, L46-47, L51-52, L54) or at the West End (L120, L153) and Haymarket Station (L171) are likely to be Major and adverse in nature. Direct effects upon historic street furniture associated with Category B listed buildings (L55, L57, L154) and unlisted railings (B52-54) are likely to be of Minor or Moderate magnitude and adverse in effect.

Visual effects would occur on the setting of the Edinburgh New Town, within the World Heritage Site, New Town Gardens Designed Landscape (D3), New Town and West End Conservation Areas (C1-2) and many of the 140 Listed Buildings present along the assessment corridor within those Conservation Areas (L34-173). As these designated sites and areas form part of a coherent townscape of international historic and architectural importance, the effects on the area are assessed as a whole.

The effects would arise mainly through the introduction of the overhead line equipment into the streetscapes along Shandwick Place, Princes Street and around St Andrew Square. The presence of the overhead line equipment would affect some key views, such as Edinburgh Castle and the Old Town skyline seen from the north side of Princes Street (particularly between Castle Street and Hanover Street), the Scott Monument (L74) seen from South St David Street, and the Scottish National Portrait Gallery (L36) viewed along Queen Street. Other views, such as from Edinburgh Castle across the New Town, would be less affected as the elements of the scheme would be less visible from greater distances. The presence of the tram stop along Shandwick Place, along with the roadside modifications required to accommodate it, would also affect the setting of the garden crescent between Coates Crescent and Atholl Crescent, as well as the setting of the Gladstone Memorial (L149).

The magnitude of visual effects would be high in some areas (e.g. St David Street, Princes Street) and medium in others (e.g. Haymarket, West Maitland Street). However, cumulatively the indirect effect of the scheme upon the cultural heritage of the assessment corridor within the New Town would be Major and adverse.

Section 4-5 – Haymarket Terrace to Murrayfield

No significant effects would occur on cultural heritage interests along this route section. Very slight, neutral and non-significant changes to baseline may occur in relation to views from Russell Road railway bridge (L3), Roseburn Primary School (L4) and Roseburn House (L5). Limited views of the parts of the tram route may be visible from these receptors, although in no case would such views affect the settings of the listed buildings. The tram may also add very slightly to the background traffic noise detectable from the listed buildings at Roseburn (L4-5).

Section 6 – Murrayfield to Carrick Knowe

The proposed construction of Balgreen Road station would have a Minor direct adverse effect upon the listed buildings at the Jenners Depository (L6), through the requirement to realign part of the southern boundary of the complex. The construction would lead to the removal of the scrubby woodland currently obscuring views of the Depository from the cycleway running along the railway embankment to the south. The opening up of this area would increase the visibility of this important complex of commercial buildings from the south, allowing greater appreciation of them, which would be a beneficial impact of the scheme.

The construction would increase the external noise experienced from within the complex. However, the Depository was built next to an operational and busy railway line, with the external noise volume presumably not a consideration in its siting, and the nature of the proposed development is in keeping with the railway setting of the complex. On balance, the impact of the proposed development on the Jenners Depository would be Minor, with both adverse and beneficial aspects.
The partial disturbance of the relict field boundary in Carrick Knowe Golf Course (A3) would not constitute a significant effect on the archaeological resource. The impact of the proposals on any undetected archaeological remains cannot be assessed.

Section 7 – Carrick Knowe to Hermiston Gait

No significant impact would occur as a result of the construction of this section of the tram route. The partial disturbance of any surviving buried remains of the Old Saughton House designed landscape (A8), taking into account mitigation, would not constitute a significant impact. The impact of the proposals on any undetected archaeological remains cannot be assessed.

Section 8 – Edinburgh Park to Gogar Roundabout

No significant impacts would occur in relation to cultural heritage interests along this route section. The impact of the proposals on the site of Gogar Loch (A19) and any undetected archaeological remains within the areas of undeveloped land cannot be assessed reliably from current baseline information.

Section 9 – Gogar Roundabout to Airport Terminal

The mitigation proposed in relation to Nether Gogar (A24) would ensure that the direct and indirect impacts of the proposed development would be imperceptible, and not significant. The presence of the tram would also assist in ensuring the long-term preservation of this site, thus providing a beneficial impact of the proposed development. The construction of the tram route across the Castle Gogar avenue (A22) would cause a partial but material change to its character and setting. A direct impact would occur through the felling of trees, and an indirect impact would occur through the visibility of development features when looking along the avenue. The construction of the tram would also cause a direct impact upon the remains of a hearth (A21), although the significance of that effect is uncertain. The magnitude and significance of any direct effects of the scheme upon a suspected archaeological site (A35) and a WWII pillbox (A25) present off the preferred line but within the limits of deviation cannot be reliably assessed, although the removal of the pillbox, a locally important feature, would constitute a Moderate adverse effect. The impact of the proposals on any undetected archaeological remains cannot be assessed.

Although Castle Gogar lodge (L8) lies within a very secluded setting, the tram route would be visible from its front elevation and would increase the directions from which traffic noise would be received. Together these factors would alter the baseline condition of the setting of the building, but if sensitively designed and mitigated the impact of the scheme may be only Minor and adverse. The tram route would also be visible from the west side of Gogar Church and graveyard (L11), although the setting of the church is relatively self-contained and secluded by the trees around the boundary of the graveyard. If sensitively designed, the overhead line equipment and raised track bed would not fundamentally affect the setting of the Listed Building. The intermittent reductions in visibility and increased traffic noise caused by passing trams would constitute another change to baseline conditions, and this might be reduced through the introduction of sensitive screening.

The proposals would not cause significant indirect effects on any other external receptors. Gogar Park (L7; B41-42) and Gogarburn House (L24) and their self-contained grounds are screened from the proposed tram route by mature trees, and a busy trunk road is present between the receptors and the proposed development. The magnitude of impact would be imperceptible, and the nature of the impact neutral. The same is also true for Gogar Mount North Lodge (L25), in this case with the additional screening of the proposed route provided by the rising ground on the north side of the A8 road, although it is possible that the overhead line equipment might be visible in the distance. The setting of this building is in any case defined principally by its relationship to the other buildings and policies of Gogar Mount,
located to the south. With appropriate mitigation, the residual indirect effect on Castle Gogar (L10) would not be significant.

Section 10 – Ingliston to Newbridge

The potential low magnitude disturbance to the scheduled area of Huly Hill (S2), as well as other areas immediately outside the scheduled area, would constitute a significantly adverse direct impact. Low magnitude indirect impacts on the setting of the monument are also likely to occur through the addition of overhead line equipment to the existing developed landscaped surroundings of the monument, particularly to the east where the monument is not screened.

The loss of the prehistoric remains north of Huly Hill (A33), albeit with prior archaeological recording, would represent a significant direct impact. The disturbance of the remains of Ratho Station (A29) would not be significant. The potential direct impact on the potential archaeological site A36 cannot be assessed on the basis of the available baseline. The impact of the proposals on any undetected archaeological remains cannot be assessed.

None of the Listed Buildings in the vicinity of the proposed tram route would undergo indirect effects that are considered to be significant. Those properties adjacent to the A8 road (L12-17) already front onto a busy and noisy transport corridor, and minimising the placement of poles directly in front of the buildings with screening where appropriate would reduce the visual impact of the tram infrastructure upon their settings. With this mitigation in place, the impacts would not be significant. The magnitude and significance of potential direct effects upon the Norton House Hotel North Lodge (L17) cannot be assessed.

Hillwood House (L22) overlooks the proposed tram route, here currently fenced waste ground and a railway compound reusing the former Ratho Station (A29). The development of this area might slightly improve the setting of the Listed Building. Hillwood House was first built when the Glasgow-Edinburgh railway and station was already in existence, and thus the nature of this proposed development, including a tram stop, would be in keeping with the historic land use of this immediate area. Other Listed Buildings may receive indirect impacts from the construction and operation of the tram but, as all lie at greater distance from the proposed route and are partly or substantially screened by trees or buildings, in all cases the new development would be barely discernible and impacts would be neutral and non-significant (L18, L23, L26-28).

Table 11.5 – Summary of Assessment of Residual Impacts

<table>
<thead>
<tr>
<th>Route section</th>
<th>ID</th>
<th>Site</th>
<th>Effect Type</th>
<th>Site Importance</th>
<th>Effect Magnitude</th>
<th>Significance of effect</th>
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<tr>
<td>1-3</td>
<td>C1-C2 D3 L34-L173</td>
<td>Edinburgh New Town</td>
<td>I, A</td>
<td>International</td>
<td>Medium / high</td>
<td>Major</td>
</tr>
<tr>
<td>3</td>
<td>L173</td>
<td>Caledonian Alehouse</td>
<td>D, A</td>
<td>Local</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>5</td>
<td>L3</td>
<td>Russell Road, railway bridge</td>
<td>I, N</td>
<td>Regional</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>5</td>
<td>L4</td>
<td>Roseburn Primary School</td>
<td>I, N</td>
<td>Regional</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>5</td>
<td>L5</td>
<td>Roseburn House</td>
<td>I, N</td>
<td>National</td>
<td>Imperceptible</td>
<td>Minor</td>
</tr>
<tr>
<td>6</td>
<td>L6</td>
<td>Jenners Depository</td>
<td>D, I, A &amp; B</td>
<td>Regional</td>
<td>Low</td>
<td>Minor</td>
</tr>
<tr>
<td>6</td>
<td>A3</td>
<td>Field boundary</td>
<td>D, A</td>
<td>Lesser</td>
<td>Medium</td>
<td>Negligible</td>
</tr>
<tr>
<td>7</td>
<td>A8</td>
<td>Old Saughton House</td>
<td>Uncertain</td>
<td>Local</td>
<td>Uncertain</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Route section</td>
<td>ID</td>
<td>Site</td>
<td>Effect Type*</td>
<td>Site Importance</td>
<td>Effect Magnitude</td>
<td>Significance of effect</td>
</tr>
<tr>
<td>---------------</td>
<td>---------</td>
<td>-----------------------</td>
<td>--------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>8</td>
<td>A19</td>
<td>Gogar Loch</td>
<td>Uncertain</td>
<td>Local</td>
<td>Uncertain</td>
<td>Uncertain</td>
</tr>
<tr>
<td>9</td>
<td>A22</td>
<td>Castle Gogar landscape</td>
<td>D, I, A</td>
<td>Local</td>
<td>Medium</td>
<td>Minor</td>
</tr>
<tr>
<td>9</td>
<td>A21</td>
<td>Castle Gogar</td>
<td>D, A</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td>Uncertain</td>
</tr>
<tr>
<td>9</td>
<td>L8</td>
<td>Castle Gogar lodge</td>
<td>I, A</td>
<td>Regional</td>
<td>Low</td>
<td>Minor</td>
</tr>
<tr>
<td>9</td>
<td>L11</td>
<td>Gogar Church</td>
<td>I, A</td>
<td>Regional</td>
<td>Medium</td>
<td>Moderate</td>
</tr>
<tr>
<td>9</td>
<td>L7;</td>
<td>Gogar Park</td>
<td>I, N</td>
<td>Local</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>9</td>
<td>B41-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>L24</td>
<td>Gogarburn House</td>
<td>I, N</td>
<td>Regional</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>9</td>
<td>L25</td>
<td>Gogar Mount North Lodge</td>
<td>I, N</td>
<td>Regional</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>9</td>
<td>L10</td>
<td>Castle Gogar</td>
<td>I, A</td>
<td>National</td>
<td>Imperceptible</td>
<td>Minor</td>
</tr>
<tr>
<td>10</td>
<td>S2</td>
<td>Huly Hill</td>
<td>D, I, A</td>
<td>National</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>10</td>
<td>A33</td>
<td>Edinburgh Road</td>
<td>D, A</td>
<td>Regional</td>
<td>Medium</td>
<td>Moderate</td>
</tr>
<tr>
<td>10</td>
<td>A29</td>
<td>Ratho Station</td>
<td>D, A</td>
<td>Lesser</td>
<td>Medium</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>A36</td>
<td>Potential site</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td>Uncertain</td>
<td>Uncertain</td>
</tr>
<tr>
<td>10</td>
<td>L12</td>
<td>Ingliston House lodge</td>
<td>I, A</td>
<td>Regional</td>
<td>Low</td>
<td>Minor</td>
</tr>
<tr>
<td>10</td>
<td>L13-16</td>
<td>Middle Norton</td>
<td>I, A</td>
<td>Local</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>L17</td>
<td>Norton House North Lodge</td>
<td>I, A</td>
<td>Local</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>L22</td>
<td>Hillwood House</td>
<td>I, B</td>
<td>Local</td>
<td>Low</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>L18</td>
<td>West Mains of Ingliston</td>
<td>I, N</td>
<td>Local</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>L23</td>
<td>Newbridge Inn</td>
<td>I, N</td>
<td>Local</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
<tr>
<td>10</td>
<td>L26</td>
<td>Ingliston Inn</td>
<td>I, N</td>
<td>National</td>
<td>Imperceptible</td>
<td>Minor</td>
</tr>
<tr>
<td>10</td>
<td>L27</td>
<td>Ingliston House, Stables</td>
<td>I, N</td>
<td>National</td>
<td>Imperceptible</td>
<td>Minor</td>
</tr>
<tr>
<td>10</td>
<td>L28</td>
<td>Norton Mains</td>
<td>I, N</td>
<td>Local</td>
<td>Imperceptible</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

*Key – D, direct; I, indirect; A, adverse; B, beneficial; N, neutral; shaded boxes indicate significant effects.

11.6 SUMMARY

Baseline Conditions

273 archaeological and heritage sites have been identified within the assessment corridor. They comprise:

- 3 Scheduled Ancient Monuments (S1-3).
- 36 other sites or areas of archaeological interest (A1-36).
- 173 Listed Buildings (L1-173).
- 54 other sites of architectural interest (B1-54).
- 3 Outstanding Conservation Areas (C1-3).
• 3 Inventory status Historic Gardens and Designed Landscapes (D1-3).

• 1 World Heritage Site.

Between St Andrew Square and Haymarket Terrace the assessment corridor runs entirely within the Edinburgh World Heritage Site, New Town Gardens Designed Landscape, and Outstanding Conservation Areas (New Town / West End). There are also 140 Listed Buildings spread densely along the whole of this route section (44 Category A, 76 Category B, 18 Category C(s) and 2 non-statutory C). 29 Listed Buildings are present along the corridor between Queen Street and Princes Street, around St Andrew Square; 64 Listed Buildings are present along Princes Street and in East and West Princes Street Gardens; and 47 Listed Buildings are present at the West End, between Princes Street and Haymarket Terrace. These designations reflect the recognition of the New Town as a distinctive part of the Edinburgh’s status as an internationally important cultural and architectural asset and townscape. A number of views and vistas are particularly important in the New Town. Examples are the views down Princes Street towards Calton Hill, down St David Street to the Scott Monument, down Castle Street towards the Castle, and along George Street to St Andrew Square. There are also highly important views from Princes Street across Princes Street Gardens to Edinburgh Castle and the Old Town skyline, and views from the Castle across the New Town. The potential of this route section to contain currently unidentified archaeological remains is negligible.

Between Haymarket Terrace and Gogar Roundabout only a scatter of cultural heritage features are present. These comprise six Listed Buildings (1 Category A, 3 Category B, 2 Category C(s)), forty sites of minor architectural importance, and nineteen sites or areas of limited archaeological interest. The potential of this route section to contain currently unidentified archaeological remains is mostly low or negligible.

Between Gogar Roundabout and Newbridge identified features include 3 Scheduled Ancient Monuments and 17 other sites of archaeological interest, 27 Listed Buildings (3 Category A, 13 Category B, 11 Category C(s)) and eleven sites of minor architectural importance, and two Inventory status Historic Gardens and Designed Landscapes. Most of the Listed Buildings are associated with a series of former country residences set within landscaped grounds to either side of the Glasgow Road (now the A8 trunk road). The potential of this route section to contain currently unidentified archaeological remains is high in areas of agricultural land, but negligible elsewhere.

Impacts and Mitigation

Between St Andrew Square only one site would certainly receive a direct impact. The Caledonian Alehouse (L173) would require to be demolished to make way for the tram line to approach the proposed tram stop on Haymarket Terrace, which would constitute a significant effect. Detailed standing building and photographic survey, both internal and external, to RCAHMS standards is proposed in advance of its demolition. Potential direct effects could occur on a range of Listed Buildings and other features of architectural interest along this route section, although the nature and magnitude of impact cannot be predicted at this stage. A detailed photographic record is proposed in the event of physical impacts being proposed, although depending upon the nature of the development works further mitigation responses might be necessary, such as detailed standing building survey, salvage works during demolition operations, or documentary research.

Visual effects would occur on the setting of the Edinburgh New Town. The effects would arise mainly through the introduction of the overhead line equipment into the streetscapes along Shandwick Place, Princes Street and around St Andrew Square. The presence of the overhead line equipment would affect some key views and vistas. The magnitude of visual effects would be high in some areas (e.g. St David Street, Princes Street) and Moderate in others (e.g. Haymarket, West Maitland Street). However, cumulatively the indirect effect of the scheme upon the cultural heritage of the assessment corridor within the New Town would be Major and
adverse. The mitigation for these impacts is to design the tram system well, so that it fits comfortably into the historic townscape as far as possible. A Design Manual is being progressed for Tram Line 1 by tie that sets out the principles of design and detailing to be followed in the final design, including the whole of the World Heritage Site.

Between Haymarket Terrace and Newbridge potential effects would be much more localised, reflecting the more fragmentary nature of cultural heritage resources. A Moderate adverse effect would occur to the character and setting of Huly Hill Scheduled Ancient Monument. Up to 9 other sites or areas of archaeological significance may, taking into account mitigation proposed below, undergo Moderate adverse (1 no), Minor adverse (2 no), negligible (2 no) or uncertain (4 no) effects (Table 11.5). Three further archaeological sites potentially could receive direct effects. Buried and currently unidentified remains of archaeological significance might be disturbed by the construction of the tram, particularly in the areas of agricultural land between Gogar Roundabout and Newbridge. Taking into account mitigation, significant adverse impacts would occur only upon Huly Hill Scheduled Ancient Monument and the archaeological site at Edinburgh Road, Newbridge.

Key mitigation measures proposed in relation to these potential effects include:

- A watching brief to be conducted during ground breaking works at selected locations between Murrayfield and Edinburgh Park, including Carrick Knowe golf course.

- A photographic record to be made of the remains of Ratho Station Low Level Station; and photographic survey and building recording of the Edinburgh Airport pillbox if necessary.

- A programme of archaeological recording, through prior excavation or watching briefs as appropriate, of all known archaeological remains that would be directly affected. Such sites include the affected parts of Huly Hill and environs, and the site at Edinburgh Road, Newbridge.

- Archaeological evaluation of areas of agricultural land along the proposed development corridor between Gogar Roundabout and Newbridge, with further mitigation responses (excavation, watching briefs) conducted as appropriate to the results of the evaluation.

- Preservation in situ of the buried remains of Nether Gogar village, with the tram route built on made ground above the existing ground level.

- All archaeological mitigation works to be detailed in a Written Scheme of Investigation approved in advance by City of Edinburgh Council and/or Historic Scotland as appropriate. Provision would be made for post-excavation analyses, publication of the results and archiving of the project materials and records.

Indirect visual effects would occur on 4 Category A, 8 Category B and 10 Category C(s) Listed Buildings. A Minor direct effect would occur on the Jenners Depository (Category B listed) to accommodate a tram stop. A direct impact could occur on Norton House Hotel North Lodge, although its magnitude and significance cannot presently be assessed. Where Listed Buildings lie close to the proposed route, the overhead line equipment where possible would be spaced to minimise visual intrusion into their settings. The introduction of sensitive screening in some cases may assist in mitigating the increased traffic noise and visibility experienced by adjacent Listed Buildings. Taking into account this mitigation, the indirect effects on Listed Buildings would be significant only in relation to Gogar Church.

In overall terms the cumulative effects of the proposed scheme upon cultural heritage interests would be:
- St Andrew Square – Haymarket Terrace: Major adverse.
- Haymarket Terrace – Gogar Roundabout: Minor adverse.
- Gogar Roundabout – Newbridge: Moderate adverse.
12 Socio-Economics

12.1 INTRODUCTION

The key socio-economic issues are employment, the local economy and demography, including population distribution and settlement. This section examines the impact of the construction and operation of the Tram Line 2 on these issues. There is an interface between this assessment and the assessment of land use, and other sections relating to impacts on the community. A general statement is provided on the impacts on the community based in other specialist sections, particularly, severance, noise, air quality, and landscape and visual impacts.

12.2 METHODS

12.2.1 Objectives

There are a number of distinct objectives of the socio-economic assessment, each of which varies in the level of assessment that can be undertaken and the certainty/uncertainty with which impacts can be established. The key objectives are to:

- Provide a brief description of current socio-economic conditions in Edinburgh and the area through which the tram would pass.
- Assess the likely direct effects on employment and the local economy i.e. job creation during construction and operation and expenditure injected into the local economy.

Other issues are also examined but are subject to a greater degree of uncertainty associated with their assessment:

- The indirect economic impacts of the Tram Line 2 on the wider economy e.g. the extent to which improved mobility/accessibility would benefit the local and wider economy.
- The likely impacts of the scheme on population and settlement e.g. the extent to which Tram Line 2 could influence where people live and work.

Examples of possible impacts associated with Tram Line 2 are shown in Table 12.1.
Table 12.1 Potential Socio-Economic Impacts

<table>
<thead>
<tr>
<th>Positive Impacts</th>
<th>Negative Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>o Direct and indirect employment creation during construction and operation</td>
<td>o Displacement of businesses</td>
</tr>
<tr>
<td>o Injection of money into the local economy from project capital and/or operational expenditure</td>
<td>o Actual or perceived community severance created by the alignment</td>
</tr>
<tr>
<td>o Improved mobility</td>
<td>o Unmitigatable nuisance or disruption to sections of the community during construction and/or operation</td>
</tr>
<tr>
<td>o Enhanced land values due to improved accessibility (may be seen as negative in some instances)</td>
<td>o Devaluation of property</td>
</tr>
<tr>
<td>o Business time savings and increased competitiveness</td>
<td>o Loss of employment land (i.e. land allocated in development and/or with planning permission)</td>
</tr>
<tr>
<td>o Catalyst for economic regeneration/development</td>
<td></td>
</tr>
</tbody>
</table>

12.2.2 Sources of Information

Information has been collected by means of desk study but also from a number of other sources:

• The key document is the Edinburgh Tram Line Two, Economic Development (RTP, 2003). This document provides economic baseline data and an analysis predicted economic activity resulting from the implementation of Tram Line 2.

• Site visits – to gain familiarity with the study area and route corridor.

• Information included in Chapter 6 Land Use to obtain an understanding of current trends and the wider land use changes that would directly result from the construction of the Tram or that could be stimulated by the tram’s operation.

12.2.3 Determining the Significance of Impacts

There are no recognised standards or guidelines for defining socio-economic impacts. In order to summarise the significance of impacts, general statements have been devised, against which a judgement on the degree of change (resulting from the Tram Line 2) can be assessed (Table 12.2).
Table 12.2 Criteria for Describing Residual Impacts

<table>
<thead>
<tr>
<th>Level of Significance</th>
<th>Description of economic/employment effects</th>
<th>Description of community effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Intensive change to local area, or noticeable change to extensive area e.g. due to change in expenditure or through job creation or loss of employment.</td>
<td>Severe unmitigatable short-term nuisance to local people, or any identifiable significant risks to human health. Major benefits to local community.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Clearly identifiable benefit or loss to the local economy over long term.</td>
<td>Marked short or long term effects on local people including short-term nuisance or disruption to sectors of the community. Clearly identifiable benefits to community.</td>
</tr>
<tr>
<td>Minor</td>
<td>Slight or short term changes to local economy.</td>
<td>Perceptible, though short-term or limited disruption/benefits to community.</td>
</tr>
<tr>
<td>Negligible</td>
<td>No identifiable effects.</td>
<td>No perceptible effects.</td>
</tr>
</tbody>
</table>

Direct impacts would be quantified wherever possible. Fundamentally, the significance of the impact is based on ‘professional judgment’. The report Edinburgh Tram Line Two, Economic Development (RTP, 2003) provides model outputs quantifying the indirect impacts of Tram Line 2 on the wider economy. Due to the varying degree of certainty associated with socio-economic impacts, the criteria set out in Table 6.3 have been used to describe the level of certainty with which residual impacts can be determined.

Table 12.3 Confidence of Effects Occurring

<table>
<thead>
<tr>
<th>Confidence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Available data/evidence permit fairly accurate prediction of effects.</td>
</tr>
<tr>
<td>Medium</td>
<td>Some data/evidence permit informed prediction of possible effects.</td>
</tr>
<tr>
<td>Low</td>
<td>Very difficult to predict the scale of effect on basis of current knowledge.</td>
</tr>
</tbody>
</table>

12.3 EXISTING CONDITIONS

This section provides a brief description of some of the key socio-economic characteristics of the city, and along the corridor of the route of Tram Line 2. It is stressed that this represents a snapshot in time. Clearly, economic conditions are dynamic and the state of the local economy in 2009 when the tram system could be operational, is difficult to forecast and beyond the scope of this brief study. This section therefore provides only a broad overview of current economic conditions to provide a context against which to assess the potential impacts of Tram Line 2.

The majority of the information below has been extracted from the Edinburgh Tram Line Two, Economic Development Report (RTP, 2003).

12.3.1 Population and Community Characteristics

Regional Population Characteristics

Population estimates for June 2002 show that Scotland’s population fell by 0.2% (9,400) to 5,054,800 in the year from June 2001. In this same period, the City of Edinburgh population also declined by 0.2% from 449,020 in 2001 to 448,080 in 2002. The areas where greatest population increases occurred during this period were East Lothian, West Lothian (both 0.6%) and Fife (0.3%). It should be noted that the areas displaying the highest growth are those immediately adjacent to
Edinburgh. The predominant reason for population decline is the rate of deaths out numbering births, and to lesser extent net out migration.

The most up-to-date population projections published by the General Register Office for Scotland (2000 based) shows that the population of the City of Edinburgh is projected to grow to 459,148 by 2006, and then to 464,579 in 2011. Over this similar time period, the population of the wider Lothian area (comprising Edinburgh City, East Lothian, West Lothian and Midlothian) is projected to increase from 779,290 in 2002, to 802,350 by 2006 and 818,455 in the year 2011.

**Edinburgh West Population Characteristics**

The total population of the Edinburgh West area (defined as the area covered by the Edinburgh West Local Development Committee) was estimated to be some 80,684 people at the time of the 2001 Census, representing 18% of the total City population of 448,624.

A brief examination of the general age structure of the sub-area indicates that Edinburgh West has a broadly similar profile to that at City level as well as that across Scotland. Indeed, this is also reflected in the population’s gender balance which shows that there are also more females (52%) than males (48%).

### 12.3.2 Housing

**Regional Housing Characteristics**

Recent residential property market research indicates that throughout the second half of 2002 the Edinburgh housing market continued to flourish, with demand for family houses outstripping most other residential market sectors. This steady rise is in contrast with London and the South East of England, and subject to any dramatic global influences is expected to continue during 2003.

Traditional and established residential areas continue to attract most interest with detached family homes now selling for well in excess of £1 million in some locations, putting the City on equal footing with likes of Oxford, Bristol and Manchester. House buyers are continuing to out number the sellers, and new areas of interest are opening up with locations such as Portobello, Musselburgh and Corstorphine (in the immediate tram corridor) looking likely as the next ‘boom’ areas.

**Edinburgh West Housing Characteristics**

In 2001, Edinburgh West comprised a considerably higher percentage of owner occupied households (78%) in comparison to both the City’s average (68%) and similarly the national average (63%). The remaining 22% are therefore either public or privately rented, which is again significantly lower than the corresponding rates of 32% and 37% for Edinburgh City and Scotland.
Table 12.4 Household Composition

<table>
<thead>
<tr>
<th></th>
<th>Edinburgh West</th>
<th>City of Edinburgh</th>
<th>Scotland</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Households</td>
<td>34,248</td>
<td>204,683</td>
<td>2,192,246</td>
</tr>
<tr>
<td>Average no. of persons</td>
<td>2.3</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>per household</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households – single</td>
<td>29.9</td>
<td>37.5</td>
<td>32.9</td>
</tr>
<tr>
<td>person</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households – 2</td>
<td>35.3</td>
<td>33.0</td>
<td>33.1</td>
</tr>
<tr>
<td>people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households – 3 to 4</td>
<td>29.3</td>
<td>24.8</td>
<td>28.5</td>
</tr>
<tr>
<td>people</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of households – 5 or</td>
<td>5.4</td>
<td>4.8</td>
<td>5.6</td>
</tr>
<tr>
<td>more people</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: 2001 Census

Table 12.4 above, highlights the size and composition of the households in Edinburgh West, at the time of the 2001 Census. This demonstrates that the average household size in the area was comparable to the Scottish average, but slightly higher than the Edinburgh City average rate of 2.2. It also shows that there are generally fewer single person households, but slightly more households comprising 2 to 4 people than across the City as a whole. This trend is again evident in terms of the increasing demand for more family-orientated homes in the City.

12.3.3 Economic Activity and Employment

Scottish Economic Characteristics

The Scottish economy is a small open economy, which is heavily reliant on exports to the EU, which accounts for 63% of the export market and worth £28 billion in 1999-2000 and supports 300,000 jobs. The EU makes up for 63% of Scottish exports particularly for electronic exports, which account for the production of more than one third of all branded PCs sold in the EU.

At present, the main drivers of the Scottish economy are consumption and government spending, although net exports and investment are expected to become more important. Overall economic growth in Scotland remains weak largely due to the decline of the manufacturing sector, which has seen a rise in job loses and a decline in output during 2003

Regional Economic Characteristics

Edinburgh is the seat of Scotland’s administrative power and is also the location of the country’s financial, legal, medical, and insurance centre. It is also becoming more important for accommodating important nuclear and electronics research. Leith port acts as the gateway for imports of grain, fertiliser, petroleum, minerals, wood pulp, cement, fruit and vegetables for the region. Other industries that characterise Edinburgh are its distilleries, the manufacture of glassware, pharmaceuticals, chemicals and shipbuilding. The historical significance of Edinburgh alongside its designation as a World Heritage Site has made tourism one of its strongest industries.

The local economy is very buoyant and well placed for future growth, reflecting the employment bias towards the service sector, particularly financial services. Forecasts show an overall increase between 2000-2015 of 34,500 jobs in Edinburgh (12%). Although the traditional sectors are projected to decline, the service sector is expected to increase by 53,500 jobs.
Indicators of the region’s economic success include:

- Average disposable income in Edinburgh is amongst the highest in the UK (Henley Centre).
- GDP per capita in Edinburgh is 147% (Lothians 117%) of the UK average.
- Edinburgh is the city with the fastest growing economy in the UK (Cambridge Econometrics June 2000, August 2001).
- Edinburgh’s world ranking as a conference venue rose from 22nd in 1996 to 12th in 2001 (ICCA).
- Edinburgh is the UK’s second most important financial centre.
- Output from the Lothians financial services sector is predicted to expand by a quarter by 2008 (BSL 1999).
- Amongst Scottish local authority areas, average gross weekly earnings in Edinburgh are the second highest (New Earnings Survey 2000).
- Edinburgh’s per capita spending on personal goods is 12% above the national average (CACI, Sept. 2000).
- Passenger arrivals at Edinburgh Airport grew from 3.8 million in 1996 to 5.5 million in 2000 (47% of the total Scottish growth over that period) (Scottish Transport Statistics).
- Edinburgh is the UK’s second largest overseas tourist destination after London; UK visitor bednights in Edinburgh have grown by 16% since 1996 (ONS).

However, traditional employment sectors (primary, manufacturing and construction) all continue to decline, although Midlothian is expected to experience continued growth in biotechnology industries.

**Employment Characteristics**

A total of 219,228 are in employment in Edinburgh, the greatest proportion being employed in the service sector, making the City the largest financial centre outside London and the fourth largest in Europe.

Unemployment in Edinburgh stood at 2.9% in April 2001, which was well below the corresponding Scottish average rate of 4.0% (2001 Census figures). More recent data provided by National Statistics and the Labour Force Survey in 2003 indicates that claimant unemployment within the City was 2.2% in April 2002, whilst the ILO unemployment rate was 3.8%. This compares positively to the corresponding Scottish average rates of 4% and 6.8%.

The 2002 New Earnings Survey found that the average weekly earning in Scotland was £427.00, which consisted of male and female averages of £473.70 and £360.10 respectively. This works out less than the £513.80 UK average, especially when comparing the UK female average of £464.70. In Edinburgh, the corresponding average weekly earnings was £480.24 in April 2002, which compares very favourably to the Scottish average but still remains below the UK average.

**Summary of Local Characteristics and Multiple Deprivation Index**

The wards that would be directly affected by the West Edinburgh tramline are detailed in Table 12.5. This also includes wards that may benefit from the project. The Scottish Index of Multiple Deprivation (SIMD) was examined for surrounding
wards to highlight those of which rank poorly and may therefore benefit from better accessibility to jobs and services. Out of the immediate wards within the tram corridor, Dalmeny/Kirkliston scores the lowest SIMD ranking of 875 and the lowest in all indicators. The wards of Tollcross, Fountainbridge, Moat, Shandon and Sighthill were also considered as areas that may benefit. There SIMD ranking was revealed to be low, in particular Sighthill, which had the worst ranking performance for each indicator thereby highlighting the need to encourage greater social inclusion.

Table 12.5 Summary of Scottish Index of Multiple Deprivation at Ward Level

<table>
<thead>
<tr>
<th>Ward</th>
<th>SIMD Ranking</th>
<th>Income</th>
<th>Employment</th>
<th>Education</th>
<th>Housing</th>
<th>Local concentration score</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Town</td>
<td>1205</td>
<td>1130</td>
<td>1042</td>
<td>1170</td>
<td>1153</td>
<td>1194</td>
</tr>
<tr>
<td>Dean</td>
<td>1220</td>
<td>1168</td>
<td>1190</td>
<td>1221</td>
<td>1208</td>
<td>1106</td>
</tr>
<tr>
<td>Murrayfield</td>
<td>1219</td>
<td>1166</td>
<td>1172</td>
<td>1222</td>
<td>1202</td>
<td>1043</td>
</tr>
<tr>
<td>NE Corstorphine</td>
<td>1144</td>
<td>1077</td>
<td>1096</td>
<td>962</td>
<td>1131</td>
<td>691</td>
</tr>
<tr>
<td>SE Corstorphine</td>
<td>1153</td>
<td>1083</td>
<td>1149</td>
<td>777</td>
<td>1128</td>
<td>920</td>
</tr>
<tr>
<td>Gyle</td>
<td>1170</td>
<td>1149</td>
<td>1170</td>
<td>922</td>
<td>1152</td>
<td>663</td>
</tr>
<tr>
<td>Dalmeny/Kirkliston</td>
<td>875</td>
<td>897</td>
<td>960</td>
<td>551</td>
<td>931</td>
<td>299</td>
</tr>
<tr>
<td>Tollcross</td>
<td>660</td>
<td>658</td>
<td>665</td>
<td>544</td>
<td>315</td>
<td>1209</td>
</tr>
<tr>
<td>Fountainbridge</td>
<td>836</td>
<td>765</td>
<td>765</td>
<td>623</td>
<td>529</td>
<td>1128</td>
</tr>
<tr>
<td>Moat</td>
<td>517</td>
<td>498</td>
<td>633</td>
<td>245</td>
<td>389</td>
<td>1128</td>
</tr>
<tr>
<td>Shandon</td>
<td>1068</td>
<td>940</td>
<td>934</td>
<td>859</td>
<td>918</td>
<td>1195</td>
</tr>
<tr>
<td>Sighthill</td>
<td>502</td>
<td>501</td>
<td>813</td>
<td>98</td>
<td>499</td>
<td>936</td>
</tr>
</tbody>
</table>

12.4 CONSTRUCTION IMPACTS

12.4.1 Potential Effects

The impacts which the construction phase of the scheme could potentially generate are:

- Resource requirements, especially the construction workforce, capital goods and services: this would have short-term impacts on the local economy and employment.

- Intermittent disruption and nuisance from construction activities: this would impact the local community.

In general terms, the impacts resulting from satisfying resource requirements are positive, but the impacts from day-to-day construction activities are potentially negative, although short-term.

12.4.2 Economy and Employment

The capital value of the scheme has been estimated at £336.3 million. This includes the entire Tram Line 2 scheme from St Andrew Square to the Airport plus the shuttle service to Newbridge. Of this, the component costs are estimated as follows:
- £160 million - for infrastructure works (civil, structural, utilities, electrical, stops, trackwork and depot).
- £30 million – land acquisition.
- £20 million – vehicles.
- The remaining monies would be used for contractors preliminaries, design, commissioning, and Project (Client) costs.
- In addition, an “Optimism Bias” has been applied at 31% to cover project risks.

The most significant direct economic impact would be from workforce requirements. Employment impacts would represent a slight positive impact and would be experienced both directly and indirectly over the construction period. Construction would be phased over two to three years. The following occupational skills would be required for the construction of Tram Line 2:

- Contractor's management/supervisory staff including agents, quantity surveyors, engineers, technicians, foreman and administration staff.
- Trades-people including joiners, steel fixers and concrete finishers.
- Machine operators including operatives for cranes, dumpers, excavators etc.
- General operatives may be required for duties such as banksman for machines, labouring duties.

The number employed at any one time would vary throughout the construction period. Many of the jobs would be non-specialist and it is envisaged that many of the workforce could be employed locally. While the impact is Minor positive, it is small and short term.

There would also be some limited multiplier effects on employment from local procurement of goods and services for construction of Tram Line 2. The procurement of services is matter for the contractor and no data is available on the likely benefits and the impact is considered to be Minor beneficial.

The numbers of imported skilled workers are likely to be small enough to be readily absorbed into the local community without any strain being imposed on supporting infrastructure, such as health or education facilities. In-migrant workers bring a degree of indirect benefit to the local economy from their own levels of spending e.g. accommodation, food and drink, and transport. Such spending is normally small unless the worker’s household accompanies them. The impact of in-migrant workers on the economy is considered to be negligible.

12.4.3 Community

Over the three year construction period there would be intermittent disruption to communities along the length of the route corridor. The issues of potential concern are temporary traffic congestion, severance, noise, dust, and visual intrusion. These issues and the means by which they would be mitigated are dealt with in other sections of this ES. In summary:

- Short-term noise impacts would be experienced by residential occupiers during construction. These noise impacts would have a Moderate of Major negative impact. The contractor would be required to prepare and implement an EMS which would set limits on working hours and methods.
• Construction would result in short term road closures and diversions causing temporary congestion.
• Dust is a potential nuisance. The EMS would stipulate measures that the contractor must follow to reduce dust to acceptable levels.
• Landscape and visual impacts would occur during construction. Works would be fenced off and screened from view where possible.

12.4.4 Mitigation

The question in terms of the economy and employment is one not so much of mitigation but of the need for the deliberate introduction of benefit. Job generation would occur and every effort would be made to maximise the local community’s uptake both of construction jobs and of supply to the project. Although this cannot be done where commercial disbenefit would be incurred, every effort would be made by the promoters with the contractors and the administering authorities to ensure local participation and to take the opportunity to incorporate on-job training wherever possible.

In terms of the community, levels of disruption need to be contained. Community disturbance and disruption would be minimised by adopting the mitigation measures proposed in the individual Sections on landscape and visual impacts, noise and vibration, traffic and transport, and air quality (primarily dust). There would be liaison throughout the application process and during construction with the communities so that concerns and problems may be dealt with on an ongoing basis. Contractor guidelines, would be set out in a EMS. This would incorporate measures such as nominating a person/dedicating a telephone number to ensure that complaints and problems can be dealt with promptly. Safe and convenient temporary crossing points of the affected parts of the corridor would be a priority.

12.4.5 Residual Impacts

Residual impacts are summarised in Section 12.6.

12.5 PERMANENT AND OPERATIONAL IMPACTS

The impacts to be discussed are employment and economic effects, and the possible effects on communities.

12.5.1 Employment and Economy

Direct Employment

The estimated number of people required to operate the tram system is summarised below in Table 12.6. The estimate is based on data provided in the Tram Line 2 Project Cost Report (FaberMaunsell/Semaly, October 2003).

Table 12.6 Operational Staff Costs and Numbers

<table>
<thead>
<tr>
<th>Staff</th>
<th>Staff costs*</th>
<th>Number of Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers</td>
<td>£0.87M</td>
<td>44</td>
</tr>
<tr>
<td>Conductors</td>
<td>£0.68M</td>
<td>44</td>
</tr>
<tr>
<td>Other Operating Staff</td>
<td>£0.58M</td>
<td>24</td>
</tr>
<tr>
<td>Management and Admin Staff</td>
<td>£0.36M</td>
<td>10</td>
</tr>
<tr>
<td>Maintenance and Engineering Staff</td>
<td>£1.22M</td>
<td>53</td>
</tr>
<tr>
<td>Total</td>
<td>£3.71</td>
<td>175</td>
</tr>
</tbody>
</table>

*Includes a 12% overhead.
The tram system would therefore result in the creation of an estimated 175 jobs. The nature of the skills required to operate the tram suggests that the great majority of the workforce would be sourced locally i.e. from Edinburgh and Lothians. Employees would spend a proportion of their incomes in the local economy and create a demand for goods in services in the area. This in turn stimulates indirect job creation. Available data is insufficient to provide an accurate estimate of indirect jobs that would result from Tram Line 2 during its operation. However, local authority multipliers normally vary between 1.1 and 1.4 i.e. for every 10 jobs created a further 1 to 4 jobs are created.

The construction of Tram Line 2 would directly affect the following businesses:

- The Caledonian Ale House at Haymarket would be demolished.
- Clark Commercials on Russell Road would be demolished. This is vehicle rental and sales business.
- Viking International on Roseburn Street would be directly affected by the demolition of two buildings. This is a car parts (tyres, exhausts etc) outlet and supplier. The demolition of these buildings would affect the entire operations undertaken in this building.
- JB McClean on Street would be affected by the loss of a strip land from the property. This is a furniture store.
- Roseburn Garage would lose a building at rear of property.
- Two industrial units on Roseburn Street would be demolished.
- National Car Rental on Roseburn Street would be demolished.
- Speedy Clearances at Balgreen Road would be demolished. This is a second hand shop.

Land owners would be compensated either financially or through relocation of the business. With respect to potential job losses it is not known whether these business would relocate locally or outside Edinburgh. Should businesses relocate within Edinburgh there is likely to be no net loss of jobs to the local economy. However, there is a possibility that land take could result in the permanent loss of jobs to the local economy particularly if businesses were to close permanently or relocated outside Edinburgh and the Lothians.

**Impacts on the Wider Economy**

The positive indirect economic effects of this scheme could be significant. There would be travel time savings, both for those using Tram Line 2 and for those using roads where congestion has been reduced because of the Tram system. Travel time saving benefit both residents and businesses. Businesses would get improved access to a wider labour market and this can reduce their costs. Residents get access to a wider range of jobs and spending opportunities. The reduction in ‘spatial separation’ in the economy can make the conurbation more efficient and competitive. As the area improves its competitive position, this in turn attracts business from other areas and also generates new business.

The Tram system would be particularly important in providing linkages between the conurbations Major employment areas (e.g. the City centre and Edinburgh Park) and residential areas which currently experience high levels of unemployment. The system would therefore be a Major integrative force, assisting with the regeneration of the areas of high unemployment.
The following sub-sections have been summarised from the *Edinburgh Tram Line Two, Economic Development Report* (RTP, 2003). The results are based on modelling undertaken as part of the economic development appraisal. For consistency, data and text has been extracted directly from the RTP report.

**Employment**

- Total employment is expected to increase by 443 jobs within Edinburgh and Lothian, as an indirect impact of the tram line. This would, however result in a 200 job notional decline across Scotland as a whole. This can be attributed to both the Tram Line 2 enhancing the “attractiveness” of Edinburgh and also to natural displacement across the rest of Scotland.

- The greatest employment gain would take place in Edinburgh with an estimated 410 jobs, whilst West Lothian would experience a decline of 12 jobs.

- In terms of notional employment by sector at Lothian level, the greatest employment gains would occur within finance and business, construction, public administration and other services.

**Floorspace**

- The tram line would contribute to the creation of 200 sq m additional residential floorspace in Lothian and elsewhere in Scotland by 2015.

- 160 sq m additional retail floorspace in Edinburgh, along with 240 sq m of floorspace in Lothian and elsewhere in Scotland by 2025.

- 50 sq m, 510 sq m and 900 sq m of additional office space in the City of Edinburgh by the years 2015, 2020 and 2025.

- By 2025, it would also contribute to 960 sq m in Lothian and 1,100 sq m elsewhere in Scotland to total office floorspace.

- 10 sq m of additional industrial floorspace would be created by 2025 in Edinburgh, whilst some 100 sq m across Scotland would also result.

**Rental Values**

- No significant impact upon residential rental values in Edinburgh, although rental levels in Lothian would fall by around £30 by 2025.

- No direct impact upon rental values within the retail, office and industrial property market sectors in Edinburgh or Lothian.

**Added Value**

- Additional total added value of £22 million in Lothian and £2 million in Scotland by the year 2025, resulting from the tram line.

- The greatest increase in added value at the Lothian level would be achieved within the key sectors of finance and business, public administration, distribution and catering.

- Minimal impact would take place amongst the Mining, manufacturing, construction, transport and communication, and other services. No impact would be experienced within the agriculture, forestry and fishing, energy and water.
12.5.2 Population and Community

It is not expected that Tram Line 2 would have any significant effects on population. It may alter settlement patterns i.e. alter where people chose to live and work. It is not possible provide an accurate assessment of how the character of settlements would be affected by the introduction of Tram Line 2. Whilst accessibility would be increased, the desirability of properties immediately adjacent to the route may not be, particularly during the initial phases of the scheme. However, properties within walking distance of stops are expected to increase in value. Businesses are also likely to benefit from locations in close proximity to stops and Tram Line 2 may facilitate development/re-development of land.

The Royal Air Cadet building near Stenhouse Drive would be demolished. Mitigation is described below.

Community severance is discussed in Chapter 5. There are no locations were permanent severance would occur during operation of the Tram Line 2. Although the route through the Gyle shopping area would affect pedestrian movements in the car park area. Tram Line 2 would facilitate greater mobility for residents and provide improved access to employment, shopping and recreational facilities. The quality of the public transport service would also improve in terms of reliability, disabled access, quality of ride. Noise and vibration are examined in Chapter 13. With mitigation in place noise impacts are assessed as neutral or Minor along the majority of the route. Air quality is discussed in Section 14. Over much of the route air quality is predicted to improve.

12.5.3 Mitigation

With respect to impacts on business mitigation would take the form of compensation, either financial or relocation of the business. Measures to mitigate impacts on the community are set out in other sections of this ES. Land take is covered in Chapter 6. The Royal Air Cadet building would be relocated either adjacent to its existing position, away from the alignment of the tram, or in a location to the agree with the Royal Air Cadet Corps. Noise impacts would be mitigated using acoustic barriers where necessary, and other measures would be taken to reduce vibration. The mitigation of landscape and visual impacts is detailed in Chapter 8 and represented on Figures 8.3.

12.5.4 Residual Impacts

Residual impacts are summarised in Section 12.6.

12.6 SUMMARY OF RESIDUAL IMPACTS

Residual impacts are summarised in Table 12.7. Reference should be made to Tables 12.1 and 12.2 for an explanation of significance criteria.

Economic benefits can be expected during construction from the employment of local workers and the purchase of local goods and services. Impacts are assessed as being Minor to Moderate beneficial due to the scale of expenditure. Based on the assessment set out in other sections of this ES, community impacts during construction are assessed as being Moderate to Major negative at locations in close proximity to construction works, or where significant disruption would occur as a result of works.

Once operational, Tram Line 2 would create approximately 175 jobs directly. With respect to the wider economy and the community Tram Line 2 would have a number of impacts, primarily:

- There would be Minor benefits from direct and indirect employment gains resulting from the operation of Tram Line 2. Over 400 jobs in Edinburgh and the Lothians would be created indirectly.
There would be minor benefits from direct and indirect employment gains resulting from the operation of Tram Line 2. Over 400 jobs in Edinburgh and the Lothians could be created indirectly.

Economic benefits would result from improved linkages and greater economic efficiency and as a result of reduced congestion, time savings and access to jobs and employees.

Building demolition would affect a number of businesses. It is anticipated that these buildings would relocated nearby, but it is possible that some may relocate outside Edinburgh and the Lothians.

During operation, community impacts would occur due to noise and landscape and visual impacts. However, there would be no net loss of community facilities and residents would benefit from improved mobility.

### Table 12.7 Summary of Socio-Economic Impacts

<table>
<thead>
<tr>
<th>Likely Impact</th>
<th>Residual Impact</th>
<th>Confidence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment of construction workers</td>
<td>Minor Benefit</td>
<td>High</td>
</tr>
<tr>
<td>Procurement of services</td>
<td>Minor to Moderate Benefit</td>
<td>Medium</td>
</tr>
<tr>
<td>Effects of in-migrant workforce</td>
<td>Minor Benefit</td>
<td>High</td>
</tr>
<tr>
<td>Community disturbance and disruption</td>
<td>Moderate/Major Negative</td>
<td>High</td>
</tr>
<tr>
<td><strong>Operation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct employment gain from operation of Tram system.</td>
<td>Minor Benefit</td>
<td>High</td>
</tr>
<tr>
<td>Relocation or loss of employment as a result of demolition of property.</td>
<td>Minor Negative</td>
<td>Medium</td>
</tr>
<tr>
<td>Induced economic growth through multiplier effects or improved linkages and greater economic efficiency.</td>
<td>Minor / Moderate Benefit</td>
<td>Medium</td>
</tr>
<tr>
<td>Changes in settlement patterns.</td>
<td>Negligible</td>
<td>Medium</td>
</tr>
<tr>
<td>Community disturbance</td>
<td>Generally Minor negative, but Moderate negative with respect to landscape and visual impacts.</td>
<td>High</td>
</tr>
<tr>
<td>Community mobility</td>
<td>Minor Beneficial</td>
<td>High</td>
</tr>
</tbody>
</table>
13 Noise and Vibration

13.1 INTRODUCTION

This section assesses the likely impacts of noise and vibration resulting from the construction and operation of the Line 2 tram scheme. Baseline measurements of noise and vibration have been taken at locations close to the proposed route where impacts might be expected. Information on construction methods have been used to predict construction noise levels and data on likely tram movements has been used to calculate noise levels from trams. An assessment of impacts resulting from changes in road traffic flows has also been carried out. Impacts have been assessed in objective terms and the need for mitigation considered. Any residual impacts are then assessed and quantified.

This report refers to the data provided in the Chapter 5 Traffic and Transport, with regard to tram and traffic flows both along the proposed route and in the wider road network.

13.2 METHODS

13.2.1 General Assessment Criteria

Subjective Response to Noise

Noise is perceived by the ear as fluctuation in air pressure. The rate at which these fluctuations change determines the frequency of the sound and the pressure generated determines the intensity or sound level. These characteristics can be measured accurately with sound level instrumentation but the disturbance that a particular level may cause is more difficult to measure as this varies considerably from person to person. The same sound pressure level may be quite acceptable to one person but totally unacceptable to another.

Noise Criteria

In order to create a consistent approach in dealing with the subjective nature of noise disturbance, it is necessary to establish noise criteria as a basis for determination of the average response of a large group of people to a range of noise levels. Disturbance by noise can be measured in terms of disruption to speech communication during teaching, use of telephone or through interference with leisure activities. Such disturbances lead to annoyance which describes a general feeling of aggravation caused by noise nuisance and refers to a long term adverse reaction to a particular noise source. Social survey questionnaires are used to determine a score on a scale of annoyance that indicates the level of dissatisfaction with different types of noise environment.

Decibels

The commonly accepted definition of noise is sound which is undesired by the recipient. Noise can be any sound which intrudes, disturbs or annoys. Sound pressures encountered vary over a huge range. It has become practice to measure sound levels in decibels (dB). The decibel scale is logarithmic rather than linear. As indicated later, it is helpful to remember that nothing less than a change of three decibels on a sound meter reading would be readily perceptible, and that an increase of 10 decibels corresponds to a doubling of loudness.

Typical Noise Levels

The human ear responds differently to sound of different frequencies. The ear "hears" high frequency sound of a given level more loudly than low frequency sound of the same level. Research has shown that if sound is weighted so as to
reduce the effect of low frequencies, then the resultant combined level of sound of all the frequencies in the audible range 20-20,000 cycles per second, relates well to subjective experience. This weighting is called 'A-weighting' and the A-weighted sound level, dB(A), is commonly used for measurement of environmental sound in UK. It can be used to indicate the subjective human response to sound. The following are typical common sounds, taken from DMRB Vol. 11.

### Table 13.1 Common Sound Levels

<table>
<thead>
<tr>
<th>Noise Source or Environment</th>
<th>Sound Level dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threshold of hearing</td>
<td>0</td>
</tr>
<tr>
<td>Quiet Bedroom</td>
<td>35</td>
</tr>
<tr>
<td>Busy general office</td>
<td>60</td>
</tr>
<tr>
<td>Car at 7m running at 60 kph</td>
<td>70</td>
</tr>
<tr>
<td>Modern jet aircraft takeoff at 152m</td>
<td>80</td>
</tr>
<tr>
<td>Heavy lorry at 7m running at 40kph</td>
<td>85</td>
</tr>
<tr>
<td>Pneumatic drill at 7m</td>
<td>95</td>
</tr>
<tr>
<td>Threshold of pain</td>
<td>120</td>
</tr>
</tbody>
</table>

### Noise Units

Environmental sound usually varies continually from second to second. It would be possible but not practicable, to specify the sound level dB(A) at each second. In practice human response has been related to various units which include allowance for the fluctuating nature of sound. A variety of units have been devised to describe correctly the sound environment over a period of time. These include:

- $L_{A10,T}$: the level of sound exceeded for just 10% of the time period $T$ - This unit (originally referred to as $L_{10}$) is used for rating road traffic noise in UK; in most other parts of the world other units are adopted.

- $L_{Aeq,T}$: the equivalent continuous sound level - This unit relates to the equivalent level of continuous sound for a specific time period $T$, eg 18 hour. It contains all the sound energy of the varying sound levels over the same time period, and expresses it as a continuous sound level over that period. The unit is used for assessing traffic noise in most parts of the world and for assessing construction noise/railway noise/aircraft noise/industrial noise/community noise in U.K.

- $L_{Amax}$: the maximum instantaneous value of sound over the time period.

- $L_{A90,T}$: the level of sound exceeded for 90% of the time period $T$ - commonly used to represent the background noise, and is used in assessing industrial noise in UK.

### 13.2.2 Construction Noise Criteria

The code of practice for noise control on construction sites, British Standard BS5228 (BSI 1997) gives advice on noise sources, remedies and their effectiveness. The significance of noise levels that might be generated during noise construction can be estimated both by reference to existing ambient levels and by the use of noise limit criteria. It is usual, at major construction works, for acceptable noise limit criteria to be formally established with the relevant local authorities on a site by site basis. An indication of possible levels, however, can be gained from Table 13.2 which has been compiled from a variety of policies relating to rail construction schemes.
### Table 13.2 Typical Construction Noise Limit Criteria

<table>
<thead>
<tr>
<th>Day Period</th>
<th>Receptor Location</th>
<th>Time Period</th>
<th>External Level at 1m from Facade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekday Residential</td>
<td>07:00 - 19:00</td>
<td>75 dB LAeq, 12hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19:00 - 22:00</td>
<td>65 dB LAeq, 3hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22:00 - 07:00</td>
<td>55 dB LAeq, 60min</td>
<td></td>
</tr>
<tr>
<td>Schools</td>
<td>09:00 - 16:00</td>
<td>60 dB LAeq, 60min</td>
<td></td>
</tr>
<tr>
<td>Saturday Residential</td>
<td>07:00 - 13:00</td>
<td>75 dB LAeq, 8hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13:00 - 22:00</td>
<td>65 dB LAeq, 9hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22:00 - 07:00</td>
<td>55 dB LAeq, 60min</td>
<td></td>
</tr>
<tr>
<td>Sunday/ Bank Holiday Residential</td>
<td>07:00 - 21:00</td>
<td>65 dB LAeq, 14hr</td>
<td></td>
</tr>
<tr>
<td></td>
<td>21:00 - 07:00</td>
<td>55 dB LAeq, 60min</td>
<td></td>
</tr>
<tr>
<td>All Days Residential</td>
<td>All Times</td>
<td>LA90 + 10 dB(A)</td>
<td></td>
</tr>
</tbody>
</table>

### Construction Noise Prediction

The noise from construction plant will vary in intensity and character, as well as in location and in time. It is possible to make certain assumptions about the types of machinery and their possible on-times that would be used for various operations during construction. From these basic assumptions it is then possible to use Appendix C of BS5228 which gives a guide to sound level data on site equipment and site activities, as shown in Table 13.3.

### Table 13.3 Noise Levels from Typical Construction Plant likely to be used on Site

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Possible Areas of Use</th>
<th>Activity Equivalent Continuous Sound Pressure Level LAeq at 10 metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracked Excavator</td>
<td>Stations, Bridge Works, Track Laying, Embankments, Cuttings</td>
<td>84</td>
</tr>
<tr>
<td>Hydraulic Breaker</td>
<td>Stations, Track Laying</td>
<td>82</td>
</tr>
<tr>
<td>Compressor</td>
<td>Stations, Bridge Works, Track Laying</td>
<td>86</td>
</tr>
<tr>
<td>Hand Tools</td>
<td>Stations, Track Laying</td>
<td>85</td>
</tr>
<tr>
<td>Cement Lorry</td>
<td>Stations, Bridge Works</td>
<td>76</td>
</tr>
<tr>
<td>Generator</td>
<td>Stations, Track Laying</td>
<td>80</td>
</tr>
<tr>
<td>Tracked Crane</td>
<td>Bridge Works</td>
<td>83</td>
</tr>
<tr>
<td>Tamper/Compactor</td>
<td>Track Laying</td>
<td>84</td>
</tr>
<tr>
<td>Dozer</td>
<td>Embankment, Cuttings</td>
<td>87</td>
</tr>
<tr>
<td>Tracked Loader</td>
<td>Embankments</td>
<td>79</td>
</tr>
<tr>
<td>Plant Type</td>
<td>Possible Areas of Use</td>
<td>Activity Equivalent Continuous Sound Pressure Level $L_{Aeq}$ at 10 metres</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lorry</td>
<td>Stations, Embankments, Cuttings</td>
<td>70</td>
</tr>
<tr>
<td>Dropping Ball Crane</td>
<td>Demolition</td>
<td>93</td>
</tr>
<tr>
<td>Pneumatic Breaker</td>
<td>Track Laying, Demolition</td>
<td>88</td>
</tr>
</tbody>
</table>

From the above data it is possible to give an estimate of the impacts of the various site activities, in terms of $L_{Aeq, 12\text{ hr}}$ values at nearby receptor locations. In general, good public relations and extensive consultation with local authorities would be necessary to help to minimise the impact of construction work. The residents in particular would need to be persuaded that the higher levels of noise would only be for a short period of time and so it would be necessary to publicise and adhere to a stated works schedule.

### 13.2.3 Operational Noise Criteria

The Noise Insulation (Railways and Other Guided Transport Systems) Regulations (1998) state that those responsible for a new railway line should have a duty to offer noise insulation for those rooms of a dwelling that are exposed to facade levels of either:

- **Day-time (06:00 - 24:00) level of 68 dB(A), $L_{Aeq, 18\text{ hr}}$**
- **Night-time (24:00 to 06:00) 63 dB(A) $L_{Aeq, 6\text{ hr}}$**

These regulations apply to England and Wales, an equivalent for Scotland has not been introduced but the criteria are useful in assessing the levels at which rail noise is likely to become a problem.

### Operational Noise Prediction

The calculation method used in this assessment is that recommended in the technical memorandum ‘Calculation of Railway Noise’ (CORN) 1995. The memorandum is used to determine noise from all guided transport systems where the guidance system is based on a dual running rail. The method consists of determining the reference noise level generated by an individual vehicle passage (defined as Sound Exposure Level, SEL in CORN) and by then modifying these values to take account of factors such as distance, screening and number of vehicles.

Basic noise levels generated by railways are defined as a combination of rolling noise and locomotive noise. Light Rail Vehicles (LRV), however, are powered by overhead cables and so the contribution from locomotive noise is not relevant. Thus rolling noise is the sole contributor to the basic noise level and the parameters that determine the rolling noise level are the variation in noise from the units due to vehicle speed and the type of track that is used. The method provides reference noise data for different train types and for light rail vehicles.

The reference data selected for this assessment was that of the South Yorkshire Supertram, as given in CORN. This data was used as it represented the most recent tram type in the UK where data has been published. The final calculated noise level has to take account of the number vehicles forming a tram (assumed to...
be 2) and the number of tram movements in the assessment period, assumed to be 6 per hour.

13.2.4 Scope of Assessment

It is recognised that tram noise is generally lower than that of road traffic or heavy rail. For example, at 10m from a street running tram route, the noise level at the façade of a building would be 65dB(A), whereas a heavy rail electric unit train would produce a level of 69dB(A) under the same conditions. Road traffic noise at this distance for a main road would produce typical levels of 70-74dB(A). Simple predictions show that noise levels from trams fall to approximately 50dB(A) at a distance of 70-100m, which corresponds to a typical background noise level. The study was therefore limited to sensitive property within approximately 100m of the track. The properties selected for baseline noise measurement and tram noise prediction were representative of those within the study area and were agreed with CEC.

The day time noise calculations of $L_{A_{eq,18h}}$ refer to the period 0600-midnight as described in CORN. In addition, comment is made on the early morning period 0500-0600 as this is part of the night time period and may be more sensitive to occupiers of nearby dwellings. It is the period during which tram operations commence.

At many of the sensitive areas noise from road traffic is likely to dominate over tram noise. This has been assessed partly from noise measurements alongside some of the affected roads as well as from traffic flows taken from Chapter 4, Traffic and Transport.

13.2.5 Method of Impact Assessment

Operational noise impact is essentially the difference between baseline noise levels and predicted noise levels from trams while construction noise impact is assessed on the absolute predicted noise level. Table 13.4 summarises the impact significance criteria used in this assessment.

Table 13.4 Noise Impact Definitions (C - Construction, O - Operational)

<table>
<thead>
<tr>
<th>Impact Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>C: Generation of daytime facade noise levels in exceedance of 75 dB(A), $L_{A_{eq,12h}}$.</td>
</tr>
<tr>
<td></td>
<td>O: Considerable increase in the perceived noise levels as a result of routine operations, typified as an increase of +10 dB(A) or greater in $L_{A_{eq}}$ noise levels above the existing background level.</td>
</tr>
<tr>
<td>Moderate</td>
<td>C: Generation of daytime facade noise levels that are in the range of 65 to 75 dB(A), $L_{A_{eq,12h}}$.</td>
</tr>
<tr>
<td></td>
<td>O: Noticeable increase in the perceived noise levels as a result of routine operations, typified as an increase of +5 to +9 dB(A) in $L_{A_{eq}}$ noise levels above the existing background level.</td>
</tr>
<tr>
<td>Minor</td>
<td>C: Generation of daytime facade noise levels that are in the range of 55 to 65 dB(A), $L_{A_{eq,12h}}$.</td>
</tr>
</tbody>
</table>
### Impact Criteria

<table>
<thead>
<tr>
<th>Impact Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>Perceptible increase in the perceived noise levels as a result of routine operations, typified as an increase of +2 to +4 dB(A) in $L_{Aeq}$ noise levels above the existing background level.</td>
</tr>
<tr>
<td>Negligible</td>
<td>C: Generation of daytime facade noise levels that are below 55 dB(A), $L_{Aeq, 12hr}$. O: Generally imperceptible increase in the perceived noise levels as a result of routine operations, typified as an increase of +2 dB(A), or less, in $L_{Aeq}$ noise levels above the existing background level.</td>
</tr>
</tbody>
</table>

It is considered that mitigation is essential where major impacts are predicted and that mitigation measures should ideally be implemented where moderate impacts are likely to occur.

### 13.3 VIBRATION

#### 13.3.1 Scope of Vibration Study

Vibration from trams tends to be thought of as a major problem as people think of older types of tram that used to cause noticeable vibration as they passed by. Modern trams are light vehicles running on well designed track that incorporates vibration isolation measures in the mounting system. Measurements on the Manchester Metrolink ("Assessment of Vibration from Manchester Metrolink" (1995) prepared for GMPTE jointly by Halcrow Fox, CES and ERM) show that tram vibration is not likely to cause disturbance in dwellings at distances of greater than 7-10m but vibration from occasional trams may be perceptible at distances of up to 15-20m.

#### 13.3.2 Nature of Vibration

Vibration is a complex mechanism by which mechanical movement from a source is transmitted to a receiver. The source of vibration is either construction plant or interaction between the rail and wheel of the moving tram which passes through the track and into the ground. Propagation through the ground is attenuated before reaching a building foundation but the degree of attenuation depends on soil and geological formations. Vibration enters buildings through their foundations where there can be attenuation or amplification of the level, particularly to upper floors.

The prediction of vibration through the soil at distances removed from the source is difficult as the soil/subsoil structure can vary considerably from one site to another. The transmission of vibration waves through soils and rock is mathematically very complex to calculate as when boundaries are present, such as layers of soil or rock or building foundations, then waves can be attenuated or enhanced by refraction and interference. Such phenomena are impossible to foresee. It is therefore normal practice to assess vibration propagation characteristics by on site measurements of similar track structures.

When vibration reaches the foundation of a building the proportion of energy entering the building depends on the nature of the foundations. For slab floors there is little attenuation as the slab is in close contact with the surrounding soil so that the vibration of such floor slabs are virtually the same as that which would exist without the slab. At buildings with spread or piled foundations vibration levels can be reduced by a factor of 2-4 when compared to the predicted ground vibration.
Vibration is propagated within a building structure through walls and floors and is usually attenuated at upper floor levels. However, at buildings with timber floors, such as many residential houses, vibration can be amplified, especially if the natural floor resonance frequency coincides with peaks in the ground borne vibration spectrum. Increases by factors of 2-3 have been measured when compared to the foundation vibration level.

**Vibration Units**

Vibration can be expressed in terms of displacement, velocity or acceleration, each of which vary with frequency and with time. Peak Particle Velocity (PPV) is often used to assess damage risk in buildings as it correlates best with case history data and is usually measured in mms\(^{-1}\). The human body is very sensitive to vibration and a perception threshold of approximately 0.3 mms\(^{-1}\) is quite common. At levels of 1-2 mms\(^{-1}\) vibration is very clear and distinct while at levels above 3 mms\(^{-1}\) people often express serious concern about structural safety even though, at this level, the risk of damage is extremely small.

In order to take account of exposure to continuous or intermittent vibration it is necessary to consider the duration of events as well as the PPV. Annoyance generated by vibration obviously depends on both factors and British Standard BS6472 (BSI 1992) was developed to assess annoyance as a factor of human response. The exposure is measured for a particular event as a vibration dose value (VDV), an index that takes account of vibration level, the frequency at which the peak occurs and the duration of exposure. This has then been used to determine the estimated vibration exposure over day and night time periods (eVDV). BS6472 predicts the likely reaction of residents close to an LRT route.

**Vibration Criteria**

Criteria for evaluating the effect of vibration on buildings have been summarised in British Standard, BS7385 (BSI 1993). These levels to be very conservative and give an indication of safe limits to prevent the onset of superficial damage such as surface cracking, as shown in Table 13.5. These guidelines were used for assessment of construction vibration and for the protection of building structures, that is 5 mms\(^{-1}\) PPV for standard buildings and 3 mms\(^{-1}\) PPV for listed buildings or potentially sensitive buildings.

**Table 13.5 Guide Values for Vibration Velocity**

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Peak particle velocity guide values (mms(^{-1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Foundations</td>
</tr>
<tr>
<td></td>
<td>&lt; 10 Hz</td>
</tr>
<tr>
<td>Offices and industrial premises</td>
<td>20</td>
</tr>
<tr>
<td>Domestic houses and similar constructions</td>
<td>5</td>
</tr>
<tr>
<td>Other building sensitive to vibrations</td>
<td>3</td>
</tr>
</tbody>
</table>

* At frequencies higher than 100 Hz a higher guide value is allowable.

BS6472 deals with the assessment of the response to vibration of humans in buildings and recommends the use of an index known as Vibration Dose Value (VDV) when evaluating the effect of intermittent vibration such as that caused by a series of trams passing a given location. The standard provides a method of
estimating the VDV from measured values of vibration and gives a set of curves relating PPV and acceleration to levels likely to cause annoyance.

The standard recognises that human response to vibration depends on a number of factors including the time of day and the use made of occupied space in buildings. Thus night time is a more sensitive period than during the day and operating theatres require a more stringent standard than workshops. Once values of VDV have been determined for a particular set of conditions, BS6472 provides a table that can be used to assess the resulting degree of adverse comment. The values used in this assessment are 0.2 ms\(^{-1.75}\) for a low probability of adverse comment during the day and 0.13 ms\(^{-1.75}\) for night time periods.

13.3.3 Construction Vibration

During the construction period the potential sources of vibration are likely to be associated with piling and demolition operations which tend to generate transient peaks. Bridge construction, road breaking and site clearance would involve these activities while ground compaction using vibratory rollers could be used during preparation for track laying. Plant such as compressors, pumps, generators and trucks can emit significant levels of low frequency noise which can cause resonance in nearby buildings, usually perceived as vibration by occupants. Care is needed in the siting of such equipment especially in residential areas.

In order to give an indication of the likely distances at which the criterion levels are reached, data on vibration from rotary piling has been taken from BS5228, selecting results of piling through gravels and clay. As a worst case the ppv limit of 3mms\(^{-1}\) would occur at a distance of 5 metres from the rig during boring but the vibrating of casings would cause a ppv of 3mms\(^{-1}\) at a distance of 10m. The criterion of 5mms\(^{-1}\) would occur at a distance of 3 metres during boring and 6 metres during vibration of casings. Any buildings within these distances should be identified and the risk of vibration damage re-evaluated depending on the type of structure and foundation, since in most cases the level of vibration transmitted to the structure would be less than the predicted level in the adjacent ground. Vibration from vibratory rollers and road breaking has been similarly assessed and in the worst case, a ppv of 3mms\(^{-1}\) would be reached at a distance of 13 metres and 5mms\(^{-1}\) at a distance of 9 metres.

This data was used to predict construction vibration levels along the proposed Line 2 route. The impact was assessed according to the following criteria:

- **Negligible**: < 0.3 mms\(^{-1}\)
- **Minor**: 0.3 – 1.0 mms\(^{-1}\)
- **Moderate**: 1.0 – 3.0 mms\(^{-1}\)
- **Major**: > 5.0 mms\(^{-1}\)

13.3.4 Operational Vibration

The level of vibration generated by trams depends on the surface irregularities of the wheels and rails, and on the mass and speed of the tram. The levels of vibration transmitted into the ground depends on the rail and track bed isolation.

Traffic vibration may occur in buildings by two separate processes. Firstly, low frequency sound waves generated by vehicles mainly at the exhaust can couple into the structure via the windows and doors causing different parts of the building to vibrate. Secondly, in the same way that tram vibration is transmitted, forces generated by vehicles passing over the road surface can generate vibration in the ground which then propagates through the subsoil to reach the building foundations from where vibration is transferred into the walls and floors of the building.
People experience traffic vibration in different ways. As well as the perception of wall and floor vibration through touch, the low frequency sound waves tend to cause ornaments and furniture to resonate, giving the impression of significant vibration in the building structure. People can also be disturbed by the feeling of low frequency sound resonating in the body at particular frequencies.

Operational vibration is calculated from the source data and the assessment methodology found in the report "Assessment of Vibration from Manchester Metrolink".

Vibration data for trams taken from this Report, has been used to determine VDV values at properties close to the route. The source reference data specified the VDV for an average single tram movement at a distance of 7.5m and at a speed of 40kph. This event VDV was then converted to a daytime (0700 - 2300) 16hr VDV as required by BS6472 by taking account of the total number of movements within this period. Night time movements (2300 - 0700) were also considered.

The calculated values were compared with measured levels of ambient vibration, where available, in order to determine whether there is likely to be any significant change to vibration disturbance. The levels were also compared with the impact criteria based on BS6472. The impact of operational vibration has been assessed as follows:

- Negligible: <0.1 ms\(^{-1.75}\) eVDV(16 hour)
- Minor: 0.1 – 0.2 ms\(^{-1.75}\) eVDV(16 hour)
- Moderate: 0.2 - 0.4 ms\(^{-1.75}\) eVDV(16 hour)
- Major: >0.4 ms\(^{-1.75}\) eVDV(16 hour)

13.4 BASELINE SITUATION

13.4.1 Baseline Noise

The baseline measurements of noise were undertaken at 9 locations agreed with CEC. At these locations ambient noise levels were recorded for 20 minute periods and were sampled at four times of day. The sample periods were:

- Morning (0700 – 1000),
- Afternoon (1200 – 1500),
- Evening (1900 – 2200) and
- Night (0000 – 0300).

At Baird Drive a longer measurement was undertaken over the period 1100 to 0800. A further four locations between Balbirnie Place and Princes Street were monitored by ERM as part of the Line 1 ES. A description of the monitoring locations is provided in Table 13.6.
<table>
<thead>
<tr>
<th>Location</th>
<th>Approx distance from nearest track</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Princess St</td>
<td>20m</td>
<td>Commercial/leisure land use. Street running. Road traffic dominates.</td>
</tr>
<tr>
<td>2. 33 Shandwick Place</td>
<td>10m</td>
<td>Hotel. Street Running. Road traffic dominates.</td>
</tr>
<tr>
<td>3. West Maitland Stret</td>
<td>15m</td>
<td>Commercial land use. Street running. Road traffic dominates.</td>
</tr>
<tr>
<td>4. Balbirnie Place</td>
<td>5m</td>
<td>Residential properties. Tram would run at grade between properties and railway. Noise dominated by trains.</td>
</tr>
<tr>
<td>5. Roseburn Maltings, Russell Road</td>
<td>22m</td>
<td>Approximately 12 dwellings overlook Russell Road just before where the route joins Line 1. Main noise source is traffic on Russell Road plus some trains.</td>
</tr>
<tr>
<td>6. 22 Baird Drive</td>
<td>15-19m</td>
<td>26 dwellings in Baird Drive have rear facades overlooking the existing railway which was the main noise source but the proposed tram route would be closer</td>
</tr>
<tr>
<td>7. Stenhouse Drive</td>
<td>37-50m</td>
<td>The route is on the far side of Stenhouse Drive where road traffic is the main noise source</td>
</tr>
<tr>
<td>8. Broomhouse Drive</td>
<td>30-37m</td>
<td>The proposed route is on the far side of Broomhouse Drive. Main noise source is traffic on Broomhouse Drive</td>
</tr>
<tr>
<td>9. Middle Norton</td>
<td>19m</td>
<td>Main noise source is the A8. Proposed tram route passes down central reservation and could affect 11 properties</td>
</tr>
<tr>
<td>10. Norton House Hotel, Gatehouse</td>
<td>20m</td>
<td>Main noise source is again the A8. Proposed route passes down central reservation</td>
</tr>
<tr>
<td>11. Hillwood Rise, Ratho Station</td>
<td>49-70m</td>
<td>Rear of No.’s 34-98 A quieter area where the noise sources are distant trains, distant traffic and some aircraft taking off from Edinburgh Airport. Noise from trams could affect around 32 properties.</td>
</tr>
<tr>
<td>12. 84 Station Road, Ratho Station</td>
<td>15m</td>
<td>Located fairly close to Ratho Station where main noise sources are trains and aircraft and affecting 3 properties. These properties effectively screen other properties in Station Road from railway and tram noise</td>
</tr>
<tr>
<td>13. Old Liston Road, Newbridge</td>
<td>40-90m</td>
<td>At junction with Edinburgh Road, main noise source is aircraft as well as traffic in Edinburgh Road potentially affecting 9 properties on Old Liston Road and Bridge Street</td>
</tr>
</tbody>
</table>
The results of the monitoring are presented in the Tables 13.7, 13.8 and 13.9.

Table 13.7  Results of Sampled Noise Measurements, City Centre to Balbirnie Place*

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Date</th>
<th>Time</th>
<th>LA10</th>
<th>LA90</th>
<th>Lₐₐₑₜ</th>
<th>Lₐₐₘₐₓ</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balbirnie Place</td>
<td>July 14, 2003</td>
<td>17:20</td>
<td>60.8</td>
<td>40.4</td>
<td>59.6</td>
<td>80.8</td>
<td>8 trains</td>
</tr>
<tr>
<td></td>
<td>July 16, 2003</td>
<td>21:55</td>
<td>50.0</td>
<td>38.6</td>
<td>52.3</td>
<td>74.6</td>
<td>2 trains</td>
</tr>
<tr>
<td></td>
<td>July 16, 2003</td>
<td>23:15</td>
<td>57.0</td>
<td>38.4</td>
<td>56.5</td>
<td>74.5</td>
<td>3 trains</td>
</tr>
<tr>
<td></td>
<td>July 16, 2003</td>
<td>15:15</td>
<td>61.7</td>
<td>41.6</td>
<td>57.4</td>
<td>75.2</td>
<td>5 trains</td>
</tr>
<tr>
<td></td>
<td>July 16, 2003</td>
<td>15:25</td>
<td>53.7</td>
<td>43.0</td>
<td>54.8</td>
<td>71.3</td>
<td>jointed track</td>
</tr>
<tr>
<td></td>
<td>July 17, 2003</td>
<td>10:40</td>
<td>56.0</td>
<td>41.8</td>
<td>54.8</td>
<td>75.5</td>
<td>quiet apart from trains</td>
</tr>
<tr>
<td>Princes Street</td>
<td>July 16, 2003</td>
<td>14:05</td>
<td>73.6</td>
<td>62.8</td>
<td>70.4</td>
<td>84.0</td>
<td>Slow traffic, pedestrians, street noise</td>
</tr>
<tr>
<td></td>
<td>July 16, 2003</td>
<td>23:40</td>
<td>69.4</td>
<td>55.4</td>
<td>66.1</td>
<td>82.2</td>
<td></td>
</tr>
<tr>
<td>Shandwick Place</td>
<td>July 16, 2003</td>
<td>14:35</td>
<td>75.4</td>
<td>61.4</td>
<td>72.1</td>
<td>88.4</td>
<td>Buses idling, heavy traffic, pedestrians</td>
</tr>
<tr>
<td></td>
<td>July 17, 2003</td>
<td>0:00</td>
<td>69.0</td>
<td>50.8</td>
<td>65.7</td>
<td>81.9</td>
<td></td>
</tr>
<tr>
<td>West Maitland Place</td>
<td>July 16, 2003</td>
<td>14:55</td>
<td>74.6</td>
<td>62.2</td>
<td>70.9</td>
<td>85.3</td>
<td>Traffic at lights, buses, pedestrians</td>
</tr>
<tr>
<td></td>
<td>July 17, 2003</td>
<td>0:00</td>
<td>70.8</td>
<td>55.1</td>
<td>67.6</td>
<td>83.9</td>
<td></td>
</tr>
</tbody>
</table>

* Data From Tram Line 1 ES (ERM, 2003).
### 13.8 Results of Ambient Noise Measurements at 22 Baird Drive; 2-3 October 2003

<table>
<thead>
<tr>
<th>Location</th>
<th>Time</th>
<th>LAeq</th>
<th>LAmx</th>
<th>LA90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roseburn</td>
<td>0900</td>
<td>62.3</td>
<td>83.5</td>
<td>44.4</td>
</tr>
<tr>
<td>Maltings</td>
<td>1200</td>
<td>57.6</td>
<td>82.7</td>
<td>43.4</td>
</tr>
<tr>
<td></td>
<td>1300</td>
<td>56.9</td>
<td>79.8</td>
<td>42.7</td>
</tr>
<tr>
<td></td>
<td>1400</td>
<td>58.8</td>
<td>78.2</td>
<td>43.6</td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>57.5</td>
<td>79.1</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>1600</td>
<td>56.5</td>
<td>80.4</td>
<td>42.1</td>
</tr>
<tr>
<td></td>
<td>1700</td>
<td>57.9</td>
<td>79.1</td>
<td>42.5</td>
</tr>
<tr>
<td></td>
<td>1800</td>
<td>61.2</td>
<td>79.7</td>
<td>43.0</td>
</tr>
<tr>
<td></td>
<td>1900</td>
<td>56.3</td>
<td>76.7</td>
<td>42.4</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>58.4</td>
<td>77.3</td>
<td>43.9</td>
</tr>
<tr>
<td></td>
<td>2100</td>
<td>59.8</td>
<td>76.0</td>
<td>42.8</td>
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<td>Night time average</td>
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### 13.9 Results of Sampled Noise Measurements, Roseburn to Newbridge

<table>
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<tr>
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<td>Time</td>
<td>0830</td>
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<td>2210</td>
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<td>LAmx</td>
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<th>0230</th>
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<tr>
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<table>
<thead>
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<th>84 Station Road Ratho</th>
<th>Time</th>
<th>0730</th>
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<th>1920</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
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<table>
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<th>1950</th>
<th>0100</th>
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<tbody>
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<td>1950</td>
<td>0100</td>
</tr>
<tr>
<td></td>
<td>LAmx</td>
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<td>53.8</td>
<td>55.9</td>
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<td></td>
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<td>50.0</td>
<td>48.6</td>
<td>47.9</td>
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</table>

<table>
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<th>1310</th>
<th>2020</th>
<th>0130</th>
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<td>65.9</td>
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</tr>
<tr>
<td></td>
<td>LAmx</td>
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<td>89.2</td>
<td>77.3</td>
<td>74.7</td>
</tr>
<tr>
<td></td>
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<td>58.5</td>
<td>59.6</td>
<td>58.2</td>
<td>55.9</td>
</tr>
</tbody>
</table>

### 13.4.2 Baseline Vibration

Vibration measurements were carried out at locations closest to the tram route, Roseburn Maltings, Baird Drive, Middle Norton, Station Road. An additional location was used near Edinburgh Park Centre as a commercial building was identified at 15m from the track. Weighted acceleration levels were measured over 20 minute periods and the results are shown in Table 13.10.
Table 13.10 Results of Ambient Vibration Measurements

<table>
<thead>
<tr>
<th>Location</th>
<th>Time</th>
<th>Weighted Acceleration mm/s^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle Norton</td>
<td>1330</td>
<td>2.39</td>
</tr>
<tr>
<td></td>
<td>2250</td>
<td>2.45</td>
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<tr>
<td>84 Station Road</td>
<td>740</td>
<td>2.25</td>
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<tr>
<td>Ratho</td>
<td>1930</td>
<td>2.92</td>
</tr>
<tr>
<td>Roseburn Maltings</td>
<td>910</td>
<td>2.42</td>
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<tr>
<td></td>
<td>2100</td>
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</tr>
<tr>
<td>22 Baird Drive</td>
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<td></td>
<td>1900</td>
<td>2.30</td>
</tr>
<tr>
<td>Edinburgh Park</td>
<td>1500</td>
<td>2.34</td>
</tr>
</tbody>
</table>

13.5 CONSTRUCTION EFFECTS

13.5.1 Potential Impacts

Construction noise varies considerably during any building project. Properties within 50 to 100m of such works can be disturbed but provided there is some sort of restriction on working hours then the fact that the works are of limited duration, reduces the likelihood of complaints. The character of construction noise varies during the project depending on the activities being undertaken. For tram routes, initial phases can involve road breaking, demolition work or earth moving followed by clearance and levelling. These activities can produce high levels of noise and vibration but would be of limited duration. Compaction and base laying can also be noisy but finishing phases of track construction and electrical installations tend to be low noise operations.

13.5.2 Mitigation

As well as providing a calculation methodology, BS5228 also gives detailed advice on methods of minimising nuisance from construction noise. This can take the form of reduction at source, control of noise spread and in areas of very high noise levels, insulation at receptors. It should be a requirement of any construction contract for the contractors to comply with the recommendations in this standard in order to achieve specific noise limit criteria for each site. The code of construction practice would include the following provisions at locations where noise is likely to be a problem:

- Sites to be surrounded with fencing or other barriers, where appropriate, and continuous running plant to housed in acoustic enclosures.
- Use of electrical items of plant instead of diesel plant in especially sensitive locations.
- Exhaust silencing and plant muffling equipment to be maintained in good working order.
- Night time working to be kept to an absolute minimum and the normal working day to be used wherever possible.

In general, good public relations and extensive consultation with local authorities would be necessary to help to minimise the impact of construction work. The
residents in particular would need to be persuaded that the higher levels of noise would only be for a short period of time and so it would be necessary to publicise and adhere to a stated works schedule. At certain sensitive locations this is likely to involve restrictions on daytime working hours, no night time working (unless unavoidable, eg night rail possessions) and restricted weekend working.

13.5.3 Residual Impacts

The results of the construction noise assessment are summarised in Table 13.11.

Table 13.11 Impact of Construction Noise

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from track m</th>
<th>Estimated Ambient Noise Level LAeq,12hr</th>
<th>Predicted Construction Noise Level LAeq,12hr</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princes Street</td>
<td>20</td>
<td>70</td>
<td>75-80</td>
<td>Major</td>
</tr>
<tr>
<td>Shandwick Place</td>
<td>10</td>
<td>72</td>
<td>75-80</td>
<td>Major</td>
</tr>
<tr>
<td>West Maitland Street</td>
<td>15</td>
<td>71</td>
<td>75-80</td>
<td>Major</td>
</tr>
<tr>
<td>Balbirnie Place (Closest point)</td>
<td>5</td>
<td>57</td>
<td>78-83</td>
<td>Major</td>
</tr>
<tr>
<td>Russell Road, Roseburn Maltings</td>
<td>22</td>
<td>62</td>
<td>70-75</td>
<td>Moderate</td>
</tr>
<tr>
<td>Baird Drive (unmitigated)</td>
<td>15-19</td>
<td>58</td>
<td>78-83</td>
<td>Major</td>
</tr>
<tr>
<td>Baird Drive (mitigated)</td>
<td>15-19</td>
<td>58</td>
<td>73-78</td>
<td>Moderate</td>
</tr>
<tr>
<td>Whitson Road/Stenhouse Avenue West</td>
<td>68</td>
<td>55</td>
<td>63-68</td>
<td>Moderate</td>
</tr>
<tr>
<td>Stenhouse Drive</td>
<td>37</td>
<td>64</td>
<td>68-73</td>
<td>Moderate</td>
</tr>
<tr>
<td>Broomhouse Drive</td>
<td>30</td>
<td>69</td>
<td>70-75</td>
<td>Moderate</td>
</tr>
<tr>
<td>Bankhead Drive</td>
<td>37</td>
<td>69</td>
<td>68-73</td>
<td>Moderate</td>
</tr>
<tr>
<td>Edinburgh Park</td>
<td>15</td>
<td>60</td>
<td>78-83</td>
<td>Major</td>
</tr>
<tr>
<td>Glasgow Road</td>
<td>19</td>
<td>74</td>
<td>73-78</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hillwood Rise (unmitigated)</td>
<td>49-70</td>
<td>54</td>
<td>64-69</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hillwood Rise (mitigated)</td>
<td>49-70</td>
<td>54</td>
<td>59-64</td>
<td>Minor</td>
</tr>
<tr>
<td>Station Road (unmitigated)</td>
<td>15</td>
<td>57</td>
<td>75-80</td>
<td>Major</td>
</tr>
<tr>
<td>Station Road</td>
<td>15</td>
<td>57</td>
<td>70-75</td>
<td>Moderate</td>
</tr>
<tr>
<td>Newbridge</td>
<td>40-100</td>
<td>68</td>
<td>67-72</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
13.5.4 Description of Construction Noise Impacts

City Centre to Haymarket

Throughout this section construction noise levels are likely to be in the range 75-80dB(A) at the facades of the buildings facing the route. Ambient noise levels are in the range 70-72dB(A) thus the area is accustomed to high levels of noise, nevertheless, construction noise would be a Major impact.

Haymarket to Bankhead Drive

This route section includes sensitive development at Balbirnie Place, Roseburn Maltings in Russell Road, Baird Drive, Whitsun Road, Stenhouse Drive and Broomhouse Drive.

Roseburn Maltings

Roseburn Maltings is located at 22m from the route and construction noise levels are predicted to be in the range 72-77dB(A), approximately 10 dB(A) above the existing ambient and would be regarded as a Moderate to Major impact.

Baird Drive

Rear facades of properties on Baird Drive face the existing railway. Baseline noise measurements showed a daytime average $L_{Aeq,18hr}$ of 58dB(A) and construction noise is likely to be in the range 78-83dB(A) $L_{Aeq,12hr}$ during the site clearance and track laying phases. This would be a Major impact for a period of a few weeks during the overall construction period.

Whitson Road/Stenhouse Avenue West

Properties in this area face the existing railway line, which is located between Line 2 and the properties. Based on measurements in Baird Drive, the ambient noise at these properties would be 55-58dB(A) and construction noise levels 63-68dB(A) would produce a Minor to Moderate impact. Located at 68m from the route, construction vibration would be Negligible.

Stenhouse Drive

Traffic on Stenhouse Drive is located between the proposed route and a number of blocks of flats, the nearest of which is at 37m from the track. Construction noise levels are predicted to be in the range 68-73dB(A), approximately 8dB(A) above the existing ambient and would be regarded as a Moderate impact.

Broomhouse Drive

Traffic on Broomhouse Drive is also located between the proposed route and the blocks of flats, the nearest of which is at 30m from the proposed track. Construction noise levels are predicted to be in the range 70-75dB(A), approximately 5dB(A) above the measured ambient and would be regarded as a Moderate impact.

Bankhead Drive

Commercial property on Bankhead Drive is located at 37m from the proposed route and construction noise levels are predicted to be in the range 68-73dB(A), approximately 5dB(A) above the measured ambient and should not cause disturbance to users of the premises.

Edinburgh Park to Gogar Roundabout

Edinburgh Park

The route passes through the commercial area of Edinburgh Park where the closest approach to the buildings is at 15m. These buildings are not as sensitive as residential property but the predicted construction noise levels are in the range 78-83dB(A) and this could cause disturbance to occupiers.
**Gogar Roundabout to Airport Terminal**

Only one sensitive property was identified in this section at Gogar Castle Lodge. Construction noise levels are likely to be 73 – 78dB(A) and due to the high ambient noise levels from traffic on the A8, the impact would be Moderate.

**Park and Ride to Newbridge**

**Glasgow Road A8**

This applies to properties at Middle Norton, the Norton House Hotel Lodge, Ingliston Lodge where the route passes along the central reservation of the A8. Properties are located at approximately 19m from the line of the route and construction noise levels are predicted to be in the range 73-78dB(A) which is marginally above the ambient noise level of 74dB(A). Due to this high background noise the impact is likely to be only Minor.

**Hillwood Rise, Ratho**

These properties are located at 49-70m from the route and construction noise levels are predicted to be in the range 64-69dB(A), approximately 10 dB(A) above the existing ambient level of 54dB(A) and would be regarded as a Minor to Moderate impact.

**Station Road, Ratho**

Located at 49-70m from the route, these properties are likely to experience construction noise levels in the range 75-80dB(A), approximately 18 dB(A) above the existing ambient level of 57dB(A) and would be regarded as a Major impact.

**Newbridge**

The rear of properties on Bridge Street and Old Liston Drive located at 40-100m from the terminal tram stop are likely to experience construction noise levels of 67-72 dB(A). This is only marginally above the existing ambient noise of 68dB(A), thus the impact would Minor.

13.5.5 **Description of Construction Vibration Impacts**

**City Centre to Haymarket**

Vibration during the road breaking, preparation and track laying phases is likely to be perceptible inside buildings closer than 15m through this section but it should not reach levels where even superficial damage might occur and would be classified as a Moderate but short term impact.

**Haymarket to Bankhead Drive**

Vibration along this route section is not likely to cause any significant impact and construction vibration would be Negligible at most locations but with the exception of Baird Drive, where, at a distance of less than 15m for a number of properties, vibration during the clearance and track laying phases is likely to be perceptible for short periods inside these dwellings but it would not reach levels where even superficial damage would occur.

**Edinburgh Park to Gogar Roundabout**

Vibration during construction might occasionally be perceptible inside the commercial buildings located close to the route but it should not reach levels where even superficial damage might occur.

**Gogar Roundabout to Airport Terminal**

No sensitive property was identified in this section where construction noise or vibration might be significant.
Ingliston Park and Ride to Newbridge

Glasgow Road A8
Vibration due to construction would be no more than that currently experienced from traffic thus the construction vibration would be regarded as Negligible.

Hillwood Rise, Ratho Station
Vibration from construction activities would be Negligible at this distance.

Station Road, Ratho Station
Vibration during the clearance and track laying phases is likely to be perceptible inside these dwellings but it should not reach levels where even superficial damage might occur and would be classified as a Moderate impact.

Newbridge
Vibration due to construction would be no more than that currently experienced from traffic on the A8 thus the construction vibration would be regarded as Negligible.

13.6 PERMANENT AND OPERATIONAL EFFECTS

13.6.1 Potential Effects

Trams passing along or close to, existing highway in an urban environment are not likely to cause any significant impact, since, in general, traffic noise levels of typically 70-75dB(A) would be higher than street running tram noise levels at 60-65dB(A). Also peak noise levels due to trams of 78-82dB(A) would be of similar value to that of a passing lorry. In areas away from main roads where trams run on more open ground, there is greater potential for disturbance, however, in these situations it is often possible to provide mitigation to reduce the potential impact.

The impacts of tram noise have been determined from the difference between predicted noise levels and ambient levels. The method of prediction and assumptions on numbers of trams and speeds are described above in the Methods section.

The effects of tram vibration are confined to locations where buildings are located closer than approximately 15m from the nearest rail. At distances of 10-15m occasional trams may cause perceptible vibration in a building and at distances of less than 7m, tram vibration is likely to be more frequently perceptible. However, even at the closest distance, tram vibration would not cause damage to building structures.

13.6.2 Mitigation

Reduction of operational noise involves system design, type of vehicle, maintenance of wheels, track design. Mitigation measures to help alleviate potential noise problems can be in terms of noise reduction at source, control of the noise transmission path or the installation of protective measures at affected receptors. The system design is such that source reduction would be achieved by the type of vehicle selected where suspension, sound insulation, wheel design and braking systems would need to be considered.

One of the most important aspects in reducing operational noise levels is the maintenance of wheels and rails. It has been estimated that the presence of irregularities or ‘flats’ on the wheel surfaces of trams can result in an increase of noise levels of up to 10 dB(A). Thus regular wheel maintenance is important. It is anticipated that wheels would be re-profiled in the Depot without removal from the vehicle.

Control of the noise transmission path could take the form of solid barriers alongside the tracks. Barriers are regarded as the most practical method of
reducing noise levels whilst still maintaining a workable transport service. It is estimated that a 2 metre reflective barrier situated 2 m from the nearside rail would afford up to a 12 dB(A) reduction in rolling noise at a receptor 10 m away. However, barriers are not usually a practicable proposition on street running sections.

Noise at tram stops is a more diffuse source than rolling noise since it comprises a variety of sources each located differently. Mitigation of such noise could take the form of extended platform walls or extra trackside barriers depending on the layout of the stop. British local authorities and many local governments in protecting dwellings from transport noise, emphasise that insulating buildings is a measure of last resort, in situations where the noise levels cannot be reduced to a defined level by other means (Noise Insulation Regulations). It should be noted that the prediction work for this study has shown that the prescribed levels in the Regulations are unlikely to be exceeded at any properties along the Tram Line 2 route.

In residential areas it is necessary to minimize the noise output from the electricity substations. The primary source of noise from the substations is the production of a mid to low frequency (100-400 Hz) noise tone generated by the rectifier and its associated transformer. Final design of the substation buildings would take into account the need to use either indoor transformers or outdoor transformers contained by a brick-built acoustically shielding wall. Either of these methods would be sufficient to reduce noise levels from the system. Other noise events within the substation buildings would be infrequent and connected with switching operations. Such noise is readily attenuated by typical brick and modular steel buildings.

Tram vibration can be mitigated by limited methods. On street running sections, the rail can be embedded in elastomer or rubber which helps to reduce vibration transmission into the ground. In addition, the slab on which the rail is fixed can be isolated by means of rubber pads or matting. On segregated sections, however, the rail is normally fixed to sleepers which are ballasted, again, to reduce vibration transmission, and in addition, rail fixings to the track can be isolated by means of rubber boots. There is also further scope for vibration reduction by using isolation mats which can be placed under the ballast.

13.6.3 Residual Impacts

The results of the operational tram noise assessment during daytime are summarised in Table 13.12 and the worse hour night time assessment is shown in Table 13.13. This table compares night time (midnight to 0600) ambient noise levels with the tram noise levels when running at 6 per hour during the busiest one hour. This takes account of the worse likely impact during night period.
Table 13.12 Daytime Impact of Operational Tram Noise

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from track (m)</th>
<th>Estimated Ambient Noise Level $L_{Aeq,18hr}$</th>
<th>Predicted Tram Noise Level $L_{Aeq,18hr}$</th>
<th>Combined Noise Level $L_{Aeq,18hr}$</th>
<th>Difference dB</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 Balbirnie Place (Unmitigated)</td>
<td>5</td>
<td>57</td>
<td>70</td>
<td>70</td>
<td>+13</td>
<td>Major</td>
</tr>
<tr>
<td>65 Balbirnie Place (Mitigated)</td>
<td>5</td>
<td>57</td>
<td>61</td>
<td>62</td>
<td>+5</td>
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</tr>
<tr>
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<td>57</td>
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<td>66</td>
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<td>Moderate</td>
</tr>
<tr>
<td>57 Balbirnie Place (Mitigated)</td>
<td>15</td>
<td>57</td>
<td>57</td>
<td>60</td>
<td>+3</td>
<td>Minor</td>
</tr>
<tr>
<td>Shandwick Place</td>
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<td>65</td>
<td>73</td>
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</tr>
<tr>
<td>West Maitland Street</td>
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<td>71</td>
<td>63</td>
<td>71</td>
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</tr>
<tr>
<td>Russell Road, Roseburn Maltings</td>
<td>22</td>
<td>62</td>
<td>61</td>
<td>64</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>22 Baird Drive (unmitigated)</td>
<td>16</td>
<td>58</td>
<td>65</td>
<td>66</td>
<td>+8</td>
<td>Moderate</td>
</tr>
<tr>
<td>22 Baird Drive (mitigated)</td>
<td>16</td>
<td>58</td>
<td>58</td>
<td>61</td>
<td>+3</td>
<td>Minor</td>
</tr>
<tr>
<td>38 Baird Drive (unmitigated)</td>
<td>14</td>
<td>59</td>
<td>66</td>
<td>67</td>
<td>+8</td>
<td>Moderate</td>
</tr>
<tr>
<td>38 Baird Drive (mitigated)</td>
<td>14</td>
<td>59</td>
<td>56</td>
<td>62</td>
<td>+3</td>
<td>Minor</td>
</tr>
<tr>
<td>Stenhouse Drive</td>
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<td>59</td>
<td>65</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Broomhouse Drive</td>
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<td>69</td>
<td>60</td>
<td>69</td>
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<td>Negligible</td>
</tr>
<tr>
<td>Bankhead Drive</td>
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<td>69</td>
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<td>Negligible</td>
</tr>
<tr>
<td>Edinburgh Park</td>
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<tr>
<td>Glasgow Road</td>
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<td>74</td>
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</tr>
<tr>
<td>Hillwood Rise (unmitigated)</td>
<td>49-70</td>
<td>54</td>
<td>59</td>
<td>60</td>
<td>+6</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hillwood Rise (mitigated)</td>
<td>49-70</td>
<td>54</td>
<td>53</td>
<td>56</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>Station Road (unmitigated)</td>
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<td>62</td>
<td>63</td>
<td>+6</td>
<td>Moderate</td>
</tr>
<tr>
<td>Station Road</td>
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<td>57</td>
<td>55</td>
<td>58</td>
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<td>Negligible</td>
</tr>
<tr>
<td>Newbridge</td>
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<td>68</td>
<td>59</td>
<td>68</td>
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<td>Negligible</td>
</tr>
</tbody>
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The results of the operational tram noise assessment are summarised in Table 13.13.
<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from track m</th>
<th>Estimated Ambient Noise Level LAeq,1hr</th>
<th>Predicted Tram Noise Level LAeq,1hr</th>
<th>Combined Noise Level LAeq,18hr</th>
<th>Difference dB</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princes Street</td>
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</tr>
<tr>
<td>Shandwick Place</td>
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<td>64</td>
<td>68</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>West Maitland Street</td>
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<td>62</td>
<td>69</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>65 Balbirnie Place (Unmitigated)</td>
<td>5</td>
<td>56</td>
<td>64</td>
<td>64</td>
<td>+8</td>
<td>Moderate</td>
</tr>
<tr>
<td>65 Balbirnie Place (Mitigated)</td>
<td>5</td>
<td>56</td>
<td>55</td>
<td>59</td>
<td>+3</td>
<td>Minor</td>
</tr>
<tr>
<td>57 Balbirnie Place (Unmitigated)</td>
<td>15</td>
<td>56</td>
<td>60</td>
<td>62</td>
<td>+6</td>
<td>Moderate</td>
</tr>
<tr>
<td>57 Balbirnie Place (Mitigated)</td>
<td>15</td>
<td>56</td>
<td>51</td>
<td>57</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Russell Road, Roseburn Maltings</td>
<td>22</td>
<td>56</td>
<td>58</td>
<td>60</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>22 Baird Drive (unmitigated)</td>
<td>16</td>
<td>56</td>
<td>64</td>
<td>64</td>
<td>+8</td>
<td>Moderate</td>
</tr>
<tr>
<td>22 Baird Drive (mitigated)</td>
<td>16</td>
<td>56</td>
<td>57</td>
<td>60</td>
<td>+4</td>
<td>Minor</td>
</tr>
<tr>
<td>38 Baird Drive (unmitigated)</td>
<td>14</td>
<td>57</td>
<td>65</td>
<td>66</td>
<td>+8</td>
<td>Moderate</td>
</tr>
<tr>
<td>38 Baird Drive (mitigated)</td>
<td>14</td>
<td>57</td>
<td>58</td>
<td>61</td>
<td>+4</td>
<td>Minor</td>
</tr>
<tr>
<td>Whitson Road/Stenhouse Avenue West</td>
<td>68</td>
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<td>57</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>Stenhouse Drive</td>
<td>37</td>
<td>60</td>
<td>57</td>
<td>62</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>Broomhouse Drive</td>
<td>30</td>
<td>60</td>
<td>54</td>
<td>60</td>
<td>0</td>
<td>Negligible</td>
</tr>
<tr>
<td>Bankhead Drive</td>
<td>37</td>
<td>60</td>
<td>57</td>
<td>62</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>Glasgow Road</td>
<td>19</td>
<td>65</td>
<td>62</td>
<td>66</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Hillwood Rise (unmitigated)</td>
<td>49-70</td>
<td>54</td>
<td>58</td>
<td>59</td>
<td>+5</td>
<td>Moderate</td>
</tr>
<tr>
<td>Hillwood Rise (mitigated)</td>
<td>49-70</td>
<td>54</td>
<td>51</td>
<td>56</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>Station Road (unmitigated)</td>
<td>15</td>
<td>51</td>
<td>60</td>
<td>63</td>
<td>+6</td>
<td>Moderate</td>
</tr>
<tr>
<td>Station Road</td>
<td>15</td>
<td>51</td>
<td>53</td>
<td>55</td>
<td>+4</td>
<td>Minor</td>
</tr>
<tr>
<td>Newbridge</td>
<td>40-100</td>
<td>60</td>
<td>52</td>
<td>60</td>
<td>0</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
13.6.4 Description of Operational Noise Impacts

City Centre to Haymarket

The effect of changes in noise levels resulting from changes in road traffic flows due to tram operations was considered. A 25% change of flow is needed to produce a 1dB(A) change of noise level and using data provided by the Traffic and Transport analysis, the change of traffic flows on roads along this section of the route suggests that traffic levels will decrease by up to 30%. Noise from traffic would decrease by approximately 1 dB(A). It was concluded therefore that traffic effects on noise were Negligible.

Due to high levels of ambient noise, impacts from the tram are likely to be Negligible through most of this section. The exception is the section along the rear of Balbirnie Place.

Balbirnie Place

At the closest position, no. 65, the track is only 5m from the building and Major impacts are predicted. The remaining properties are located at 10-20m from the track where Moderate to Major impacts would be expected. However, the construction of an absorptive trackside barrier at a height of 2m above the track level and as close to the trackside as possible, would reduce the Major impact to Moderate at the closest properties and to Minor at remaining properties. Mitigated impacts at night would also be Negligible to Minor.

Haymarket to Bankhead Drive

The change of traffic flows on roads along this section of the route are unlikely to change noise by more than 1-2 dB(A). It was concluded therefore that traffic effects on noise were Negligible.

Operational noise impacts at sensitive properties in this section of the route are likely to be Negligible with the exception of those located in Baird Drive.

Baird Drive

The tram alignment then runs parallel to the northern side of the heavy rail Edinburgh/Glasgow line, past the Murrayfield playing fields and over the Water of Leith. It then progresses west within the heavy rail reservation to Balgreen Road. Properties lie to the south of the heavy rail corridor at Baird Drive. It has been assumed that the line would be constructed at the base of the embankment at the rear of these properties. Noise predictions were made at two representative properties at Baird Drive (Table 13.13) to demonstrate how the change in distance from the tram affects noise levels.

With no barrier in place noise is predicted to increase by 8 dB(A) at both no. 22 and 38 Baird Drive. The provision of a 2m high noise barrier would significantly reduce noise from the tram. The impacts at the upper floor of the facades of these properties would be Minor (i.e. an increase of 3dB(A)) and Negligible at ground floor level. Noise levels at the ground floor level and in gardens are reduced (by a further 4-5dB(A)) as the barrier reduction is more effective at this level.

These results are representative of the effects on all of the properties on the south side of Baird Drive. While the distance between the properties and the tram varies slightly, the corresponding variation in noise levels is very small at approx 1dB(A).

Mitigated impacts along Baird Drive at night are very similar to impacts during the daytime i.e. Minor.

Edinburgh Park to Gogar Roundabout

The route passes through the commercial area of Edinburgh Park where the closest approach to the buildings is at approximately 15m. These buildings are not
as sensitive as residential property and the predicted operational noise level is 62dBA. This is unlikely to cause disturbance to occupiers.

As in the previous route section, no road segments were identified where noise due to traffic was likely to cause a noise increase in excess of 1dBA. Impact due to traffic was therefore Negligible.

**Gogar Roundabout to Airport Terminal**

Only one sensitive property was identified in this section where operational noise might be perceptible and that was at Gogar Castle Lodge. Located close to the A8 the noise of traffic on Glasgow Road would be significantly more than noise from trams and is unlikely to have any impact on the property. Tram noise and vibration would be regarded as Negligible.

**Ingliston Park and Ride to Newbridge**

As in the previous route sections, no roads were identified where noise due to traffic was likely to cause a noise increase or decrease in excess of 1dBA. Impact due to traffic was therefore regarded as Negligible.

**Glasgow Road**

Sensitive property on the Glasgow Road in the Middle Norton area is subject to high levels of existing traffic noise at 74dBA. Predicted tram noise of 64dBA would therefore not increase the ambient noise levels and impacts would be Negligible. Similarly at night, the impact of tram noise would be Negligible.

**Ingliston Road**

A residential property, No. 4 Ingliston Road, is over 30m from a proposed tram stop (Ingliston West). Existing ambient noise levels are relatively high (approximately 70dBA) mainly due to road traffic on the A8. Predicted tram noise at this location is 60dBA during the daytime and would therefore not increase the ambient noise levels and impacts would be Negligible. At night, the impact of tram noise would be approximately 54 dB(A) and therefore have a Negligible impact.

**Hillwood Rise**

Where the tram passes to the rear of properties in Hillwood Rise, operational noise levels are likely to be 59dBA which is above ambient noise levels of 54dBA resulting in a Moderate impact. These levels of noise are comparatively low and not likely to cause disturbance, nevertheless the change in noise level is likely to be noticeable and in order to reduce this impact a trackside noise barrier should be considered. This would not need to be higher than 1.5m and could be formed by bunding or rock gabions, located as close as possible to the track, reducing the noise impact to Negligible. At night, the mitigated noise levels would also be described as Negligible.

**Station Road**

At the properties in Station Road nearest the route, train and aircraft noise dominate the existing ambient noise of 57dBA which is below the predicted tram operational noise level of 62dBA. This is likely to result in a Moderate impact at these properties. A 2m barrier alongside this section of track, in front of the group of properties closest to the route would reduce the impact to Negligible. At night, unmitigated noise impact would be Moderate, reducing to Minor with the proposed mitigation measures.

**Newbridge**

At the Newbridge terminal, nearby properties on Bridge Street and Old Liston Road are subject to high levels of existing traffic noise and aircraft at 68dBA. Predicted tram noise of 59dBA would therefore not increase the ambient noise levels and impacts would be Negligible. Similarly at night, noise impacts would be Negligible.
13.6.5 Description of Operational Vibration Impacts

Table 13.14 shows the results of the operational vibration calculations at typical locations close to the tram route. Reference should be made to Section 13.3.4 for an explanation of the significance of vibration impacts.

Table 13.14 Results of Tram Vibration Predictions (Unmitigated)

<table>
<thead>
<tr>
<th>Location</th>
<th>VDV(day) ms&lt;sup&gt;1.75&lt;/sup&gt;</th>
<th>VDV (night) ms&lt;sup&gt;1.75&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shandwick Place</td>
<td>0.12</td>
<td>0.07</td>
</tr>
<tr>
<td>65 Balbirnie Place</td>
<td>0.24</td>
<td>0.14</td>
</tr>
<tr>
<td>Roseburn Maltings</td>
<td>0.06</td>
<td>0.03</td>
</tr>
<tr>
<td>22 Baird Drive</td>
<td>0.15</td>
<td>0.08</td>
</tr>
<tr>
<td>Edinburgh Park</td>
<td>0.10</td>
<td>0.06</td>
</tr>
<tr>
<td>Middle Norton</td>
<td>0.12</td>
<td>0.07</td>
</tr>
<tr>
<td>84 Station Road Ratho</td>
<td>0.08</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**City Centre to Balbirnie Place**

Vibration due to trams is likely to be Negligible at buildings greater than 15m from the track through most of this section for most of the time, however, occasional trams might be perceptible within some of the properties located closer than 15m from the track where impacts are expected to be Minor as shown in the predicted levels in Shandwick Place. At distances of less than 7m tram vibration is likely to be more frequently perceptible and additional isolation measures should be considered. There are properties in West Maitland Street, Shandwick Place, Princes Street and around St Andrew Square which are located at distances of less than 15m where impacts would be Negligible or Minor. However, those identified at closer than 7m were at 65 Balbirnie Place, 18 Devon Place and Rosebury House where impacts would be Moderate. Additional isolation measures would be considered on track alongside these properties during detailed design, depending on the sensitivity of the buildings.

**Balbirnie Place to Bankhead Drive**

During operation, throughout this section, vibration from trams is likely to be Negligible except at Baird Drive where occasional trams might be perceptible within these properties where impacts are expected to be Minor. To reduce the likelihood of such impacts mitigation could be considered during detailed design in the form of trackbed isolation mats placed under the ballasted track. This assumes that the line is constructed at the base of the embankment, if constructed on the existing railway embankment then vibration impacts would be Negligible.

**Edinburgh Park to Gogar Roundabout**

Vibration from trams might occasionally be perceptible inside buildings near the Park Centre, located at 15m from the track but it should not cause disturbance as these are commercial uses and would not reach levels where even superficial damage might occur.

**Gogar Roundabout to Airport Terminal**

Gogar Castle Lodge is the only sensitive property on this section and vibration from trams would be Negligible.

**Ingliston Park and Ride to Newbridge**

Throughout this section, vibration from trams at the distances of sensitive buildings would be imperceptible and less that ambient levels of vibration due to local traffic. Thus impacts would be Negligible.
**Noise and Vibration Impacts from the Depot**

The depot is ideally situated with respect to noise sensitive development. Activities at the depot would include the movement of vehicles around the site, vehicle washing facilities and maintenance works, all of which would operate through 24 hours. The nearest residence at Gogar Castle Lodge, is approximately 300m from the site and is located on the A8 Glasgow Road where ambient noise levels are high during the day and night. Noise from the depot would not be audible over these high ambient levels even at night. Vibration from activities at the depot would not be detectable at this distance.

**13.7 SUMMARY**

An assessment of noise and vibration due to construction and operation of the proposed Tram Line 2 has been carried out. The route passes through areas of high ambient noise and areas of significant residential and commercial use.

Construction noise is likely to cause the highest impacts with Major effects at a number of locations, including the city section between St Andrew Square and Balbirnie Place, Roseburn Maltings, Baird Drive and Station Road, Ratho Station. An EMS would be implemented to control and minimise the impact of construction noise. Vibration from construction is predicted to cause temporary impacts in the city section and at Baird Drive and Station Road but all construction impacts would be of limited duration. At no location would construction vibration cause any damage to buildings.

The impact of operational noise is limited to properties relatively close to the route. Major/Moderate (unmitigated) impacts were predicted at Balbirnie Place and at Baird Drive, Station Road and Hillwood Rise were. However, mitigation measures, such as noise barriers at these locations, would reduce these impacts to Minor or Negligible. Operational vibration from trams is predicted to be Negligible. Some locations were identified where additional track isolation would be considered during detailed design to ensure that Negligible impacts are achieved.
14 Air Quality

14.1 INTRODUCTION
This section assesses the impact of the proposed Tram Line 2 on local and global air quality. The impact on local air quality was determined by examining the change in predicted concentrations in the Edinburgh area. The effect on global air quality was assessed by determining the impact on carbon dioxide (CO₂) emissions.

14.2 METHODS

14.2.1 Assessment Scope
The impact of the Tram Line 2 scheme would have an effect on the distribution of traffic throughout the Edinburgh area. Therefore, the study area for this assessment has been selected to cover the A8 corridor to the west of the city centre and the city centre, especially concentrating on the western half of the city. All the significant roads in the area have been assessed with particular attention on roads with greater than 10,000 vehicles per day (AADT) and roads with changes in traffic flow of ±5%.

The assessment was designed to predict concentrations and CO₂ emissions for a base case (2001), an opening year (2011) and a design year (2016). Two scenarios, one without the Line 2 scheme (Do-Minimum) and one with the scheme (Do-Something) were assessed for the two future years.

14.2.2 Baseline Methods
Information was collected from a number of sources to provide background details to the air quality assessment. The Air Quality Review and Assessment reports produced by City of Edinburgh Council (CEC) were examined. Data were also obtained from the UK Air Quality Archive for monitoring and background concentration data.

14.2.3 Assessment Methods

Local Air Quality
The local air quality sub-objective was assessed by determining concentrations of nitrogen dioxide (NO₂) and particulate matter smaller than 10 µm (PM₁₀). Following consultations with CEC it was agreed that FaberMaunsell would undertake a detailed regional dispersion modelling appraisal of the effects from Line 2. This methodology was used because CEC has designated part of central Edinburgh as an Air Quality Management Area (AQMA) due to predicted exceedences of NO₂ concentrations. The AAQuI RE 6.1 model has been used to provide the detailed assessment required in such areas.

This type of appraisal is a more comprehensive assessment than the DMRB approach recommended in STAG, but it has been undertaken in a manner which is compatible with STAG requirements (i.e. the numbers of properties experiencing change in air quality within specified distance bands has been calculated). The AAQuI RE 6.1 regional air quality model was used to predict NO₂ and PM₁₀ concentrations for an existing baseline (2001) and two future years (the opening year (2011) and design year (2026)). The opening and design year scenarios were both run for a Do-Minimum case and a Do-Something case. Contour plots for the study area were also produced.

Impacts will be defined qualitatively with reference to Table 14.1. Predicted levels of both pollutants will be compared to the annual mean objectives outlined in ‘The Air Quality (Scotland) (Amendment) Regulations 2002’. These objectives and standards for NO₂ and PM₁₀ are listed in Table 14.2.
Table 14.1 Criteria for Assessing Impact on Local Air Quality

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Where 20% or more of residential properties observe, on average, a change in concentration of 1 µg/m³.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Where 10% or more of residential properties observe, on average, a change in concentration of 1 µg/m³.</td>
</tr>
<tr>
<td>Minor</td>
<td>Where 1% or more of residential properties observe, on average, a change in concentration of 1 µg/m³.</td>
</tr>
<tr>
<td>Negligible</td>
<td>Where less than 1% or more of residential properties observe, on average, a change in concentration of 1 µg/m³.</td>
</tr>
</tbody>
</table>

Table 14.2 UK Objectives for NO₂ and PM₁₀ for Scotland

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Concentration</th>
<th>Measured as</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO₂</td>
<td>200 µg/m³</td>
<td>1 Hour Mean, 18 exceedences</td>
<td>31 Dec 2005</td>
</tr>
<tr>
<td></td>
<td>40 µg/m³</td>
<td>Annual Mean</td>
<td>31 Dec 2005</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>50 µg/m³</td>
<td>24 Hour Mean, 35 exceedences</td>
<td>31 Dec 2004</td>
</tr>
<tr>
<td></td>
<td>40 µg/m³</td>
<td>Annual Mean</td>
<td>31 Dec 2004</td>
</tr>
<tr>
<td></td>
<td>50 µg/m³</td>
<td>24 Hour Mean, 7 exceedences</td>
<td>31 Dec 2010</td>
</tr>
<tr>
<td></td>
<td>18 µg/m³</td>
<td>Annual Mean</td>
<td>31 Dec 2010</td>
</tr>
</tbody>
</table>

**Global Air Quality**

The global air sub-objective in accordance with STAG has been undertaken using the DMRB Volume 11, Section 3, Part 1. This sub-objective was assessed by determining the impact on CO₂ emissions and using this gas as a proxy for all greenhouse gases. Both the impacts due to the change in road traffic flows and the CO₂ produced indirectly by the power consumption of the trams have been accounted for. CO₂ emissions for each link in the road network have been assessed. The assessment compares a existing baseline case based on current traffic flows with the opening year (2011) and the design year (2026), with and without the tram system.

Impacts will be defined qualitatively with reference to Table 14.3.

Table 14.3 Criteria for Assessing Impact on Global Air Quality

<table>
<thead>
<tr>
<th>Impact Assessment</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td>Where CO₂ emissions change by more than 20%.</td>
</tr>
<tr>
<td>Moderate</td>
<td>Where CO₂ emissions change by more than 10%.</td>
</tr>
<tr>
<td>Minor</td>
<td>Where CO₂ emissions change by more than 1%.</td>
</tr>
<tr>
<td>Negligible</td>
<td>Where CO₂ emissions change by less than 1%.</td>
</tr>
</tbody>
</table>

Significant impacts on roadside concentrations were defined as a change in 1 µg/m³.

### 14.3 EXISTING CONDITIONS

#### 14.3.1 Air Quality Monitoring

A summary of the continuous monitoring undertaken in Edinburgh during 2001 is listed in Table 14.4.
Table 14.4 Continuous Monitoring Results in Edinburgh for 2002

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual Mean NO₂ / µg/m³</th>
<th>Annual Mean PM₁₀ (grav) / µg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>AURN Princes St Gdns</td>
<td>48</td>
<td>21</td>
</tr>
<tr>
<td>Queen St/North Castle St</td>
<td>44</td>
<td>23</td>
</tr>
<tr>
<td>Gorgie Road</td>
<td>38</td>
<td>NM</td>
</tr>
<tr>
<td>Haymarket Terrace</td>
<td>42</td>
<td>23</td>
</tr>
</tbody>
</table>

NM – Not Measured

14.3.2 Background Concentrations

Background concentrations were based from the National Air Quality Archive website using the concentrations for grid reference (321500,673500). Future year backgrounds were calculated using the correction factors developed for Local Authority Review and Assessment work. The background concentrations used in the study are listed in Table 14.5.

Table 14.5 Background Concentrations

<table>
<thead>
<tr>
<th>Location</th>
<th>NO₂ / µg/m³</th>
<th>PM₁₀ (grav) / µg/m³</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>46.2</td>
<td>18.1</td>
</tr>
<tr>
<td>2011</td>
<td>30.5</td>
<td>16.6</td>
</tr>
<tr>
<td>2026</td>
<td>27.5</td>
<td>16.6</td>
</tr>
</tbody>
</table>

14.3.3 Conversion of NOₓ to NO₂

Oxides of nitrogen (NOₓ) are primarily comprised of nitric oxide (NO) and nitrogen dioxide (NO₂), which are formed as a result of high temperature combustion. The majority of NOₓ emitted from vehicles is in the form of NO, part of which is then oxidised in the air to produce NO₂. The conversion of NO to NO₂ takes place in the atmosphere via reactions with chemically active species such as ozone.

Therefore, dispersion modellers actually initially predict NOₓ concentrations and then a variable factor is used to estimate NO₂ concentrations. The conversion curve used in this study was derived from the 8760 hours of NO₂ and NOₓ data measured in 2002 at the AURN site at Princes Street Gardens. This was considered to be representative of the Edinburgh urban area.

14.3.4 Edinburgh Air Quality Management Area

CEC completed the first phase of the Local Authority Review and Assessment work with their Stage 4 report in May 2002. This work predicted that the NO₂ annual mean objective would be exceeded in 2005 at the following city centre locations:

- City centre area including Princes Street
- Haymarket
- Roseburn
- Gorgie/Ardmillan
- McDonald Road

An Air Quality Management Area (AQMA) was designated within Edinburgh, which joins all five areas. The boundaries of the AQMA are shown below:
CEC has produced an Air Quality Action Plan for this Area which concentrates on:

• reducing vehicle numbers
• easing congestion, and
• reducing health risk, especially to vulnerable members of society.

14.4 CONSTRUCTION EFFECTS

14.4.1 Potential Impacts

Potential impacts associated with the construction phase of the Line 2 scheme have been assessed qualitatively in the following sections.

Road Traffic

During construction of the tram infrastructure, there will inevitably be disruption caused to the normal traffic flows. To keep the impacts to a minimum, the re-routing of traffic should be clearly signed and as much planning done to reduce congestion as much as possible. The more free-flowing the traffic is, the lower the impacts are likely to be on air quality.

Dust

The construction of the proposed Tram Line 2 will lead to the generation of dust. It is expected that the impact will be reasonably short-term and will have no residual impacts. However, the construction area is within 20 metres of residential areas and particular care will need to be taken to minimise any dust impacts.

Fugitive dust emissions can pose a number of problems including detrimental effects on health, nuisance problems and effects on vegetation. There is no recognised guidance on the significance of construction dust impacts, so this table was taken from evidence provided for a large construction project at Public Inquiry (ABP, 2000).
### Table 14.6 Proposed Assessment Criteria for Dust and PM$_{10}$ from Construction Activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Scale</th>
<th>Duration</th>
<th>Soiling</th>
<th>PM$_{10}$</th>
<th>Vegetation Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No Mitigation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large construction sites, with high use of haul routes</td>
<td>Major</td>
<td>Year or more</td>
<td>500 m</td>
<td>100 m</td>
<td>100 m</td>
</tr>
<tr>
<td>Moderate sized construction sites, with moderate use of haul routes</td>
<td>Moderate</td>
<td>Months</td>
<td>200 m</td>
<td>50 m</td>
<td>50 m</td>
</tr>
<tr>
<td>Minor Construction sites, with limited use of haul routes</td>
<td>Minor</td>
<td>Weeks</td>
<td>100 m</td>
<td>25 m</td>
<td>25 m</td>
</tr>
<tr>
<td><strong>With Mitigation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large construction sites, with high use of haul routes</td>
<td>Major</td>
<td>Year or more</td>
<td>100 m</td>
<td>25 m</td>
<td>25 m</td>
</tr>
<tr>
<td>Moderate sized construction sites, with moderate use of haul routes</td>
<td>Moderate</td>
<td>Months</td>
<td>50 m</td>
<td>15 m</td>
<td>15 m</td>
</tr>
<tr>
<td>Minor Construction sites, with limited use of haul routes</td>
<td>Minor</td>
<td>Weeks</td>
<td>25 m</td>
<td>10 m</td>
<td>10 m</td>
</tr>
</tbody>
</table>

Activities with the potential to give rise to dust emissions at this potential development are likely to be as follows:

- Site preparation.
- Excavations.
- Storage/use of cement or other fine particulate materials
- Wind blown material from areas with no vegetation cover.
- Material transfer to and from trucks/lorries.
- Material spills during transportation and handling.
- Vehicle/plant movements on unpaved roads and over construction sites.
- Concrete batching and finishing.

The main impact of construction is likely to be short-term nuisance caused by the deposition of dust settling on properties, vehicles and street furniture during site clearance and construction. Due to the technical difficulties in quantifying meaningful dust emission levels, emphasis is generally placed upon identifying those particular activities which give rise to the greatest dust emissions and formulating suitable control strategies.

### 14.4.2 Mitigation

All potential dust generating activities and locations would be identified prior to commencement of work within the Environmental Management System (EMS). The EMS would set out detailed proposals for dust mitigation. Dust should be controlled at source by the use of appropriate plant handling techniques, good maintenance and housekeeping, and should be minimised by the following:
- The use of surfaced roadways where practicable to minimise dust generation.
- Restriction of access routes to minimise surface destruction.
- Limitation of vehicle movements.
- Restriction of site vehicle speeds.
- Minimisation of dust generation from the loading of trucks by the use of appropriate loading machines.
- Control of dust emissions from vehicles leaving the site by efficient cleaning and sheeting of vehicles.
- Provision of wheel wash facilities which all vehicles will be required to use prior to entering a public highway where necessary.
- Minimisation of on-site storage, with storage areas located away from potentially sensitive receptors.
- Storage of bulk cement and other such potential dust generating materials in silos with appropriate filters.
- Location of stationary construction equipment well away from sensitive receptors.
- Access roads will be swept periodically to remove dust from hard surfaces.
- Unsurfaced site roads will be watered when necessary to maintain moisture content and hence reduce dust generation.
- Re-vegetation of open areas to minimise wind blown dust.
- Removal of any odorous material.

14.4.3 Residual Impacts

Residual impacts associated with the construction phase, comprising those impacts that are likely to remain after mitigation measures have been put in place, are likely to be Negligible for air quality.

14.5 PERMANENT AND OPERATIONAL EFFECTS

This section assesses the potential permanent and operation impacts of the proposed scheme.

14.5.1 Local Air Quality

Contour plots showing predicted concentrations in the study area are shown in Appendix 14. An estimate of the number of properties affected by the Line 2 scheme was determined by predicting roadside concentrations for the two future year scenarios. Table 14.7 indicates the number of properties exposed to improvements and degradations in air quality.

<table>
<thead>
<tr>
<th>Year</th>
<th>With an Improvement in Air Quality</th>
<th>With a Degradation in Air Quality</th>
<th>With Unchanged Air Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>175,893</td>
<td>101,315</td>
<td>1,226</td>
</tr>
<tr>
<td>2026</td>
<td>165,425</td>
<td>105,842</td>
<td>7,167</td>
</tr>
</tbody>
</table>
This table demonstrates that there are a greater number of properties predicted to observe improvements in air quality than those showing a deterioration in air quality.

A more detailed indication of the impact of the Line 2 scheme is achieved by the calculation of the local air quality indices. These indices provide an assessment of the change in exposure to air quality over the whole study area. This assessment combines the change in roadside concentrations with the number of properties affected. A negative value indicates that the scheme is predicted to have a beneficial impact on air quality; a positive value indicates a detrimental impact. Table 14.8 summarises the impacts.

### Table 14.8 Air Quality Indices for Line 2 Scheme

<table>
<thead>
<tr>
<th>Year</th>
<th>NO₂ Index</th>
<th>PM₁₀ Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>-47,669</td>
<td>-11,334</td>
</tr>
<tr>
<td>2026</td>
<td>-39,193</td>
<td>-17,780</td>
</tr>
</tbody>
</table>

These indices predict that the scheme will lead to a Moderate positive impact on local air quality in both 2011 and 2026. This impact was due to a reduction in vehicle kilometres, especially in the more populated areas of the City. The 2011 NO₂ index is equivalent to 47,669 properties seeing a reduction in NO₂ concentrations of 1 µg/m³.

The greatest benefits were found along Haymarket Terrace and Morrison Street. Lesser disbenefits were predicted along Saughton Road and Queensferry Road.

From the contour plots it is possible to examine the predicted concentrations in the study area. In the base case, exceedences of the annual mean NO₂ standard of 40 µg/m³ was widespread along the major roads to the west of the city and throughout the city centre.

No exceedences of the 2004 annual mean PM₁₀ standard was predicted, but the whole study area was predicted to exceed the 2010 annual mean PM₁₀ standard of 18 µg/m³. This was primarily due to the background concentrations used for this study.

In 2011 Do-Minimum, major reductions in NO₂ concentrations were predicted due predominantly to lower vehicular emissions and background concentrations. To the west of the city, only the closest receptors to the A8 and Costorphine Road were predicted to exceed the NO₂ annual mean standard. Within the city centre, the exceedences were more widespread, but reduced greatly from the base case.

There were widespread exceedences of the 2010 annual mean PM₁₀ standard of 18 µg/m³. Again, this was primarily due to the background concentrations used for this study, which meant that exceedences were predicted up to 50 metres from the kerbside of most of the main roads.

The 2011 Do-Something scheme leads to a similar pattern for exceedences. The main impact of the scheme was shown to occur in the Haymarket area. Roadside concentrations of NO₂ and PM₁₀ were predicted to decrease by 10 µg/m³ and 2 µg/m³, respectively. This decrease in NO₂ concentrations significantly reduced the number of properties in the Haymarket area predicted to exceed the annual mean standard. Of the four areas highlighted in the Stage 4 Review and Assessment within the study area, three (Roseburn, Haymarket and the Central Area) were predicted to see significant beneficial impacts. Only one area (Gorgie / Ardmillan) was predicted to slight to significant adverse impacts.
Significant beneficial impacts (change of more than 1 µg/m$^3$) on roadside NO$_2$ concentrations were predicted along the following streets:

- Haymarket Terrace
- Roseburn Terrace
- West Coates
- Roseburn Street
- Wester Coates Road
- Dalry Road
- Morrison Street
- Shandwick Place
- Bread Street
- Manor Place
- Gorgie Road West
- South Gyle Broadway
- Bankhead Road
- Lauriston Place

Significant adverse impacts (change of more than 1 µg/m$^3$) on roadside NO$_2$ concentrations were predicted along the following streets:

- Fountainbridge
- Gilmore Place
- Chester Street
- Belford Road
- Dundee Street
- Gorgie Road East
- Saughton Road
- Costorphine High Street
- Glasgow Road.

Significant beneficial impacts (change of more than 1 µg/m$^3$) on roadside PM$_{10}$ concentrations were predicted along the following streets:

- Haymarket Terrace
- West Coates
- Morrison Street
No significant adverse impacts (change of more than 1 µg/m³) on roadside PM₁₀ concentrations were predicted.

**Verification of Model**

The model was verified with the continuous monitoring sites located within the study area. Table 14.9 shows the comparison of the base case modelling and monitoring results.

<table>
<thead>
<tr>
<th>Site</th>
<th>NO₂</th>
<th>PM₁₀</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Monitored</td>
<td>Modelled</td>
</tr>
<tr>
<td>AURN Princes St Gdns</td>
<td>48</td>
<td>44</td>
</tr>
<tr>
<td>Queen St/North Castle St</td>
<td>44</td>
<td>39</td>
</tr>
<tr>
<td>Gorgie Road</td>
<td>38</td>
<td>47</td>
</tr>
<tr>
<td>Haymarket Terrace</td>
<td>42</td>
<td>45</td>
</tr>
</tbody>
</table>

The results show reasonable agreement for NO₂ except at the Gorgie Road site, whereas the model appears to be slightly underpredicting for PM₁₀.

**14.5.2 Global Air Quality**

The impact of the Line 2 scheme on greenhouse gases has been assessed by predicting the effect on CO₂ emissions. The total CO₂ emissions for the whole study area are listed in the Table 14.10.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>CO₂ Emissions / tonnes per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Baseline (2001)</td>
<td>236,300</td>
</tr>
<tr>
<td>Do-Minimum (2011)</td>
<td>245,131</td>
</tr>
<tr>
<td>Line 2 (2011)</td>
<td>236,792</td>
</tr>
<tr>
<td>Do-Minimum (2026)</td>
<td>284,942</td>
</tr>
<tr>
<td>Line 2 (2026)</td>
<td>260,030</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line 2 (2011) as % of Existing Baseline (2001)</td>
</tr>
<tr>
<td>Line 2 (2011) as % of Do-Minimum (2011)</td>
</tr>
<tr>
<td>Line 2 (2026) as % of Existing Baseline (2001)</td>
</tr>
<tr>
<td>Line 2 (2026) as % of Do-Minimum (2026)</td>
</tr>
</tbody>
</table>

The table indicates that the Line 2 scheme will have a Minor positive impact, as defined by STAG, on air quality, with reductions in CO₂ emissions of 3% and 9% in 2011 and 2026, respectively. It should be noted, however, that due to increased numbers of vehicles in the future years and only minor predicted improvements in vehicular CO₂ emissions, the implementation of Line 2 will result in a neutral impact relative to the Existing Baseline, whereas in 2026 the corresponding impact will be a 10% increase in emissions.

**14.5.3 Mitigation**

**Local Air Quality and Global Air Quality**

Mitigation measures include the increased usage of the trams and other modes of public transport. Further improvements could be made by restricting road traffic through the City or by encouraging the use of non-polluting vehicles. Improved energy efficiency for both road vehicles and the trams used would aid the reduction of CO₂ emissions.
14.6 SUMMARY OF RESIDUAL IMPACTS

The following residual impacts from the construction and operational phases are predicted in Table 14.11.

Table 14.11 Residual Impacts

<table>
<thead>
<tr>
<th>Issue</th>
<th>Construction Impact</th>
<th>Operational Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Air Quality</td>
<td>Negligible</td>
<td>Moderate Positive</td>
</tr>
<tr>
<td>Global Air Quality</td>
<td>Negligible</td>
<td>Minor Positive</td>
</tr>
</tbody>
</table>
15 Cumulative Impacts

15.1 INTRODUCTION

The previous chapters of this ES assess the environmental impacts of the proposed Tram Line 2 scheme as a stand-alone system. This chapter considers the impacts of Tram Lines 1 and 2 running simultaneously. Figure 1.1 shows the alignment of both Lines and the common running section.

The requirement to undertake an assessment of cumulative effects as part of an EIA is set out in Schedule 4 of the Environmental Impact Assessment (Scotland) Regulations 1999 (as amended), which requires:

“A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from...the development”

15.2 METHOD

The approach taken to the cumulative assessment has been to examine potential differences between the Tram Line 2, as discussed in other chapters of the ES, and the proposed combined operation on areas of common running within the Tram Line 2 route. Note that cumulative impacts relating to Tram Line 1 are addressed in the Line 1 ES.

No additional baseline studies have been undertaken for this assessment as the baseline information for Tram Line 2 operating as a standalone route or as part of a network is considered to be the same. The assessment has been undertaken mainly on a qualitative basis.

The significance of cumulative impacts identified in this Chapter is based on the criteria set out in Chapters 5 to 14 of this ES. In addition, Table 15.1 provides criteria to provide an indication of significance of the change in impacts over and above those identified in the Tram Line 2 ES.

<table>
<thead>
<tr>
<th>Impact</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible Change</td>
<td>Operation of the network would result in no change on the parameter considered.</td>
</tr>
<tr>
<td>Minor Change</td>
<td>Slight changes would occur (either positive or negative) that are not significant and do not require any additional mitigation.</td>
</tr>
<tr>
<td>Moderate Change</td>
<td>Additional impacts would be significant and, where negative, require additional mitigation.</td>
</tr>
<tr>
<td>Major Change</td>
<td>Additional impacts would be substantially higher than those assessed in the Line 2 ES.</td>
</tr>
</tbody>
</table>
### 15.3 SCHEME DESCRIPTION

The scenario that is the subject of this cumulative assessment is summarised in Table 15.2 below.

**Table 15.2 Line 1 & 2 Characteristics**

<table>
<thead>
<tr>
<th>Location / Issue</th>
<th>Network Characteristic and Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of Common Running</td>
<td>Common tram route runs in both directions from St Andrew Square to the Roseburn Delta Junction as shown on Figure 1.1.</td>
</tr>
<tr>
<td>Tram Line 1</td>
<td>Would operate 8 tph between St Andrew Square and Roseburn.</td>
</tr>
<tr>
<td>Tram Line 2</td>
<td>Would operate 6 tph between St Andrew Sq and Roseburn.</td>
</tr>
<tr>
<td>Depots</td>
<td>Depot facilities and their operational characteristics are assumed to be the same as those assessed in Tram Line 2 ES.</td>
</tr>
<tr>
<td>Other infrastructure changes compared to Line 1 and Tram Line 2 existing in isolation</td>
<td>Other infrastructure (including sub-stations and turn back facilities) are assumed to be the same as those covered in the Tram Line 2 ES.</td>
</tr>
<tr>
<td>Traffic Data</td>
<td>Limited data available at the time of writing.</td>
</tr>
</tbody>
</table>

For the purposes of the current Chapter, the scope of the cumulative impact assessment of network operations is confined only to those impacts associated with running additional trams on the shared network section between St Andrew Square and the Roseburn junction.

As Table 15.2 above shows this would mean an additional 8 tph along the shared section, giving a total number of trams on the shared section as 14 tph. This is the only operational difference between the standalone Tram Line 2 scheme and the combined scheme that will be considered in this Chapter.

### 15.4 ASSESSMENT

**Traffic and Transport**

Impacts on traffic and transport for Tram Line 2 are discussed in Chapter 5 above. The following permanent and operational effects are considered of overall significance:

- There are likely to be benefits within the city-centre for pedestrians and cyclists although it is difficult to be precise about these given other traffic measures, for example traffic management, that are also proposed. A local benefit of Moderate significance is predicted.

- At a city-wide level the Edinburgh Tram Line 2 can be expected to bring significant benefits in the form of a small reduction in overall traffic flows on highways. However there are a few locations where this is likely to be significant at a local level, providing a regional benefit of Moderate to Major significance.

Running additional trams on the St Andrew Square to Roseburn section would not have a significant effect on pedestrian and cyclist as these impacts relate to the placement of tram infrastructure and not to the frequency or capacity of trams operated. The cumulative effect is therefore assessed Negligible for both parameters.
Running additional trams on the section of track shared by Line 1 and Line 2 would impact on overall traffic flows within Edinburgh. Based on the network effects tests examining the combined effects of lines 1 and 2 (14 tph); whilst detailed traffic modelling has not been carried out, the indications from the tests undertaken are that the impact of adding Line 1 to Line 2 is to generate a decrease in the peak and an increase in the off-peak highway mileage, with an overall decrease of 0.1% highway mileage for 2011 & 0.3% for 2026.

**Table 15.3 Impact on Highway Mileage**

<table>
<thead>
<tr>
<th>Year</th>
<th>AM</th>
<th>Off peak</th>
<th>PM Peak</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>-0.4%</td>
<td>+0.1%</td>
<td>-0.3%</td>
<td>-0.1%</td>
</tr>
<tr>
<td>2026</td>
<td>-0.7%</td>
<td>-0.04%</td>
<td>-0.8%</td>
<td>-0.3%</td>
</tr>
</tbody>
</table>

Information is not available to compare this to a base case of Line 2 operating in isolation over this stretch of the route without operation of the additional Line 1 trams, so it is difficult to assess actual cumulative impact at this stage. However, the figures do show an overall decrease in highway mileage that may be caused by an actual reduction in vehicle journeys and/or a modal shift from other forms of transport to the tram.

**Land Use**

Impacts on land use for Tram Line 2 are discussed in Chapter 6 above. No additional land take is required and therefore no additional impacts on existing or future land use in this area is anticipated. The cumulative impact is therefore assessed as Negligible.

**Geology, Soils & Contamination, Including Hydrogeology and Waste Management**

Impacts on geology, soils and contamination for Tram Line 2 are discussed in Chapter 7 above. The operation of additional trams on the section of common running would not impact on geology or soils over and above the impact already associated with Tram Line 2 in isolation, as no additional land take or construction work would be required. No geological SSSIs or RIGS would be affected and therefore the impact would be Negligible. There would be no additional impacts on contaminated land with the route limits and the cumulative impact associated with contaminated land is assessed as Negligible.

There are no active or potential mining reserves or agricultural land within this section of Tram Line 2, nor evidence of undermining. The cumulative impacts on these issues would therefore all be Negligible. Assuming that the adequate drainage arrangements and environmental management procedures are put in place there would be no additional impact on shallow or deep aquifers during operation of the network and therefore the impacts on hydrogeology would be Negligible. In addition, operation of the network would not generate any significant impacts on waste management sites or create significantly greater waste management issues. The cumulative impact on waste management is therefore assessed as unchanged and therefore negligible.

**Landscape and Visual Impacts**

Impacts on landscape and visual impacts for Tram Line 2 are discussed in Chapter 8 above. The increase in number of trams operating between Roseburn and St Andrew Square would not significantly increase the landscape impact on the local character areas already assessed in Chapter 8 (Area A: Historic City Core).

The long term impacts would remain Moderate to Substantial and adverse. Equally, the additional number and movement of trams on the shared section between Roseburn and St Andrew Square would not result in measurable additional visual impacts to those already assessed under the operation of Line 2 for receptors along this section of the corridor. In summary there would be no
significant landscape or visual cumulative impacts occurring as a result of the network operation.

**Ecology and Nature Conservation**

Impacts on ecology and nature conservation resulting from the Tram Line 2 proposals (including the effect on the Disused Railway UWS and delta junction at Roseburn) are assessed in Chapter 9 above. No additional landtake or construction impacts would occur as a result of combining Tram Lines 1 and 2 in this common area. Beyond the UWS ecological resources are of low ecological value and limited to scrub and grassland adjacent to the railway, and amenity grassland and formal planting at St Andrew Square, Princes Street Gardens and Atholl Crescent / Coates Crescent. There are no known protected species in this area. The cumulative impact of running additional trams on this section is therefore unlikely to have an effect on ecological receptors. The cumulative impact is therefore assessed as Negligible.

**Surface Water**

Impacts on surface water for Tram Line 2 are discussed in Chapter 10 above. There are no surface watercourses that cross or are close to the section of Tram Line 2 track in this study area. The cumulative impacts resulting from the operation of Tram Line 2 on water quality would therefore be Negligible.

There would be Minor potential for accumulated pollutants to be washed from the track areas to the permanent drainage system. Pollution control measures would be incorporated into the drainage system wherever necessary such as from the depot. Sustainable Urban Drainage Systems (SUDS) would be integral to the drainage system designed during the detailed design phase. As the network does not operate close to any watercourses there would be no cumulative impacts on watercourse characteristics or flooding and the impact would therefore be negligible.

**Heritage**

Impacts on archaeology and heritage traffic and transport for Tram Line 2 are discussed in Chapter 11 above. The passage of additional trams along the route section between St Andrew Square and Roseburn would not result in any measurable cumulative effects occurring. The significantly adverse effects of Tram Line 2 on the cultural heritage in this area result from the addition of fixed fixtures (overhead line equipment, tram stops, etc) into the highly sensitive New Town townscape, rather than from the proposed passage of trams along what are already busy transport corridors. In summary, it is anticipated that the combined running of Tram Line 1 and 2 would not give rise to any cumulative network effects occurring on cultural heritage.

**Socio-Economic Effects**

Impacts on socio-economic effects for Tram Line 2 are discussed in Chapter 12 above. The main conclusions relating to the operation are as follows:

- There would be Minor benefits from direct and indirect employment gains resulting from the operation of Tram Line 2.

- The tram would be Minor benefits resulting from induced economic growth through improved linkages and greater economic efficiency.

Assuming the operation of Trams Line 1 and 2 remains the same, the impact on direct employment creation would be negligible. However, it is likely that the operator would attempt to reduce costs and improve overall efficiency of the network and direct job creation may therefore be reduced. The effects on indirect employment are not known but it is likely that the improved linkages and further
reduction of spatial separation in the economy would have benefits for the economy of Edinburgh and the Lothians. This would constitute a Minor Benefit.

**Noise and Vibration**

Impacts on noise and vibration for Tram Line 2 are discussed in Chapter 13 above. For the purpose of this cumulative impact assessment calculations of tram noise and vibration were carried out on the common section of Lines 1 and 2.

Table 15.4 below summarises the results, showing the predicted Tram Line 2 overall noise levels (ambient noise plus 6 trams per hour) and the cumulative noise level (ambient plus 14 trams per hour). The increase in tram movements from 6 per hour to 14 per hour resulted in increases to the tram noise levels but due to the high ambient levels in these areas the increases in combined noise levels were small. There is only one location at Roseburn Maltings where the impact description is likely to change. This change from Negligible to Minor is not considered to be significant.

**Table 15.4 Daytime Cumulative Impact of Tram Noise**

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance from track (m)</th>
<th>Estimated Ambient Noise Level $L_{Aeq,18hr}$</th>
<th>Predicted Line 2 Noise Level $L_{Aeq,18hr}$</th>
<th>Line 1 + Line 2 Noise Level $L_{Aeq,18hr}$</th>
<th>Cumulative Difference from ambient dB</th>
<th>Change of impact from Line 2 to cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Princes Street</td>
<td>20</td>
<td>70</td>
<td>70</td>
<td>71</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Shandwick Place</td>
<td>10</td>
<td>72</td>
<td>73</td>
<td>74</td>
<td>+2</td>
<td>Negligible</td>
</tr>
<tr>
<td>West Maitland Street</td>
<td>15</td>
<td>71</td>
<td>71</td>
<td>72</td>
<td>+1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Balbirnie Place (Unmitigated)</td>
<td>5</td>
<td>57</td>
<td>70</td>
<td>73</td>
<td>+16</td>
<td>Minor</td>
</tr>
<tr>
<td>Balbirnie Place (Mitigated)</td>
<td>5</td>
<td>57</td>
<td>62</td>
<td>65</td>
<td>+8</td>
<td>Negligible to Minor</td>
</tr>
<tr>
<td>Russell Road, Roseburn Maltings</td>
<td>22</td>
<td>62</td>
<td>64</td>
<td>66</td>
<td>+4</td>
<td>Negligible to Minor</td>
</tr>
</tbody>
</table>

Vibration levels were recalculated for the increased tram activity, showing a typical $0.03 \text{ ms}^{-1.75}$ increase to the daytime VDV values. This did not result in any changes to the impact descriptions at the locations where tram vibration levels were assessed.

**Air Quality**

Impacts on air quality for Line 2 are discussed in chapter 13 above. Running additional trams on the route section between St Andrew Square and Roseburn is likely to result in an improvement in air quality, because it is likely that there would be a corresponding decrease in traffic flows in Edinburgh. Overall a minor beneficial impact on air quality is predicted, with regard to both CO$_2$ emissions and concentrations of local air pollutants. Changes in concentrations will depend on future traffic composition, speeds resulting from development of the network. A Minor Beneficial cumulative impact is therefore predicted.
15.5 SUMMARY OF CUMULATIVE IMPACTS

Cumulative impacts associated with operation of the network were assessed on the basis of running additional trams on the section between St Andrew Square and Roseburn (operating 14 tph as opposed to 6tph). Cumulative impacts are summarised in Table 15.4 below, which compares the cumulative impact against the impact associated with the standalone scheme.

<table>
<thead>
<tr>
<th>Environmental Issue</th>
<th>Summary of Significance set out in Line 2 ES for Common Study Area when Tram is Operating</th>
<th>Cumulative Impact (over and above that stated in the Line 2 ES)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traffic and Transport</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pedestrian and Cyclists</td>
<td>Moderate to Benefit</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Reduction in Traffic Flows</td>
<td>Moderate to Major Benefit</td>
<td>Minor Beneficial Impact</td>
</tr>
<tr>
<td><strong>Landuse</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land-take</td>
<td>Moderate Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Geology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designated Sites</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Agricultural Soils</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Contaminated Land</td>
<td>Minor Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Mineral Reserves</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Hydrogeology</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Minor Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Landscape and Visual</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape Impacts</td>
<td>Moderate to Major Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>Moderate to Major Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Ecology and Nature Conservation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Designated Sites</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Species</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Habitats</td>
<td>Minor Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Surface Water</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>Minor Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td>Flooding and drainage</td>
<td>Moderate Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Heritage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultural Heritage</td>
<td>Major Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Socio-Economic Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td>Minor Beneficial Impact</td>
<td>Minor Beneficial Impact</td>
</tr>
<tr>
<td>Community</td>
<td>Minor Negative Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Noise and Vibration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>Negligible to Minor Negative Impact</td>
<td>Negligible to Minor Negative Impact</td>
</tr>
<tr>
<td>Vibration</td>
<td>Negligible Impact</td>
<td>Negligible Impact</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td>Minor Beneficial Impact</td>
<td>Minor Beneficial Impact</td>
</tr>
<tr>
<td>NOₓ and PM₁₀</td>
<td>Moderate Beneficial Impact</td>
<td>Minor Beneficial Impact</td>
</tr>
</tbody>
</table>

Cumulative impacts over and above those impacts associated with Tram Line 2 as a standalone scheme are generally Negligible with Minor beneficial impacts identified for traffic flows, air quality and socio-economic. Minor negative impacts were identified for noise.
16 Summary

16.1 SUMMARY OF CONSTRUCTION AND PERMANENT/OPERATIONAL IMPACTS

This chapter provides a summary of the main construction and permanent/operational impacts for each section of the Tram Line 2 route: findings are summarised in Tables 16.1-16.6 below. The tables briefly describe the potential environmental impacts, the duration of impacts, proposed mitigation measures and residual impacts. To assist the reader the tables have been divided into five areas:

- City Centre (St Andrew Square – Haymarket).
- Haymarket – Bankhead Drive (Edinburgh Park Station).
- Bank Head Drive (Edinburgh Park Station) – Gogar Roundabout.
- Gogar Roundabout – Airport Terminal.
- Ingliston Park and Ride to Newbridge.

In addition, other ‘scheme wide’ issues that are considered to be not location specific, such as greenhouse gas emissions, are summarised in Table 16.6.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increased congestion (cyclists, pedestrians, motor vehicles)</td>
<td>Construction</td>
<td>Avoid closure of Princes Street and Queen Street at same time; divert traffic to other routes.</td>
<td>Minor – Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Difficulty in servicing (motor vehicles and frontage occupiers)</td>
<td>Construction</td>
<td>Provide alternative servicing</td>
<td>Minor – Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Loss of on-street parking</td>
<td>Construction and Operational/Permanent</td>
<td>None</td>
<td>Construction: Minor negative Operation: Negligible</td>
</tr>
<tr>
<td></td>
<td>Reduced difficulty of crossing</td>
<td>Operational/Permanent</td>
<td>Provision of pedestrian and cycle crossing facilities</td>
<td>Moderate benefit</td>
</tr>
<tr>
<td></td>
<td>Increased difficulty in servicing</td>
<td>Operational/Permanent</td>
<td>Provide alternative servicing</td>
<td>Not significant</td>
</tr>
<tr>
<td>Land Use</td>
<td>Commercial building at Haymarket Station</td>
<td>Permanent</td>
<td>Compensation relating to acquisition would be negotiated.</td>
<td>Demolition of 1 commercial building (Caledonian Ale House)</td>
</tr>
<tr>
<td>Geology, Soils and Contamination</td>
<td>No areas of contaminated land identified within scheme limits</td>
<td>N/A</td>
<td>N/A</td>
<td>Negligible</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>The iconic vistas and long views experienced from Princes Street, roads forming the north and south axis to St Andrew Square, and the Mound/Hanover Street would be fundamentally changed by the tram (OLE and poles).</td>
<td>Construction and Operational/Permanent</td>
<td>Streetscape works; refer to ES text and principles identified in the Design Manual for further details</td>
<td>Major – Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Negative impact on views from the Scott Monument and adjacent gardens</td>
<td>Construction and Operational/Permanent</td>
<td>Streetscape works; refer to ES text and principles identified in the Design Manual for further details</td>
<td>Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Negative impact on views from the majority of buildings which front the tram corridor between St Andrew Square and Haymarket</td>
<td>Construction and Operational/Permanent</td>
<td>Streetscape works; refer to ES text and principles identified in the Design Manual for further details</td>
<td>Moderate – Minor negative</td>
</tr>
<tr>
<td>Landscape Impacts</td>
<td>Poles and wires would impact negatively on character of the famous New Town townscapes of St. Andrew Square, Princes Street, Shandwick Place, West Maitland Street and Atholl Crescent</td>
<td>Construction and Operational/Permanent</td>
<td>Streetscape works; refer to ES text and principles identified in the Design Manual for further details</td>
<td>Major negative</td>
</tr>
<tr>
<td></td>
<td>Poles and wires would impact negatively on the character of the Haymarket area</td>
<td>Construction and Operational/Permanent</td>
<td>Streetscape works; refer to ES text and principles identified in the Design Manual for further details</td>
<td>Moderate-Major negative</td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------------------------------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Potential loss of bat roosts due to demolition of building</td>
<td>Construction and Permanent</td>
<td>Further surveys would need to be undertaken prior to demolition to check for presence of bats.</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Loss of amenity grassland at Atholl Crescent/Coates Crescent</td>
<td>Construction and Permanent</td>
<td>Replacement Planting / Landscaping</td>
<td></td>
<td>Negligible</td>
</tr>
<tr>
<td>Surface Water</td>
<td>No watercourses in this section</td>
<td>N/A</td>
<td>N/A</td>
<td>Negligible</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Visual effects on the setting of the New Town townscape</td>
<td>Construction and Permanent/ operational</td>
<td>Sensitive design – see Edinburgh Tram Network Design Manual</td>
<td>Construction: Moderate – Major negative Operation: Major negative</td>
</tr>
<tr>
<td>Demolition of Category C(s) Listed Caledonian Alehouse</td>
<td>Construction and Permanent/ operational</td>
<td>Building survey and monitoring of demolition works</td>
<td></td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Potential direct effects on other Listed Buildings</td>
<td>Construction and Permanent/ operational</td>
<td>Building survey / photographic survey / monitoring of demolition or alterations, as appropriate</td>
<td></td>
<td>Minor – Major negative</td>
</tr>
<tr>
<td>Socio-Economics</td>
<td>General Impacts – see Table 16.6</td>
<td>Construction/ permanent</td>
<td>See Table 16.6</td>
<td>See Table 16.6</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Construction disturbance</td>
<td>Construction/ permanent</td>
<td>Environmental Management System</td>
<td>Major/Moderate</td>
</tr>
<tr>
<td>Change in traffic noise</td>
<td>Permanent/Operation</td>
<td>Not applicable</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Noise from tram</td>
<td>Permanent/Operation</td>
<td>None required.</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>Construction dust and traffic</td>
<td>Construction</td>
<td>Environmental Management System</td>
<td>Negligible</td>
</tr>
<tr>
<td>Improvement in air quality as a result of changes in traffic characteristics</td>
<td>Permanent/Operation</td>
<td>None required</td>
<td>Moderate benefit</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------</td>
<td>----------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Traffic and Transport</td>
<td>Local disruption of footway and cycle track (Roseburn Delta Junction, NW of Balgreen Road and S of Carrick Knowe Ave)</td>
<td>Construction and Permanent/ Operational</td>
<td>Minimise obstruction of footway and cycle track by construction activity. Maintain access on alternative line throughout construction.</td>
<td>Construction: Minor negative Operation: Negligible</td>
</tr>
<tr>
<td></td>
<td>Local disruption of access to Haymarket Yards and Murrayfield Stadium</td>
<td>Construction and Permanent/ Operational</td>
<td>Minimise closure of Haymarket Yards and maintain access or provide alternative access</td>
<td>Construction: Minor negative Operation: Negligible</td>
</tr>
<tr>
<td></td>
<td>Closure of local roads (Russell Road, Balgreen Road)</td>
<td>Construction</td>
<td>Minimise length of closure and programme to avoid disruption</td>
<td>Minor – Moderate Negative</td>
</tr>
<tr>
<td></td>
<td>Loss of on-street parking (Roseburn Street)</td>
<td>Construction and Permanent/ Operational</td>
<td>None</td>
<td>Construction: Negligible-Minor negative Operation: Negligible</td>
</tr>
<tr>
<td></td>
<td>At grade crossing of footways and cycle tracks (Roseburn Delta Junction and Balgreen Road)</td>
<td>Permanent/ Operational</td>
<td>Good standard crossing with provision of pedestrian signals (Balgreen Road).</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>Construction compounds may be sited in areas currently used for industrial, recreational/amenity and commercial purposes.</td>
<td>Construction</td>
<td>Careful positioning of compounds to minimise impacts on current local recreational, amenity or transport corridor purposes. Recreational and amenity areas would be reinstated on completion of works.</td>
<td>Negligible, as all land will be returned back to its original state.</td>
</tr>
<tr>
<td>Land Use</td>
<td>Industrial and commercial building demolitions off Russell Road, Roseburn Street and Balgreen Road</td>
<td>Permanent</td>
<td>Compensation relating to acquisition would be negotiated.</td>
<td>Impacts restricted to: 3 commercial properties demolished 1 commercial property modified 4 industrial properties demolished 2 industrial properties modified</td>
</tr>
<tr>
<td></td>
<td>Air Cadets hall demolition off Stenhouse Drive</td>
<td>Permanent</td>
<td>Compensation relating to acquisition would be negotiated. In addition, possible relocation and rebuilding of hall in an adjacent plot of land to the east of the existing site.</td>
<td>Demolition of facility and relocation of community group.</td>
</tr>
<tr>
<td>Geology, Soils and Contamination</td>
<td>Potentially contaminated site identified within limits</td>
<td>Construction</td>
<td>Environmental Management System</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>Properties which front Balbirnie Place where the tram proposals would dominate immediate views</td>
<td>Construction and Operational/ Permanent</td>
<td>Reinstatement planting would be limited to a hedge along this section of alignment</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Flats on Russell Road where the overbridge structure and delta junction would permanently intrude into both low and higher level views</td>
<td></td>
<td>Reinstatement mixed woodland planting to screen some views between tram and buildings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Properties along Baird Drive with immediate views of the tops of the OLE, poles and passing trams</td>
<td></td>
<td>Mixed woodland and scrub planting to embankments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flats adjacent to Carrick Knowe footbridge where the tram and overbridge structure would dominate and negatively impact views</td>
<td></td>
<td>Woodland planting to embankment slopes of overbridge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction in visual amenity experienced along sections of footpaths along the disused railway corridors at Roseburn and Balgreen.</td>
<td></td>
<td>Reinstatement planting to compensate loss of existing vegetation and planting. Planting and hardworks associated with tram stop at Balgreen.</td>
<td></td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Negative visual impact on views from buildings which front the tram corridor along Haymarket terrace, two office/commercial premises in Haymarket Yards and one on Devon Place.</td>
<td></td>
<td>Refer to principles identified in the Design Manual.</td>
<td></td>
<td>Moderate – Minor negative</td>
</tr>
<tr>
<td>Landscape Impacts</td>
<td>Landscape impacts due to over-bridge at Roseburn</td>
<td>Construction and Operational/ Permanent</td>
<td>Woodland planting to embankment slopes of overbridge</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Indirect impact on rear gardens of properties in Baird Drive; loss of mature trees made good in time with new planting.</td>
<td></td>
<td>Construction and Operational/ Permanent</td>
<td>Woodland and scrub planting to embankment slopes; false cutting</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Direct and indirect landscape impacts on Carrick Knowe Golf Course and adjacent housing area as track crosses railway on over-bridge</td>
<td></td>
<td>Construction and Operational/ Permanent</td>
<td>Woodland planting to embankment slopes of overbridge</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Loss of immature ecologically isolated low diversity plantation woodland compartments</td>
<td>Permanent</td>
<td>Replacement planting would enhance wildlife corridor.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Effects on Disused Railway UWS</td>
<td></td>
<td>Permanent</td>
<td>Replacement planting and habitat creation, but with limited space available.</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Loss of potential bat roosts due to demolition of buildings</td>
<td></td>
<td>Construction/ Permanent</td>
<td>Further surveys would need to be under taken prior to demolition to check for presence of bats.</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Loss of part of Improved grassland/Scattered scrub habitat, ecologically isolated dense scrub.</td>
<td></td>
<td>Construction/ Permanent</td>
<td>Replacement planting</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Loss of significant % mature plantation. Partial loss of integrity of rail network wildlife corridor</td>
<td></td>
<td>Construction/ Operation - permanent</td>
<td>Appropriate replacement planting, protection of remaining areas during construction.</td>
<td>Minor/Moderate negative</td>
</tr>
<tr>
<td>Effects on Water of Leith UWS</td>
<td></td>
<td>Construction/ Operation - permanent</td>
<td>Best practice during construction.</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Loss of part of transitory ruderal habitat and areas of low ecological value amenity grassland/parkland</td>
<td></td>
<td>Construction/ permanent</td>
<td>Replacement planting</td>
<td>Negligible</td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Prevention of fly tipping and further degradation of the area through pollution and waste accumulation</td>
<td>Construction/ operation-permanent</td>
<td>N/A</td>
<td></td>
<td>Minor positive</td>
</tr>
<tr>
<td>Demolition of Buildings – Loss of potential bat roosts</td>
<td>Construction/ permanent</td>
<td>Further surveys would need to be under taken prior to demolition to check for presence of bats.</td>
<td></td>
<td>Minor negative</td>
</tr>
<tr>
<td>Run off from construction and operation. Physical Damage due to over-bridging and culverting – Water of Leith</td>
<td>Construction and Operational/ Permanent</td>
<td>Environmental Management of construction sites and operational activities</td>
<td></td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Loss of flood plain area due to development of tram route – Murrayfield CEC Area of Importance for Flood Control</td>
<td>Permanent</td>
<td>Place tram on concrete supports rather than embankment</td>
<td></td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Visual and noise effects on Listed Buildings at Roseburn</td>
<td>Construction and Permanent/ Operational</td>
<td>See visual and noise sections for mitigation.</td>
<td>Negligible – Minor negative</td>
<td></td>
</tr>
<tr>
<td>Minor alterations to listed boundary of Jenners Depository and alteration of setting</td>
<td>Construction and Permanent/ Operational</td>
<td>Best practice in relocation, accompanied by photographic survey</td>
<td>Minor negative and beneficial</td>
<td></td>
</tr>
<tr>
<td>Disturbance of archaeological remains</td>
<td>Construction and Permanent/ Operational</td>
<td>Archaeological watching briefs during construction works</td>
<td>Negligible or uncertain</td>
<td></td>
</tr>
<tr>
<td>General Impacts – see Table 16.6</td>
<td>Construction/ permanent</td>
<td>See Table 16.6</td>
<td>See Table 16.6</td>
<td></td>
</tr>
<tr>
<td>Construction disturbance</td>
<td>Construction/ Permanent/Operation</td>
<td>Environmental Management System</td>
<td>Major/Moderate</td>
<td></td>
</tr>
<tr>
<td>Change in traffic noise</td>
<td>Permanent/Operation</td>
<td>Not applicable</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Noise from tram at Balbirnie Place, Baird Drive</td>
<td>Permanent/Operation</td>
<td>Noise barriers proposed</td>
<td>Minor</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Traffic and Transport</td>
<td>Local disruption of movement (Edinburgh Park, South Gyle Broadway and The Gyle Shopping Centre)</td>
<td>Construction and Permanent/ Operational</td>
<td>Minimise closure of roads and provide temporary access arrangements and crossing facilities. For permanent provide good standard crossing.</td>
<td>Minor to Moderate Negative</td>
</tr>
<tr>
<td></td>
<td>Disruption of access to Edinburgh Park Station from Hermiston Gait</td>
<td>Construction</td>
<td>Maintain access on alternative line throughout construction.</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Disruption of movement within car park and to the service area of The Gyle Shopping Centre.</td>
<td>Permanent and Operational</td>
<td>Provision of crossing points but questionable suitability for trolleys.</td>
<td>Minor to Moderate Negative</td>
</tr>
<tr>
<td>Land Use</td>
<td>Construction compounds may be sited in areas currently used for commercial purposes</td>
<td>Construction</td>
<td>Discussions would be undertaken with management at facilities likely to be inconvenienced from the location of construction compounds on or near to premises.</td>
<td>Negligible, as all land will be returned back to its original state.</td>
</tr>
<tr>
<td>Geology, Soils and Contamination</td>
<td>Potentially contaminated site identified within limits.</td>
<td>Construction</td>
<td>Environmental Management System</td>
<td>Minor Negative</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>Office units and part of the waterside landscape corridor at Edinburgh Park with direct, un- obstructed views of the tram alignment, overbridge and stop</td>
<td>Construction and Operational/ Permanent</td>
<td>Specimen tree and amenity planting to tie in with existing landscape treatment. Grass seeding of tram track.</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Landscape Impacts</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Negligible</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Loss of an area of ruderal/ephemeral habitat and areas of low ecological value amenity grassland habitat</td>
<td>Construction and Operational/ Permanent</td>
<td>Replacement planting</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Loss of agricultural land and field boundaries for construction compounds</td>
<td>Construction Temporary</td>
<td>Appropriate best practice would ensure that impacts are minimised.</td>
<td>Minor negative</td>
</tr>
<tr>
<td></td>
<td>Disturbance of water borne protected species</td>
<td>Construction - temporary</td>
<td>Best practice</td>
<td>Minor negative / Negligible</td>
</tr>
<tr>
<td></td>
<td>Loss of ecologically isolated immature plantation woodland</td>
<td>Construction and Permanent/ Operational</td>
<td>Appropriate planting</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Surface Waters/Land Drainage/Flood Defence</td>
<td>Run off from construction and operation - Loch Ross (Gogar Burn)</td>
<td>Construction and Permanent/ Operational</td>
<td>Environmental Management of construction sites and operational activities</td>
<td>Negligible</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Potential disturbance of former Gogar Loch</td>
<td>Construction and Permanent</td>
<td>Assessment of geotechnical cores; further mitigation as necessary</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Socio-Economics</td>
<td>General Impacts – see Table 16.6</td>
<td>Construction/ permanent</td>
<td>See Table 16.6</td>
<td>See Table 16.6</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Construction disturbance</td>
<td>Construction/ Permanent/Operation</td>
<td>Environmental Management System</td>
<td>Major/Moderate</td>
</tr>
<tr>
<td></td>
<td>Change in traffic noise</td>
<td>Permanent/Operation</td>
<td>Not applicable</td>
<td>Negligible</td>
</tr>
</tbody>
</table>
### Noise from tram

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
<td></td>
<td>Minor</td>
</tr>
</tbody>
</table>

### Traffic and Transport

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disruption of movement through area around Airport</td>
<td>Construction</td>
<td>Minimise closure and maintain routes during construction</td>
<td>Minor – Moderate Negative</td>
<td></td>
</tr>
<tr>
<td>Disruption of use of bus and taxi facilities</td>
<td>Permanent and Operational</td>
<td>Provide equally or more convenient alternative facilities through design of airport terminal bus, tram and taxi facilities</td>
<td>Minor Benefit</td>
<td></td>
</tr>
<tr>
<td>Disruption of movement along Eastfield Road, Ingliston Rd and Glasgow Road</td>
<td>Permanent and Operational</td>
<td>Good standard crossing and measures to avoid queuing back to the A8 Glasgow Road junction and consideration of safety risk of crossing of A8 Glasgow Road</td>
<td>Minor Negative</td>
<td></td>
</tr>
</tbody>
</table>

### Land Use: Agriculture

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of agricultural farming ground required for the operation of the tram line, within LODs. Tram Line 2 would also result in areas of land being unsuitable for further agricultural use because the remaining field area (between the field boundary and the Tram Line 2 alignment) is considered too small for viable farming use.</td>
<td>Construction/ Temporary</td>
<td>Care during construction. Reinstatement of agricultural fields to enable continued farming practices. Maintained access to agricultural fields during construction.</td>
<td>Negligible,</td>
<td></td>
</tr>
</tbody>
</table>

### Geology, Soils and Contamination

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially contaminated site identified within limits, including former landfill.</td>
<td>Construction</td>
<td>Environmental Management System</td>
<td>Minor</td>
<td></td>
</tr>
</tbody>
</table>

### Visual Impacts

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct immediate views of the tram from Castle Gogar Lodge House</td>
<td>Construction and Operational/ Permanent</td>
<td>“Willow wall” to screen direct views of tram alignment. Broadleaved woodland structure planting between A8 and tram alignment.</td>
<td>Moderate negative</td>
<td></td>
</tr>
<tr>
<td>Tram alignment would negatively impact views and visual amenity from Gogar Church and graveyard</td>
<td>Construction and Operational/ Permanent</td>
<td>Native hedgerow planting along alignment to tie into adjacent field landscape. Pockets of scrub planting to break up linearity of route.</td>
<td>Moderate – Minor negative</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------</td>
<td>----------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Landscape Impacts</td>
<td>Direct Impacts on historic setting of Gogar Church; small amount of tree loss; direct and indirect impacts on Gogar Castle avenue; demolition of old houses by road</td>
<td>Construction and Operational/Permanent</td>
<td>Hedge planting to reduce setting impacts on church; tree planting; replanting of impacted section of avenue; “willow wall” to rear of lodge house.</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Disturbance of otters</td>
<td>Construction and Operation- temporary</td>
<td>Best practice during construction and ensuring free passage along Burn.</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Disturbance of Badgers</td>
<td>Construction /Operation temporary/permanent</td>
<td>Mitigation to be agreed with SNH prior to construction and to include possible realignment within LODs. Badger fencing and tunnelling as required.</td>
<td>Moderate to Major negative during construction. Moderate Negative during operation (depending on success of mitigation).</td>
</tr>
<tr>
<td>Loss of low diversity agricultural habitat</td>
<td>Construction /permanent</td>
<td>Appropriate alternative planting</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Loss of mature trees</td>
<td>Permanent</td>
<td>Appropriate alternative planting</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Loss of agricultural land and field boundaries for construction compounds</td>
<td>Construction</td>
<td>Appropriate best practice would ensure that impacts are minimised.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Surface Waters/Land Drainage/Flood Defence</td>
<td>Run off from construction and operation. Physical Damage due to new structure crossing the burn – Gogar Burn</td>
<td>Construction and Operational/Permanent</td>
<td>Environmental Management System for construction works and best practice during operations.</td>
<td>Minor negative impact</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Disturbance of archaeological remains of Nether Gogar medieval village</td>
<td>Construction and Operational/Permanent</td>
<td>Preservation in situ – tram to be built above existing ground surface; prior archaeological evaluation</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Diminution of setting of listed Castle Gogar lodge and Castle Gogar house</td>
<td>Construction and Operational/Permanent</td>
<td>Sensitive design and screening</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Diminution of setting of listed Gogar Parish Church</td>
<td>Construction and Operational/Permanent</td>
<td>Sensitive design and screening</td>
<td>Moderate negative</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Diminution of setting of other Listed Buildings at Gogar Park, Gogarburn House and Gogar Mount</td>
<td>Construction and Operational/Permanent</td>
<td>None required.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Disturbance of other archaeological remains</td>
<td>Construction and Operational/ Permanent</td>
<td>Archaeological evaluation, excavations, watching briefs and recording, as appropriate</td>
<td>Uncertain, but potentially Minor or Moderate negative</td>
<td></td>
</tr>
<tr>
<td>Disturbance of remains of Castle Gogar relict designed landscape</td>
<td>Construction and Operational/ Permanent</td>
<td>Archaeological evaluation, excavations, watching briefs and recording, as appropriate</td>
<td>Minor negative</td>
<td></td>
</tr>
<tr>
<td>Socio-Economics</td>
<td>General Impacts – see Table 16.6</td>
<td>Construction/ permanent</td>
<td>See Table 16.6</td>
<td>See Table 16.6</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Construction disturbance</td>
<td>Construction/</td>
<td>Environmental Management System</td>
<td>Major/Moderate</td>
</tr>
<tr>
<td></td>
<td>Change in traffic noise</td>
<td>Permanent/Operation</td>
<td>Not applicable</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Noise from tram</td>
<td>Permanent/Operation</td>
<td>None required.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 16.4 Summary of Impacts: Gogar Roundabout – Airport Terminal
<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic and Transport</td>
<td>Disruption of movement through area</td>
<td>Construction</td>
<td>Minimise closure and maintain routes during construction</td>
<td>Minor – Moderate Negative</td>
</tr>
<tr>
<td></td>
<td>Disruption of access to property on Glasgow Road and within Newbridge Industrial Estate.</td>
<td>Permanent and Operational</td>
<td>Provide adequate alternative accesses</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>Severance of footpath and cycle route at Ratho Station</td>
<td>Permanent and Operational</td>
<td>Maintain existing route with modifications to give access to tram stop.</td>
<td>Not significant</td>
</tr>
<tr>
<td>Land Use</td>
<td>Impacts on the topsoil structure of agricultural fields used during construction and potential damage or disruption to existing agricultural under drainage systems.</td>
<td>Construction/ Temporary</td>
<td>• Care during construction. This would require possible stripping and storage of top soils to prevent soil structure damage during construction and repair and replacement of agricultural drains. • Reinstatement of agricultural fields to enable continued farming practices. • Maintained access to agricultural fields during construction.</td>
<td>Negligible, as all land will be returned back to its original state (assuming that all necessary mitigation measures are carried out correctly).</td>
</tr>
<tr>
<td></td>
<td>Loss of agricultural farming ground required for the operation of the tram line, within LODs. Tram Line 2 would also result in areas of land being unsuitable for further agricultural use because the remaining field area (between the field boundary and the Tram Line 2 alignment) is considered too small for viable farming use.</td>
<td>Permanent</td>
<td>• Level crossings with warning lights will be built across access roads and fields to enable safe crossing of the tram line to enable continued agricultural use.</td>
<td>Minor Negative Impact for individual farming plots.</td>
</tr>
<tr>
<td></td>
<td>Loss of part of garden of property on Ingliston Road.</td>
<td>Permanent</td>
<td>Compensation.</td>
<td>Loss of residential garden</td>
</tr>
<tr>
<td>Geology, Soils and Contamination</td>
<td>Potentially contaminated site identified within limits</td>
<td>Construction</td>
<td>Environmental Management System</td>
<td>Minor negative</td>
</tr>
<tr>
<td>Visual Impacts</td>
<td>Property at junction of A8 and Ingliston Road where the tram alignment would run through the garden and dominate views from the property</td>
<td>Construction and Operational/ Permanent</td>
<td>Mixed woodland screen planting between property and tram alignment.</td>
<td>Major negative</td>
</tr>
<tr>
<td></td>
<td>Tram would dominate views and negatively impact on the visual amenity of a section of footpath to the south of Ratho Station</td>
<td>Construction and Operational/ Permanent</td>
<td>Reinstatement planting including broadleaved woodland planting in severed corner of land adjacent to path</td>
<td>Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Tram would form a visually intrusive element in views from Ingliston Park Lodge</td>
<td>Construction and Operational/ Permanent</td>
<td>Native hedgerow and tree planting along alignment to tie in with adjacent field landscape and mixed woodland screen planting in severed field corner.</td>
<td>Moderate – Minor negative</td>
</tr>
</tbody>
</table>
### Table 16.5 Summary of Impacts: Ingliston Park and Ride to Newbridge

<table>
<thead>
<tr>
<th>Issue</th>
<th>Potential Impact</th>
<th>Duration</th>
<th>Mitigation</th>
<th>Residual Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape Impacts</td>
<td>The OLE and poles would form a negative element in the visual amenity experienced at Huly Hill</td>
<td>Construction and Operational/ Permanent</td>
<td>Hedgerow planting along alignment at edge of Huly Hill</td>
<td>Moderate – Minor negative</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Loss of agricultural land and field boundaries for construction compounds</td>
<td>Construction Temporary</td>
<td>Appropriate best practice would ensure that impacts are minimised.</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Loss of low diversity agricultural habitat</td>
<td>Construction/ Permanent</td>
<td>Appropriate alternative planting</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Partial loss mature plantation resulting in a break in the integrity of rail network wildlife corridor at Ratho Station (dismantled rail section)</td>
<td>Construction/ Operation - permanent</td>
<td>Appropriate replacement planting, protection of remaining areas during construction.</td>
<td>Minor/Moderate negative</td>
</tr>
<tr>
<td>Surface Waters/Land Drainage/Flood Defence</td>
<td>Run off from construction and operation – River Almond</td>
<td>Construction and Operational/ Permanent</td>
<td>Environmental management of construction sites and operational activities</td>
<td>Negligible</td>
</tr>
<tr>
<td>Archaeology and Heritage</td>
<td>Disturbance of archaeological remains associated with Huly Hill scheduled monument, and diminution of setting of Huly Hill</td>
<td>Construction and Permanent and Operational</td>
<td>Archaeological evaluation, excavations, watching briefs and recording, as appropriate</td>
<td>Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Disturbance of archaeological remains north of Edinburgh Road, Newbridge</td>
<td>Construction and Permanent and Operational</td>
<td>Archaeological excavations and recording</td>
<td>Moderate negative</td>
</tr>
<tr>
<td></td>
<td>Disturbance of remains of Ratho Station Low Level Station</td>
<td>Construction and Permanent and Operational</td>
<td>Photographic record</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Disturbance of other archaeological remains</td>
<td>Construction and Permanent and Operational</td>
<td>Archaeological evaluation, excavations, watching briefs and recording, as appropriate</td>
<td>Uncertain</td>
</tr>
<tr>
<td></td>
<td>Diminution of setting of Listed Buildings at Ingliston, Ratho Station and Newbridge</td>
<td>Construction and Permanent and Operational</td>
<td>Sensitive design and screening where appropriate</td>
<td>Negligible or Minor negative</td>
</tr>
<tr>
<td></td>
<td>Potential direct effect on listed Norton House Hotel, North Lodge</td>
<td>Construction and Permanent and Operational</td>
<td>Photographic and standing building recording</td>
<td>Uncertain</td>
</tr>
<tr>
<td>Socio-Economics</td>
<td>General Impacts – see Table 16.6</td>
<td>Construction/ permanent</td>
<td>See Table 16.6</td>
<td>See Table 16.6</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Construction disturbance</td>
<td>Construction/</td>
<td>Environmental Management System</td>
<td>Major/Moderate</td>
</tr>
<tr>
<td></td>
<td>Change in traffic noise</td>
<td>Permanent/Operation</td>
<td>Not applicable</td>
<td>Negligible</td>
</tr>
<tr>
<td></td>
<td>Noise from tram</td>
<td>Permanent/Operation</td>
<td>Noise barriers proposed.</td>
<td>Negligible</td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
<td>Mitigation</td>
<td>Residual Impact</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>---------------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>Traffic and Transport</td>
<td>Reduction of vehicular traffic</td>
<td>Operational</td>
<td>NA</td>
<td>Moderate - Major benefit</td>
</tr>
<tr>
<td>Geology, Soils and Contamination</td>
<td>Hydrogeology: Risk to groundwater - run-off or accidental spillage from construction sites and operation of the tram, drilling and piling operations.</td>
<td>Construction/operation</td>
<td>Effective environmental management of construction activities. Drainage would channel to interceptors and sewers as opposed to infiltration.</td>
<td>Shallow aquifers – Construction :Minor; Operational: Negligible Deep aquifers – Construction and Operational : Negligible</td>
</tr>
<tr>
<td></td>
<td>Contaminated Land: Disturbance of potentially contaminated land.</td>
<td>Construction</td>
<td>Where excavations are planned, intrusive investigations would be carried out in advance to confirm presence of contamination. Adherence to Environmental Management System</td>
<td>Minor</td>
</tr>
<tr>
<td></td>
<td>Disposal of potentially contaminated waste material and disposal of wastes generated by the construction activities and operation of the trams.</td>
<td>Construction/ operation</td>
<td>Re-use of as much of the excavated material as possible. Handling and disposal of waste in accordance with Waste Management legislation. Development of environmental management to minimise wastes.</td>
<td>Minor</td>
</tr>
<tr>
<td>Ecology and Nature Conservation</td>
<td>Disturbance to fauna from construction activities including noise, dust and plant and machinery movements</td>
<td>Construction - Temporary</td>
<td>Appropriate best practice would ensure that impacts are minimised.</td>
<td>Minor Negative Potential Major Negative on badgers.</td>
</tr>
<tr>
<td></td>
<td>Permanent loss of habitat and disturbance to fauna</td>
<td>Operation - Permanent</td>
<td>Replacement planting and habitat creation</td>
<td>Potential Minor to moderate benefits in some locations Moderate negative impacts on protected species.</td>
</tr>
<tr>
<td>Socio-Economics</td>
<td>Employment of construction workers</td>
<td>Construction</td>
<td>N/A</td>
<td>Minor Benefit</td>
</tr>
<tr>
<td></td>
<td>Procurement of services</td>
<td>Construction</td>
<td>N/A</td>
<td>Minor to Moderate Benefit</td>
</tr>
<tr>
<td></td>
<td>Effects of in-migrant workforce</td>
<td>Construction</td>
<td>N/A</td>
<td>Minor Benefit</td>
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<td></td>
<td>Community disturbance and disruption</td>
<td>Construction</td>
<td>Environmental Management System and liaison with communities</td>
<td>Moderate/Major Negative</td>
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<td></td>
<td>Direct employment gain from operation of Tram system.</td>
<td>Operation</td>
<td>N/A</td>
<td>Minor Benefit</td>
</tr>
<tr>
<td></td>
<td>Relocation or loss of employment as a result of demolition of property.</td>
<td>Operation</td>
<td>Compensation</td>
<td>Minor Negative</td>
</tr>
<tr>
<td></td>
<td>Induced economic growth through multiplier effects or improved linkages and greater economic efficiency.</td>
<td>Operation</td>
<td>N/A</td>
<td>Minor/Moderate Benefit</td>
</tr>
<tr>
<td></td>
<td>Changes in settlement patterns.</td>
<td>Operation</td>
<td>N/A</td>
<td>Negligible</td>
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<td>Issue</td>
<td>Potential Impact</td>
<td>Duration</td>
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<td>Community disturbance</td>
<td>Operation</td>
<td></td>
<td>Environmental Management System and liaison with communities</td>
<td>Minor to Moderate Negative</td>
</tr>
<tr>
<td>Direct employment gain from operation of Tram system.</td>
<td>Operation</td>
<td></td>
<td>N/A</td>
<td>Minor Beneficial</td>
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<td>Noise and Vibration</td>
<td>All impacts area specific</td>
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<td>British Airports Authority</td>
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<td>City of Edinburgh Council</td>
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<td>Cost Effective Landscapes: Learning from Nature (Scottish Office 1998)</td>
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<td>CO₂</td>
<td>Carbon Dioxide</td>
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<td>CORN</td>
<td>Calculation of Railway Noise</td>
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<td>Compulsory Purchase Order</td>
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<td>Design Manual for Roads and Bridges</td>
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<td>Environmental Management Plan</td>
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<td>Groundwater Source Protection Zone</td>
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<td>Institute of Environmental Management and Assessment</td>
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<td>Integrated Transportation Initiative</td>
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<td>Landscape &amp; Visual Assessment Supplementary Guidance (Scottish Executive 2002)</td>
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<td>Lothian Wildlife Information Centre</td>
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<td>Not Environmentally Worse Than</td>
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<td>Neighbourhood Nature Area</td>
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<td>Passenger Car Units</td>
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<td>Personal Injury Accidents</td>
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<tr>
<td>PM₁₀</td>
<td>Particulates (e.g. dust) less than 10 micrometers in diameter</td>
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<td>PPG</td>
<td>Pollution Prevention Guidelines</td>
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<td>PPV</td>
<td>Peak Particle Velocity</td>
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<td>PRW</td>
<td>Public Right of Way</td>
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<td>Proposed Special Protection Area</td>
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<td>Royal Bank of Scotland</td>
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<td>RCAHMS</td>
<td>The Royal Commission on the Ancient and Historical Monuments of Scotland</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>RHSG</td>
<td>Royal Highland Showground</td>
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<td>RIGS</td>
<td>Regionally Important Geological/Geomorphological Sites</td>
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<tr>
<td>RSPB</td>
<td>Royal Society for the Protection of Birds</td>
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<td>RTP</td>
<td>Roger Tym and Partners Ltd</td>
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<td>RWELP</td>
<td>Rural West Edinburgh Local Plan, 1999</td>
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<td>SAC</td>
<td>Special Area of Conservation</td>
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<td>SAM</td>
<td>Scheduled Ancient Monuments</td>
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<td>SAP</td>
<td>Species Action Plans</td>
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<td>SEL</td>
<td>Sound Exposure Level</td>
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<td>SEPA</td>
<td>Scottish Environment Protection Agency</td>
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<td>SERAD</td>
<td>Scottish Executive Rural Affairs Department</td>
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<td>SIMD</td>
<td>Scottish Index of Multiple Deprivation</td>
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<td>SINC</td>
<td>Site of Interest for Nature Conservation</td>
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<td>SNH</td>
<td>Scottish Natural Heritage</td>
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<td>Special Protection Area</td>
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<td>Scottish Planning Policy</td>
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<td>SSSI</td>
<td>Site of Special Scientific Interest</td>
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<td>Scottish Transport Appraisal Guidance</td>
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<td>SUDS</td>
<td>Sustainable Urban Drainage Systems</td>
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<td>TIE</td>
<td>Transport Initiatives Edinburgh</td>
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<td>TPH</td>
<td>Trams per hour</td>
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<td>TPO</td>
<td>Tree Preservation Order</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organisation</td>
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<td>UWS</td>
<td>Urban Wildlife Site</td>
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<td>VDV</td>
<td>Vibration Dose Value</td>
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<td>WCA</td>
<td>Wildlife and Countryside Act 1981, as amended</td>
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<td>WEBS</td>
<td>West Edinburgh Bus System</td>
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<td>West Edinburgh Local Plan, 2001</td>
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<td>World Heritage Site</td>
<td></td>
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<td>WSI</td>
<td>Written Scheme of Investigation</td>
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<td>ZVI</td>
<td>Zone of Visual Influence</td>
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<td><strong>GLOSSARY</strong></td>
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<tr>
<td><strong>Air Quality Action Plan (AQAP)</strong></td>
<td>Action Plan for air quality management within an Air Quality Management Area.</td>
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</tr>
<tr>
<td><strong>Air Quality Management Area (AQMA)</strong></td>
<td>An area designated by a local authority as being under the threat of exceeding stated air quality standards.</td>
<td></td>
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<tr>
<td><strong>Alluvial</strong></td>
<td>Pertaining to geological deposits associated with former and existing watercourses.</td>
<td></td>
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<tr>
<td><strong>Aquifer</strong></td>
<td>A natural reservoir of underground water held in rocks or superficial deposits such as sand or gravels.</td>
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<tr>
<td><strong>Area of Importance for Flood Control</strong></td>
<td>An area designated by the Council adjacent to a watercourse that is allowed to temporarily flood when the river overflows in order to prevent inundation of more sensitive areas close to the river.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>At-grade / Grade Segregated</strong></td>
<td>Where the tram would cross a road and require a signalised junction. A grade segregated alignment would mean that the tram would cross over or under a road using a bridge or a tunnel.</td>
<td></td>
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<tr>
<td><strong>A-weighted Decibel</strong></td>
<td>Internationally accepted unit for the most frequently used noise measurement, and which represents the sound pressure level weighted to correspond to the frequency response for the human ear. A difference of 3 dB(A) may just be noticeable, and a difference of 10 dB(A) represents a subjective doubling or halving of loudness.</td>
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<tr>
<td><strong>Baseline Conditions</strong></td>
<td>The conditions against which potential effects arising from the Scheme are identified and evaluated.</td>
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<tr>
<td><strong>Biodiversity</strong></td>
<td>Genetically determined variability amongst living organisms, including the variability within species, between species, and of ecosystems. Abbreviated from ‘biological diversity’.</td>
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<tr>
<td><strong>Biodiversity Action Plan (BAP)</strong></td>
<td>Action plans (which are on both national and local scales) through which biodiversity objectives are set out.</td>
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<tr>
<td><strong>Calculation of Road Traffic Noise</strong></td>
<td>A model referenced by DMRB Volume 11 that describes the method by which road traffic noise can be calculated.</td>
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<tr>
<td><strong>Congestion Charging</strong></td>
<td>Proposed scheme to charge vehicles to enter the city.</td>
<td></td>
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<tr>
<td><strong>Conservation Area</strong></td>
<td>Designation given by the Local Authority to areas of settlements, the character or appearance of which it is considered desirable to preserve and enhance.</td>
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<tr>
<td><strong>Contaminated Land Exposure Assessment (CLEA)</strong></td>
<td>The CLEA model is the common basis for contamination assessments in the UK.</td>
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<tr>
<td><strong>Decibel</strong></td>
<td>Logarithmic ratio used to relate sound pressure to a standard reference point.</td>
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<tr>
<td><strong>Designated Sites</strong></td>
<td>Sites, such as Sites of Special Scientific Interest (SSSI) or Scheduled Ancient Monuments (SAM), identified and protected by national or international legislation.</td>
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<tr>
<td><strong>Drift</strong></td>
<td>Superficial geological deposits, such as sand, clay, gravel, etc., overlying bedrock.</td>
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<tr>
<td><strong>Ecology</strong></td>
<td>The study of the relationships between living organisms and between organisms and their environment.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Ecosystem</td>
<td>A community of interdependent organisms together with the environment they inhabit and with which they interact.</td>
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<td>Enhancement of Interchange</td>
<td>Indicates that there would be an increased opportunity for changing between different modes of transport, e.g. trams and buses.</td>
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<tr>
<td>Environmental Impact/Effect</td>
<td>A change in the existing environment caused directly or indirectly by the scheme or development.</td>
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<tr>
<td>Environmental Impact Assessment (EIA)</td>
<td>A systematic means of assessing a project’s likely significant environmental impacts and effects.</td>
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<tr>
<td>Environmental Management Plan/System (EMP/S)</td>
<td>Management plan or system developed for construction and operation of the scheme that considers environmental effects, identifies significant issues, and details procedures for managing those issues.</td>
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<tr>
<td>Environmental Statement (ES)</td>
<td>Document that reports the findings of an Environmental Impact Assessment.</td>
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<tr>
<td>Fauna</td>
<td>The animals of a specified area.</td>
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<tr>
<td>Fermtoun</td>
<td>An archaic term denoting a collection of dwellings associated with a farm (also known as a township).</td>
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<tr>
<td>Flight Envelope</td>
<td>Three-dimensional space associated with and required for safe operation of an airport. Planning restrictions such as height of buildings would apply in a flight envelope.</td>
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<tr>
<td>Flora</td>
<td>The plants of a specified area.</td>
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<tr>
<td>Geomorphology</td>
<td>The study and interpretation of landforms.</td>
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<tr>
<td>Green Belt</td>
<td>An area of protected countryside designated for the dual purposes of restricting urban sprawl, and conserving landscape.</td>
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<tr>
<td>Groundwater Source Protection Zone (GSPZ)</td>
<td>Area functioning as the recharge zone for an aquifer supplying groundwater for public consumption that is specifically protected to prevent activities that may pollute or cause over-extraction of the aquifer.</td>
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<tr>
<td>Habitat</td>
<td>The environment in which a species lives at any stage of its life cycle.</td>
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<tr>
<td>Hazardous Waste</td>
<td>Wastes featuring on a list drawn up by the European Commission, that possess one or more of the hazardous properties set out in the Hazardous Waste Directive (HWD, Council Directive 91/689/EC), including waste that is toxic, flammable, infectious, mutagenic, eco-toxic, etc.</td>
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<tr>
<td>Herpetofauna</td>
<td>Lizard, snakes and other reptiles.</td>
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<tr>
<td>Hydrogeology</td>
<td>Pertaining to groundwater, i.e. water present in soils, superficial deposits such as sands and gravels and in bedrock.</td>
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<tr>
<td>Hydrology</td>
<td>The study of water systems.</td>
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<tr>
<td>Inert Waste</td>
<td>Defines waste that does not undergo significant physical, chemical or biological reactions or cause environmental pollution when deposited in a landfill under normal conditions.</td>
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<tr>
<td>Intervisibility</td>
<td>Where there is a direct line of sight between a source and a receptor.</td>
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<tr>
<td>Lacustrine</td>
<td>Pertaining to geological deposits associated with ancient lochs and other water bodies.</td>
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<tr>
<td><strong>Landscape</strong></td>
<td>Those physical components, which together form the appearance of land, including its shapes, colours and textures. Landscape also reflects the way in which these various components combine to create distinctive landscape characters that are particular to localities.</td>
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<tr>
<td><strong>Landscape Character Areas</strong></td>
<td>Discrete areas, defined by specific homogeneous landscape components, for example: landform, land cover vegetation, settlement pattern, remoteness and degree of tranquillity.</td>
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<tr>
<td><strong>Limits</strong></td>
<td>The precise boundaries of land for which powers are sought to build and operate the tram system, comprising Limits of Deviation (LOD) and Limits of Land to be Acquired or Used (LLAU). In general, the LOD is the area over which a permanent interest in land is required for the construction and operation of the tram system. The LLAU is the area of land required, or rights over that land are required, either permanently for a specified purpose connected with the construction or operation of the tram system, or temporarily for construction purposes or access. The limits necessarily encompass a wider corridor than is necessary for the tram tracks, not only to construct the tram system, but also to maintain it.</td>
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<tr>
<td><strong>Listed Building</strong></td>
<td>A building or structure included on the Statutory List of Buildings of Special Architectural or Historic Interest compiled by the Scottish Ministers. Graded A, B and C(s).</td>
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<tr>
<td><strong>Local Plan</strong></td>
<td>Documents produced by CEC setting out their policies regarding planning issues within a specific area.</td>
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<tr>
<td><strong>Macro-Invertebrates</strong></td>
<td>Multi-celled invertebrate animals such as insects, annelid worms or crustaceans, etc., generally used an indicator of water quality in aquatic environments.</td>
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<tr>
<td><strong>Mitigation</strong></td>
<td>Measures taken to avoid, reduce or remove environmental impacts. Mitigation can moderate adverse effects and enhance the beneficial ones arising from the whole or specific elements of the Scheme</td>
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<tr>
<td><strong>Moraine</strong></td>
<td>Geological deposits associated with glaciers</td>
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<tr>
<td><strong>Multiple Indices of Deprivation</strong></td>
<td>Published by the Office for National Statistics, the multiple indices are based on measuring aspects such as employment, access, income, housing etc. From these a combined index is produced for each electoral ward in the country.</td>
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<tr>
<td><strong>National Monuments Record of Scotland</strong></td>
<td>National database of archaeological remains, historic buildings and other sites of interest, held by the Royal Commission on the Ancient and Historic Monuments of Scotland in Edinburgh.</td>
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<tr>
<td><strong>Non-Hazardous Waste</strong></td>
<td>A general term defining waste with no known or immediate hazard connected with its handling or disposal, although it may possess a reactive property including biodegradation.</td>
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<tr>
<td><strong>Notable Species</strong></td>
<td>Species that are recognised (e.g. as rare, scarce, flagship, etc.) as warranting particular attention in a legal or local policy context</td>
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<tr>
<td><strong>Phase 1 Habitat Survey</strong></td>
<td>A standard ecological survey technique devised by the Joint Nature Conservation Committee that identifies and maps the main habitat types in an area.</td>
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<tr>
<td><strong>Physiography</strong></td>
<td>The description of natural features.</td>
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<td><strong>Precautionary Principle</strong></td>
<td>The principle that authorities should act prudently to avoid the possibility of irreversible environmental damage in situations</td>
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</tbody>
</table>
where the scientific evidence is inconclusive but the potential damage could be significant.

### Prior Approval
While approval of the Bill would provide powers to build and operate the tram system, the Council would retain ‘Prior Approval’ authority over specific design issues (buildings and access).

### Public Open Space
Area of open land designated by the local authority and protected for continued use by the public.

### Receptor
Receptors comprise anything that may be affected by an environmental impact, be this human beings, socio-economic activity, habitats, species, controlled waters, landscape or cultural heritage.

### Residual Impacts
Environmental Impacts remaining after mitigation measures have been taken.

### Resource
A biophysical feature or item of 'environmental capital'; examples include habitats, aquifers, agricultural land, views, access routes and community facilities.

### RIGS
Regionally Important Geological/Geomorphological Site.

### Riparian
Relating to a river bank.

### Ruderal
Plants characteristic of waste ground and other disturbed and marginal habitats.

### Scheduled Ancient Monument
A monument considered of national importance and which is listed on a statutory schedule. Permission must be sought from Historic Scotland before any excavation or development work is carried out on, or around a Scheduled Monument.

### Scoping
The stage of EIA during which its scope is determined. Involves identification of significant issues that require assessment.

### Scottish Transport Appraisal Guidance (STAG)
The official appraisal framework to aid transport planners in the development of transport policies, plans programmes and projects.

### Severance
Where the scheme would reduce access by acting as a physical barrier. Generally, severance applies to pedestrians and road users but in the context of Tram Line 2 it also applies to farm management.

### Significant or Substantial Impact
Where Environmental Impacts are moderate or major after mitigation has taken place.

### Site of Interest for Nature Conservation (SINC)
Sites in rural areas identified by CEC as important for biodiversity and as part of the local Biodiversity Action Plan. Similar to Urban Wildlife Sites (UWS).

### Solid Geology
Bedrock.

### Spatial
Of, or relating to, geographical space.

### Special Area of Conservation (SAC)
A special area designated for protection under the Habitats Directive. A cSAC is a candidate SAC, which is afforded the same protection as a full SAC. Such sites are also Natura 2000 site or European Sites.

### Special Protection Area (SPA)
An area designated for protection under the Birds Directive. A pSPA is a proposed SPA. Such sites are also Natura 2000 site or European Sites.

### Species
A group of closely-related organisms sharing constant differences from allied groups.
<table>
<thead>
<tr>
<th><strong>Sustainable</strong></th>
<th>Relating to sustainable development: development, that takes equal account of economic, social, and environmental requirements.</th>
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<tbody>
<tr>
<td><strong>Temporal</strong></td>
<td>Of, or relating, to time.</td>
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<tr>
<td><strong>Townscape</strong></td>
<td>Composition of the built environment, including character and appearance</td>
</tr>
<tr>
<td><strong>Tree Preservation Order (TPO)</strong></td>
<td>Single trees or groups of trees that are afforded a degree of protection under planning law. NB any trees within Conservation Areas are afforded similar protection as TPO trees.</td>
</tr>
<tr>
<td><strong>Urban Wildlife Site (UWS)</strong></td>
<td>Sites in urban areas defined by CEC as important for biodiversity and as part of the local Biodiversity Action Plan. Similar to Site of Interest for Nature Conservation (SINC).</td>
</tr>
<tr>
<td><strong>Utilities</strong></td>
<td>Generally, buried services such as gas, electricity, water, sewerage and telecommunications.</td>
</tr>
<tr>
<td><strong>Visual Receptors</strong></td>
<td>People with views of the development or associated activities. These are located within the ZVI and are typically residents, motorists, pedestrians, recreational users in residential areas on publicly accessible roads, footpaths and open spaces.</td>
</tr>
<tr>
<td><strong>Wildlife Corridor</strong></td>
<td>A linear feature that is likely to be used by wildlife to move between various areas.</td>
</tr>
<tr>
<td><strong>World Heritage Site</strong></td>
<td>A cultural or natural site of outstanding universal value designated through The World Heritage Convention, adopted by UNESCO in 1972. The designation is non-statutory.</td>
</tr>
<tr>
<td><strong>Zone of Visual Influence (ZVI)</strong></td>
<td>The zone within which views of the proposed development may be achieved. It is influenced by many factors including topography and intermediate visual intrusions, such as blocks of woodland and buildings.</td>
</tr>
</tbody>
</table>
LIST OF REFERENCES

Chapter 1 References

Anderson (2001) Feasibility Study For A North Edinburgh Rapid Transit Solution, LRT Masterplan
Feasibility Study being commissioned by CEC in December 2001.

corridor with route options for consultation.

definition of a preferred alignment, frozen to allow assessment against Scottish Transport
Appraisal Guidance (STAG) criteria.

a number of preferred alignment issues.

FaberMaunsell/ Semaly (2003) Stop Location Report - Provides a rationale for the selection
of stop locations.

locations and a rationale for the selection of the site at Gogar.


British Standard EN 50121-2

October 2003 Edinburgh Tram Network Design Manual (Working Draft)

Chapter 2 References

Chapter 3 References

Edition 1 10.12.99, Revision 06.01.03 Standing Orders of the Scottish Parliament


Environmental Impact Assessment (Scotland) Regulations 1999 (as amended).

Chapter 4 References

Scottish Executive Planning Policy Publications:


Scottish Executive (November 2002) Scottish Planning Policy; SPP1 The Planning System

Scottish Executive (November 2002) Scottish Planning Policy: SPP 2 Economic
Development
Scottish Executive (January 1994) National Planning Policy Guidance; NPPG 5 Archaeology and Planning

Scottish Executive (September 1995) National Planning Policy Guidance; NPPG 7 Planning and Flooding

Scottish Executive (revised 1998) National Planning Policy Guidance; NPPG 8 Town Centres and Retailing

Scottish Executive (June 1996) National Planning Policy Guidance; NPPG 11 Sport, Physical Recreation and Open Space

Scottish Executive (January 1999) National Planning Policy Guidance; NPPG 14 Natural Heritage

Scottish Executive (April 1999) National Planning Policy Guidance; NPPG 18 Planning and the Historic Environment

Scottish Executive Planning Advice Notes Publications:

Scottish Executive (2003) Planning Advice Note; PAN 65 Planning and Open Space

Scottish Executive (2000) Planning Advice Note; PAN 60 Planning for Natural Heritage

Scottish Executive (1999) Planning Advice Note; PAN 57 Transport and Planning

Scottish Executive (1999) Planning Advice Note; PAN 56 Planning and Noise

Scottish Executive (1997) Planning Advice Note; PAN 51 Planning and Environmental Protection

Scottish Executive (1994) Planning Advice Note; PAN 42 Archaeology

Local Authority Planning Policy Publications:


The City of Edinburgh Council (2001) West Edinburgh Local Plan

The City of Edinburgh Council (1999) Rural West Edinburgh Local Plan

The City of Edinburgh Council (1997) Central Edinburgh Local Plan

The City of Edinburgh Council Interim Local Transport Strategy 2000 to 2003 (authorised by Transportation Committee 9 August 1999)

Chapter 7 References


The City of Edinburgh Council (1999) Rural West Edinburgh Local Plan
Chapter 9 References


IEMA (1995) Guidelines for Baseline Ecological Assessment

JNCC (1990) A Handbook for Phase 1 Habitat Survey

RSPCA Problems with Badgers


Chapter 10 Bibliography and References

SEPA (June 2003) SUDS Advice Note – Brownfield Sites.


SEPA Pollution Prevention Guidelines – PPG23. Maintenance of Structures over Water

SEPA Pollution Prevention Guidelines – PPG5. Working in, Near or Liable to Affect Watercourses.

SEPA (2000) River Classification Scheme.


CIRIA Sustainable Urban Drainage Systems – Design Manual for Scotland and Northern Ireland (CIRIA C521)


Chapter 11 References

Vertical Aerial Photographs

<table>
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<td>Geonex 041/090</td>
<td>377-367, 379-386, 324-326</td>
<td>24/07/90</td>
<td>1:5000</td>
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</tbody>
</table>

Historic maps

Adair, J (1735) A Map of Midlothian.


Blaeu, J (1654) Lothian and Linlithquo.


Knox, J (1812) Map of the Shire of Edinburgh.


Laurie, J (1763) A Plan of the County of Mid-Lothian.

Laurie, J (1766) A Plan of Edinburgh and Places Adjacent.

Laurie, J (1786) A Plan of Edinburgh and Places Adjacent.

Ordnance Survey (1855) Edinburghshire, sheets 1, 2, 5, 6, 1:10560.

Ordnance Survey (1895) Edinburghshire, sheets II.10-11, II.15-16, III.9, III.13, 1:2500.
Ordnance Survey (1895) *Edinburghshire, sheets III.7 & 10, 1:2500.*


Thomson, J (1821/22) *Northern Part of Edinburghshire.*

**Bibliography**


Council for Scottish Archaeology *Discovery Excav Scot.* Discovery and Excavation in Scotland, Edinburgh


RCAHMS (1929) *Tenth Report with Inventory of Monuments and Constructions in the Counties of Midlothian and West Lothian.* Edinburgh: HMSO.

RCAHMS (1951) *An Inventory of the Ancient and Historical Monuments of the City of Edinburgh with the Thirteenth Report of the Commission.* Edinburgh: HMSO.


**Chapter 12 References**

**Chapter 13 References**

BSI (1992) *British Standard BS6472*

BSI (1993) *British Standard BS7385*

BSI (1997) *British Standard BS5228: Noise and Vibration Control on Construction and Open Sites*

DoT *The Noise Insulation (Railways and Other Guided Transport Systems) Regulations (1998)*


ERM (2003) *Tram Line 1 Environmental Statement*

GMPTE jointly by Halcrow Fox, CES and ERM (1995) *Assessment of Vibration from Manchester Metrolink*

HMSO *Design Manual for Roads and Bridges (DMRB), Volume 11*

**Chapter 14 References**


NETCEN *National Air Quality Archive, http://www.airquality.co.uk/*


The Stationery Office *London, Local Air Quality Management LAQM TG4(00).*

HMSO *The Air Quality (Scotland) Amendment Regulations 2002.*

Quality of Urban Air Review Group (1993) *Urban Air in the United Kingdom*

Bate, K.J. and Coppin, N.J. (1990) *Impact of Dust from Mineral Workings, Paper presented to County Planning Officers Society Committee No 3 Conference Loughborough University*

City of Edinburgh Council (May 2002) *Review and Assessment of Air Quality Stage 4*

City of Edinburgh Council (July 2003) *Air Quality Action Plan*

Association of British Ports (2000) *Air Quality Impact Assessment Dibden Terminal TS/AQ1*