3 Approach to the Environmental Impact Assessment

3.1 Introduction
This chapter describes the approach to the EIA. It reviews the assessment work undertaken in earlier stages of the design development process (including options assessment), and then identifies key issues which have determined the approach to the EIA, including the level of design detail necessary for the appraisal of the scheme.

3.2 Approach to Assessment of Impacts

3.2.1 Impact Assessment
The assessment has considered the potential environmental impacts of the tram proposals on people, property and the natural and cultural heritage, including effects of the permanent development of land and structures for the scheme, short term, temporary impacts during construction, and long term effects resulting from tram operations. The assessment describes the baseline environmental conditions for each of the environmental topics considered (eg noise, landscape, cultural heritage etc), and follows available best practice guidance on impact assessment (see Chapters 5 to 14).

The assessment has been based on information on the alignment of the proposed tram system, its design, construction and likely operational characteristics developed for the purposes of the private Bill. Chapter 2 sets out the details of the scheme which have been used in the EIA.

Because the assessment is based upon scheme information and drawings which have been developed specifically for deposition of a Parliamentary Bill it uses the corridor defined by the Limits of Deviation (LoDs) for the scheme to delineate the extent of land within which the work will be undertaken. The LoDs define the land for which powers are sought to build and operate the tram system. They necessarily encompass a wider corridor than is necessary for the tram tracks because:

- space is required to enable a future contractor to vary the alignment slightly in the detailed design from that which has been developed in the design work leading up to the Bill; and
- sufficient space is required on either side of the tram alignment for construction, works to utilities etc.

The LoDs for the scheme typically extend across the whole 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.

As a result of this the assessment is based on approximate rather than precise alignment details.

3.2.2 Level of Design Detail

Although the assessment has been undertaken to allow for the fact that the tram system could be constructed and operated anywhere within the LoDs defined by the Parliamentary drawings, 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 LoDs. 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 Parliamentary drawings do not identify the location of tram stops, the assessment of impacts, for example townscapes, needs to take account of tram stop location and 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 gantries, 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 these changes and ensure that these are not materially worse than those described 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.

3.2.3 Significance of Impacts

In carrying out the impact assessment, a common approach to the assessment of environmental impacts has been used among the specialist disciplines. The first step is to describe the existing situation (the baseline) and how this is expected to change (if at all) in the absence of the scheme. The assessment then reports the predicted impacts of the scheme describing their nature, magnitude and other characteristics. It then evaluates the significance of those impacts where appropriate classifying them in different grades of significance.

The importance or significance of environmental impacts predicted to arise as a result of the scheme will vary in the perception of different organisations and individuals. Nevertheless the ES needs to identify clearly those impacts which in the judgement of the EIA team are considered to be significant for decision making. To this end a general definition of significance is adopted in this ES as follows:

An impact is significant if, in isolation or in combination with others, it should, in the judgement of the environmental assessment team, be brought to the attention of the reader so that it can be taken into account in the decision-making process, including the identification of mitigation.

The significance of an impact on people is considered to result from an interaction between three factors: the nature and magnitude of the impact or change, the number of people affected, and the
sensitivity of those people to the change. The significance of an impact on an environmental resource is dependent upon the nature and magnitude of the impact on the resource and the value of that resource. In turn, the magnitude of an impact has a number of different components, for example, the extent of physical change, the level of change in an environmental condition, its spatial extent, its duration and frequency, and its likelihood of occurrence where the impact is not certain to occur. Adverse and beneficial, short and long term, direct and indirect, primary, secondary and higher order, and cumulative impacts have all been considered.

In determining whether any particular impact is significant, reference is made to appropriate criteria including legal standards, policy guidance or accepted practice, and these criteria are identified in the later chapters of the ES. Consideration is also given to the views expressed by statutory agencies and other organisations consulted during the assessment.

3.2.4 Mitigation

Where the potential for significant impacts has been identified, the scope for their mitigation has been discussed with the design team. The promoter has approved measures which are considered to be feasible and is committed to implementation of all those measures described in the text. The impacts identified are those remaining after this mitigation has been implemented. A schedule listing all mitigation is provided in Appendix J.

Some mitigation measures will be developed in further detail during the final design and will be subject to the Prior Approval process. Where this is the case it has been identified in the ES.

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 will be developed such that its environmental impact will not be materially worse than that described in the ES after mitigation. This allows for flexibility in the design adopted for the final scheme and in the details of mitigation used to control environmental impacts.

3.2.5 Assessment of Cumulative Impacts

The primary focus of this ES is to present the impact assessment for the proposals to construct and operate Edinburgh Tram Line One and these are reported in the Chapters 5 to 14 of the ES. Line One of the tram is being promoted as part of a network of three tram lines. An ES has also been prepared for Line Two which should be submitted to Parliament at about the same time as Line One. A third line is being considered between the city centre and the south east of the city and a Bill for this is planned during 2004.

Line Two of the tram involves an alignment from the city centre through west Edinburgh to Gogar, Edinburgh Airport and Newbridge. Line Two will connect with the Line One at Roseburn (west of Haymarket) and it is intended that tram vehicles from Line Two will run onto the Line One network, as far east as St Andrew Square for some trams and to Ocean Terminal for a smaller number. The operation of Line Two trams on the network for Line One will give rise to cumulative operational impacts which are additional to those reported here. For this reason, consideration has been given to the cumulative impacts and this is reported in Chapter 15. This addresses aspects where changes in the frequency of tram operations will result in impacts additional to those reported for Line One.

The cumulative assessment reported in Chapter 15 does not consider the environmental impacts of Line Two other than the effect of tram operations integrating with Line One. The ES for Line Two reports the specific impacts of that development.

The cumulative effects of other types of land use change and development taking place alongside Line One are taken into account in defining the baseline or Do Minimum case against which the impacts of
the scheme are assessed (eg for noise and air quality) and where Line One is considered likely to lead to other developments which could themselves have impacts (induced impacts) these are discussed in the relevant parts of the document.

3.3 Consultations

3.3.1 EIA Consultation

Consultation with statutory and non-statutory organisations is recognised as an important part of the EIA process. A programme of extensive consultations with environmental agencies and organisations has been undertaken to inform the environmental assessment.

The organisations consulted listed in Table 3.1 below.

Table 3.1 Organisations Consulted During the Environmental Impact Assessment

<table>
<thead>
<tr>
<th>Statutory Authorities and Agencies</th>
<th>Non Statutory Groups and Organisations</th>
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<tbody>
<tr>
<td>City of Edinburgh Council (Planning and Strategy; Archaeology; Environmental &amp; Consumer Services; Biodiversity)</td>
<td>Architectural Heritage Society of Scotland</td>
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<tr>
<td>Health and Safety Executive</td>
<td>Cockburn Association</td>
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<tr>
<td>Historic Scotland</td>
<td>Cyclists Touring Club</td>
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<tr>
<td>Scottish Environment Protection Agency (SEPA), East Region</td>
<td>Edinburgh and Lothians Badger Group</td>
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<tr>
<td>Scottish Executive Environment and Rural Affairs Department</td>
<td>Edinburgh Architectural Association</td>
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<td>Scottish Executive Development Department, Planning Division</td>
<td>Edinburgh World Heritage Trust</td>
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<tr>
<td>Scottish Natural Heritage (SNH)</td>
<td>Friends of the Earth Scotland</td>
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<td>Scottish Water</td>
<td>Lothians Bat Group</td>
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<td>National Trust for Scotland</td>
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<td>Royal Fine Art Commission for Scotland</td>
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<td>•</td>
<td>Royal Society for the Protection of Birds (RSPB) Scotland</td>
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<td>•</td>
<td>Scottish Civic Trust</td>
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<td>Scottish Enterprise Edinburgh &amp; Lothian</td>
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<td>Scottish Rights of Way and Access Society</td>
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<td>•</td>
<td>Scottish Wildlife Trust</td>
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<td>•</td>
<td>SPOKES Lothian Cycle Campaign</td>
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<td>•</td>
<td>Sustrans</td>
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<td>•</td>
<td>VisitScotland</td>
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</tbody>
</table>

Two stages of consultation were held. The first was undertaken early in the process to identify key issues and guide the scope of the EIA. The findings of this part of the EIA process were reported in an Environmental Scoping Report (see Section 1.2). A copy of the Scoping Report was issued to consultees to provide information on the proposed assessment process and more detailed consultation was undertaken where needed to inform the assessment. This involved the project team in discussions and meetings with several of the organisation listed above in order to understand fully their concerns, discuss assessment methods, identify all the key environmental and development issues, obtain baseline information on the area and help develop mitigation measures.

In addition, because of the importance of Edinburgh city centre for townscape and heritage (as recognised through its designation as a World Heritage Site), a working group was convened with a number of consultees to specifically discuss aspects of design of the tram. This group included representatives from tie and its advisors, CEC, Historic Scotland, and the Edinburgh World Heritage Trust. Outputs from this working group were also considered in the assessment.

An inventory of consultations held with organisations as part of the EIA process is presented in Appendix B of this ES. This information is presented as a table summarising issues raised in all the
written communications and subsequent meetings with consultees, and an indication is provided of how the responses have been taken into account in the assessment.

Environmental issues were also raised during the programme of public consultation, through the completed feedback forms provided by the public and through questions raised at public meetings and presentations. These issues generally were similar to those already identified as within the scope of the environmental assessment, but reinforced the need for consideration of effects of the tram on communities and natural habitats in particular. The public consultation process and its findings are reported in Section 3.3.2.

3.3.2 Public Consultation

In addition to the specific consultations held for the EIA, the development of the proposals for the scheme involved a programme of public consultations from 14 May 2003 to 10 July 2003. These included:

- leaflet distribution;
- press launches;
- touring exhibitions at a series of locations;
- a static city centre exhibition;
- a series of public meetings; and
- consultations with a range of third parties including community groups, political parties, business and tourism groups.

A public information leaflet for the Edinburgh Tram Line One (and Line Two) was published and delivered to over 100,000 homes and businesses in the wards affected by the two tram lines as part of an awareness raising exercise on the tram proposals. The leaflet set out the proposed tram lines, including a number of alignment options for Line One which were under consideration at the time of the public consultation. The leaflet included a tear-off section to allow respondents to make comments on the scheme and the options and the results of the feedback exercise were taken into account in the selection of the preferred scheme (see Section 3.5).

The purpose of the exhibitions and meetings was to provide the public with information on the developing proposals including the objectives, key benefits and impacts. The public exhibitions also allowed the public to comment on the proposals and discuss the scheme with representatives from tie and their advisors.

The information contained in the leaflets, and additional background material about the proposed tram system in Edinburgh was also included on tie’s website (www.tiedinburgh.co.uk) which is accessible to the public.

3.4 Assessment of Alternatives

A large number of alternatives to the final proposals for Line One were considered during development of the scheme. The alternatives which were examined, and the environmental appraisal of these options is described in this section.
3.4.1 Initial Long List of Alignment Options

At an early stage in the Line One project, the options presented in the previous Outline Business Case (OBC) report (see Section 1.1.2) were reviewed and tested. In order to ensure that possible alternatives for the proposed northern loop were considered, the design team also generated a series of additional alignment links throughout the study area. The OBC options and the new links were sifted to reduce the large number of link options to a manageable level, where they could be clearly excluded on the criteria adopted. These sifting was undertaken using the following broad criteria:

- technical implementability;
- economy;
- transport;
- environment; and
- compatibility with the brief in serving the key areas of the city centre, Granton, Newhaven and Leith.

Each option was scored against each criterion in order to determine the poorest and best performing links overall. The lowest ranking 30 links out of a total of 61 considered were plotted, and from this plan it was clear that certain route combinations (ie series of links joined together to provide alignment alternatives) would have significant disadvantages as they consisted of a series of low ranking links end to end, and these were therefore not considered further. The remaining links were then combined into coherent sequences forming loops around the northern part of the city. From this exercise a total of four alternative loop alignments were developed for more detailed assessment. These were:

- Option 1: OBC preferred route;
- Option 2: a variation of Option 1 following Crewe Road instead of the former Roseburn Railway Corridor;
- Option 3: a variation of Option 1 following Easter Road instead of Leith Walk; and
- Option 4: a variation of Option 1 following Junction Street in Leith instead of the alignment through the Port of Leith.

3.4.2 Appraisal of Loop Alignment Alternatives

Each loop option was then appraised using a series of criteria based on the Scottish Transport Appraisal Guidance (STAG) Part 1 (1). The appraisal process considered each option for the following criteria:

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

At this stage, more detailed transport and economic modelling approaches were used in order to assess the relative performance of each option for issues such as patronage and revenues. The environmental appraisal of options was in more detail than is usual for a STAG Part 1 appraisal and used a number of the sub-objectives set out in STAG guidance for Part 2 environmental appraisal. Five key environmental sub-objectives were identified as being most important for the comparative appraisal of options. These were noise and vibration, air quality, townscape, biodiversity and cultural heritage. In environmental terms, no significant differences between the options were identified. Overall, taking account of all the objectives, Option 1 performed best, and was clearly preferred on economic

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(1) Part 1 of STAG allows a broad comparison of a large number of options using the Government's five key objectives for transport.
Option 3 performed slightly less well than Option 1 whilst Options 2 and 4 performed demonstrably worse (1).

From this appraisal, Option 1 was taken forward for more detailed consideration, along with one sub-option for Easter Road. In addition, further sub-options were identified at three locations around the broad corridor of the OBC loop in Option 1 which were recommended for further assessment. These were:

- Haymarket, where an alignment along Haymarket Terrace/Wester Coates was identified as an option to the OBC route which ramped down behind the station to run parallel with the railway lines through Haymarket Yards;
- George Street, which was identified as a potential city centre alternative to Princes Street;
- an on-street alignment along Groathill Avenue and Telford Road instead of along the former Roseburn Railway Corridor between Queensferry Road and Ferry Road;

Analysis of these alternatives was taken forward to the next stage of appraisal. As more detailed feasibility studies were undertaken, and further consultations were held, a further sub-option was identified and appraised. This comprised a sub-option for the Leith Walk alignment, where the route ran from Picardy Place along Leith Street to Princes Street instead of via York Place and St Andrew Square. This sub-option was discounted after further design feasibility work found that the gradient of Leith Street and the difficult geometry of the junction of Leith Street and Princes Street presented significant traffic congestion problems and made this alignment unfeasible in engineering terms.

### 3.4.3 Detailed Appraisal of Route Alternatives

The four main alternatives to the OBC alignment (ie at Haymarket, Telford Road, Easter Road and George Street) were assessed in detail according to the key STAG Part 2 sub-objectives, as well as using other operational feasibility criteria such as impact on traffic at junctions. An assessment planning paper was produced for each option study which presented the findings of the appraisals and these were discussed with representatives from CEC and, in the case of the city centre options, other stakeholders with particular concerns regarding townscape sensitivities in the World Heritage Site. The environmental appraisal of each option was undertaken using baseline information available to the study team at that stage in the process, alignment drawings provided by the scheme designers, site visits to verify the sensitivity of the options and information from environmental and stakeholder consultations on the scheme. The environmental appraisal considered each of the sub-objectives for environment to a level of detail commensurate with STAG Part 2. At this stage although all sub-objectives were considered, townscape and visual issues were the most significant factor in the comparison of options in Edinburgh city centre.

This process allowed a further filtering of options to a reduced number. The Easter Road alignment was less preferable to the Leith Walk alignment due to higher scheme costs and lower patronage demand forecasts, and was therefore discounted. At Haymarket, constraints on the preferred alignment imposed by proposals to widen platforms at Haymarket Railway Station led to development of an alternative (now preferred) design. This involves an alignment following the southern side of Haymarket Terrace as far west as the junction with Haymarket Yards, where it then passes along Haymarket Yards and rejoins the line of the original OBC route adjacent to the railway lines west of Haymarket Station. The on-street alignment following Haymarket Terrace and Wester Coates was less preferable due to its greater townscape impact within the Wester Coates Conservation Area and its greater impact on buses and other road traffic on Wester Coates and Roseburn Terrace.

(1) Details of the appraisal are reported in the Edinburgh Tram Line One, Northern Loop, Work Package 1 Report (tie, December 2002).
Although further detailed work was undertaken on the remaining two options, the project team considered that input from the public and stakeholder groups was necessary to determine the preferred route. These alternatives were therefore carried forward to the public consultation exercise in summer 2003 and comment was specifically sought (through the leaflets distributed about the tram proposals) on the public’s preference for options.

The options presented for public consultation were:

- Craigleith Options: Groathill Avenue/Telford Road vs Railway Corridor;
- City Centre Options: Princes Street vs George Street.

Following analysis of public consultation responses including meetings with resident groups and leaflet returns, CEC recommended that proceed with the development of a preferred alignment following the railway corridor in Craigleith and following Princes Street in the city centre.

The public consultation process also yielded a further two sub-options to the preferred alignment. These were:

- an alignment along the route of the former Craighall Railway Corridor in Trinity/Newhaven as an alternative to the on-street coastal route following Starbank Road and Pier Place; and
- an alignment following Crewe Road, with a stop at the front of the Western General Hospital, and Craigleith Road in preference to the former railway corridor from Ferry Road to Queensferry Road.

Both of these options were examined by the project team. The original OBC alignment remained the preferred option in both cases, primarily on the grounds of patronage and scheme cost. At Trinity the preferred alignment better serves areas of existing and future patronage (for example new and proposed housing development around Newhaven). At Craigleith greater environmental impact was predicted along the Roseburn Railway Corridor between Craigleith and Ferry Road due to habitat loss, effects on protected species and potential noise impacts than for the alternative route along Telford Road. However, the preferred route along the railway corridor is significantly less expensive than an alignment along either Telford Road or Crewe Road, and an access to the western side of the Western General Hospital will be provided from the tram stop at Craigleith.

### 3.4.4 Alternatives at Starbank Road

The preferred alignment for Line One was identified as following the line of Starbank Road in Trinity, adjacent to the Firth of Forth. Following public consultation, survey work in this area identified that widening of the alignment would be needed in order to accommodate traffic and trams on the road carriageway whilst maintaining pedestrian routes on either side of the road and parking and loading space for residential properties located on the southern side of the road. A series of options for the widening of the alignment northwards were therefore examined to provide the width necessary for the tram.

Each of the options developed involved works to the existing seawall which currently separates Starbank Road from the Firth of Forth. A series of alternative structures were developed by the design team. Since the Firth of Forth is an area of national and European importance for nature conservation (see Chapter 9), any works to the seawall would have potentially significant ecological impacts. Consideration of environmental impacts was therefore the priority in determining the most appropriate design solution, and a meeting was held with Scottish Natural Heritage (SNH) to inform this process. Although each option would have impacts on the foreshore of the designated area of the SPA/SSSI, the preferred design identified is predicted to have the least impact during construction and operation.
This involves the construction of supporting columns in front of the seawall along a 250m long section to support a new wooden walkway at road level.

### 3.4.5 Alternative Depot Sites

As part of the preliminary work undertaken for Edinburgh Tram Line One\(^{(1)}\), a broad assessment of 23 potential depot sites around the corridor of Line One was undertaken. This assessment identified three sites to be considered further. The remaining options did not meet the necessary size and shape criteria for the operation of a tram depot.

The first of these sites was the fire hazard training ground off Ferry Road, however it was later discounted because although its area (of 1.4 hectares) was just large enough, it has a long narrow configuration which precluded allowing any turning facilities for vehicles and reduced the flexibility for stabling arrangements (see Section 2.3.9).

The other two sites were located adjacent to each other in Leith Port accessed from the roundabout at the north eastern end of Constitution Street. The preferred depot site comprises these two sites in combination. This provides a sufficiently large operational area as well as room for a turnback facility. Since the selection of depot sites was effectively constrained by operational parameters, environmental appraisal of alternatives was not undertaken. A planning report on the depot site in Leith, which includes environmental appraisal, has, however subsequently been prepared and issued to CEC.

### 3.5 Assumptions and Uncertainties

In undertaking the EIA a number of assumptions have been made to reflect areas of uncertainty. These have arisen for two key reasons.

- The transport modelling undertaken to evaluate the economic and transport implications of Line One has incorporated a number of assumptions, in particular relating to integration of the tram with buses and other traffic on a number of city centre streets, and regarding future traffic schemes. Whilst many of these do not affect the EIA, there are a small number of issues which are relevant because the assessment of environmental effects uses outputs from the transport model. Some of these assumptions differ from those adopted in the EIA.

- The relatively outline nature of the scheme designs required for a Parliamentary Bill has necessitated the development and agreement of various parameters regarding the design and construction of the tram system in order to provide sufficient detail for a robust EIA.

This section reviews the key assumptions which have been adopted.

### 3.5.1 Assumptions on Future Traffic Conditions

Transport modelling allows planners to predict changes in transport and traffic conditions in future years as a result of implementation of land use and transport projects (such as tram systems). In order to assess the effect of schemes in the future, transport models must include an accurate future year baseline which takes account of committed plans which are likely to affect traffic conditions in the future. The transport models used for the appraisal of Line One in 2011 and 2026 take account of a number of proposed schemes which CEC has committed to implementing between the current time and these future years.

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The effects of the Central Edinburgh Traffic Management (CETM) scheme are not included in the modelling. This is because at the time of development of the transport models for the Line One project, CETM was still being heard by an inquiry into the proposals and it was not certain that the proposals would be approved. The implication of this is that transport modelling (and environmental appraisal of road traffic flow changes from this modelling) for Line One does not incorporate potential future changes in the distribution of city centre traffic which are predicted to result from implementation of CETM. A key effect of CETM is to close Princes Street to westbound car traffic during the day such that only buses, cycles and taxis will be permitted to use this route. This change will have some effect on redistribution of westbound traffic along alternative city centre routes, which has not been included in the modelling and appraisal for the Line One proposals.

CETM will also result in a number of traffic management measures in the New Town area that will affect the routing of traffic through this area of the city.

### 3.5.2 Assumptions on Bus Services

The transport modelling for operation of Line One has identified that a number of tram users will switch from bus travel to use of the tram. This would be expected to result in reduction in the demand for bus services on those routes which parallel the Northern Loop of the tram.

The extent to which bus operations would be revised following introduction of the tram system is not known. Where the tram’s operation will effectively parallel bus services along routes such as Leith Walk, the transport modelling has incorporated some rationalisation as bus operators would be expected to alter their services to complement tram services. The outputs from the traffic model which have been used for the assessment of environmental effects (for example traffic-related noise and air quality) therefore take account of slight service rationalisation.

What cannot be allowed for, and may differ between the transport case assessed and the actual situation, is the way in which services are adjusted by the bus operators. For example, the bus operators may well elect to redeploy buses by running additional services or routes elsewhere rather than reducing the size of the bus fleet. If this was the case then the slight environmental benefit predicted to result from reduced bus vehicle kilometres without redeployment (which is the case in this EIA), would not be realised. However, the difference between the two scenarios is not considered to be significant in environmental terms. Whilst the non redeployment of bus services would result in fewer vehicle kilometres and therefore reduced regional emissions of air pollutants, at a local level, significant changes in roadside air quality or pedestrian amenity due to redeployment of buses to alternative or new routes are not predicted.

### 3.5.3 Assumptions on Cumulative Effects

In Section 3.2.5 the cumulative effect of Line Two trams operating on part of the Line One network was raised. Data on operational tram movements have been assumed (see Table 2.2) and the environmental impacts of these movements has been reported in Chapter 15. The transport modelling and appraisal for Line One has not allowed for any additional modal shift caused by the larger number of trams operating between Roseburn and Ocean Terminal as a result of interconnection with Line Two, or for any redistribution of traffic due to greater occupation of street running sections by trams. This is because the modelling has been undertaken specifically to assess the economic and traffic implications of Line One. The environmental implications of changes to road traffic flows as a result of these operations has therefore not been quantified in this ES.

However, it is not predicted that the higher service frequency between Roseburn and St Andrew Square/Ocean Terminal from interconnecting Line Two trams will significantly change the magnitude and distribution of effects of trams on road traffic flows in Edinburgh. A separate Network Effects study has been commissioned by tie to address city-wide issues associated with the operation of Lines One, Two and Three of the tram.
3.5.4 Other Aspects of Scheme Design

A number of assumptions have been made regarding the design of the proposed tram scheme for the purposes of the EIA. For example, whilst the Parliamentary Bill submission does not require detailed drawings of the scheme and infrastructure, the design team working with tie has developed details to a sufficient level to provide certainty with regard to the economic case and the engineering feasibility of the scheme. This has entailed, for example, identification of tram stop locations to assist in the determination of patronage estimates. In turn these locations were used to assess the feasibility of changes to urban traffic (particularly where stops are located close to complex junctions such as Haymarket), and to assess the townscape and visual impacts of the stops in these locations.

Similar assumptions have been made on the design and fixtures for OLE support poles and the quality of design and materials to be used for tramway surfacing and tram stop construction. Whilst these details may vary slightly in the final scheme delivered, the development of the Design Manual for the tram (see Section 2.4) has been required to enable an assessment of the townscape effects of the system as well as to provide assurance to stakeholders that the tram scheme which is delivered will meet expectations for the sensitive urban environment in which it is located.

Construction of the tram will be the responsibility of the eventual contractor, and flexibility needs to be allowed through the procurement process so that innovation and efficiency can be built into the contract (see Section 3.2.2). The ES has included certain assumptions about the way in which the scheme will be constructed, and the typical quantities of materials and structures required for Line One. These assumptions have been made to allow a reasonable assessment of the likely environmental impacts of construction and to meet the relevant legislative and best practice standards expected for EIA. However, allowance has been made in the assumptions and in the assessment, that the scheme could be built and operated in slightly different ways. It is not expected that different approaches would result in environmental impacts which are significantly different from those reported in this ES.

3.6 Sources of Information

A range of information sources have been used to complete this report and to undertake the assessment including:

- Outline Business Case Route Alignment Options Appraisal Report (Report No. 61664/0002/A, 23rd July 2001 by Edinburgh Tram Line One project team);
- Work Package 1 Report (Report No. 203011/0004B, 19th December 2002 by Edinburgh Tram Line One project team);
- Environmental Scoping Report (Report No. 203011/0019A, 4 June 2003 by Edinburgh Tram Line One project team);
- Ordnance Survey (OS) mapping (Explorer Sheet 350 at 1:25,000 scale);
- Information obtained from site visits between July 2002 and September 2003;
- Information received from the following consultees:
  - City of Edinburgh Council Environmental and Consumer Services Department;
  - City of Edinburgh Council, City Development Department;
  - Historic Scotland;
  - Scottish Water;
  - Scottish Executive Environment and Rural Affairs Department;
  - Scottish Executive Development Department;
• Scottish Natural Heritage (SNH);
• Scottish Environment Protection Agency (SEPA);
• Various non-statutory bodies;
• Published information including Structure Plans, Local Plans, the Local Biodiversity Action Plan (LBAP) etc.

The assessment of Landscape and Visual impacts reported in Chapter 8 has been provided by Gillespies.