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SESTRAN

SESTRAN Integrated Transport Corridor Studies (SITCoS)

Queensferry Cross Forth Corridor Report: Technical Annex, Volume 2

June 2005

SITCoS

SESTRAN INTEGRATED TRANSPORT CORRIDOR STUDIES

QUEENSFERRY CROSS FORTH CORRIDOR

STAG APPRAISAL – TECHNICAL ANNEX
Volume 2: Consultation & Part 2 Appraisal

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SITCoS

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Volume 2: Consultation & Part 2 Appraisal

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Chapter 1

INTRODUCTION & BACKGROUND

1. INTRODUCTION & BACKGROUND

1.1 Introduction

1.1.1 The SESTRANS partners appointed a consortium of consultants led by MVA and including Scott Wilson Scotland Ltd, David Simmonds Consultancy, Hargest & Wallace Planning Ltd and Systra Ltd to undertake Integrated Transport Corridor Studies on five corridors around Edinburgh and the Forth Valley.

1.1.2 This Report refers to the Queensferry Cross Forth Corridor. The extent of the Study area for this Corridor is shown on Figure 1.1, but it should be noted that the scope of the Study requires consideration of people, freight and vehicle movements starting or finishing outwith the Study area, but travelling across the Forth Estuary at Queensferry.

1.1.3 The approach for the overall Study was discussed at Inception Meetings on 29th September and 24th October 2003, and confirmed in the Inception Report dated 20th October 2003.

1.1.4 To supplement the overall Study inception meetings, specific "start-up" meetings took place on 10th November 2003 with officers of Fife Council and the Forth Estuary Transport Authority (FETA), records of which are shown in Volume 1 (Appendix A).

1.1.5 Throughout the study there was a need to liaise closely with FETA who were in the process of developing their Local Transport Strategy.

1.2 Report Structure

1.2.1 The general process of producing the Corridor Report is set out in Figure 1.2 below. STAG recommends that reports should consider their principal audience as the public[1]. Nevertheless there is a requirement to provide a wealth of supporting detail, and in a corridor of this size and complexity this detail might be said to be in danger of obscuring the principal issues and potential solutions. Accordingly a brief summary report is being presented, focusing very much on the lay reader, with a more detailed supporting Technical Annex.

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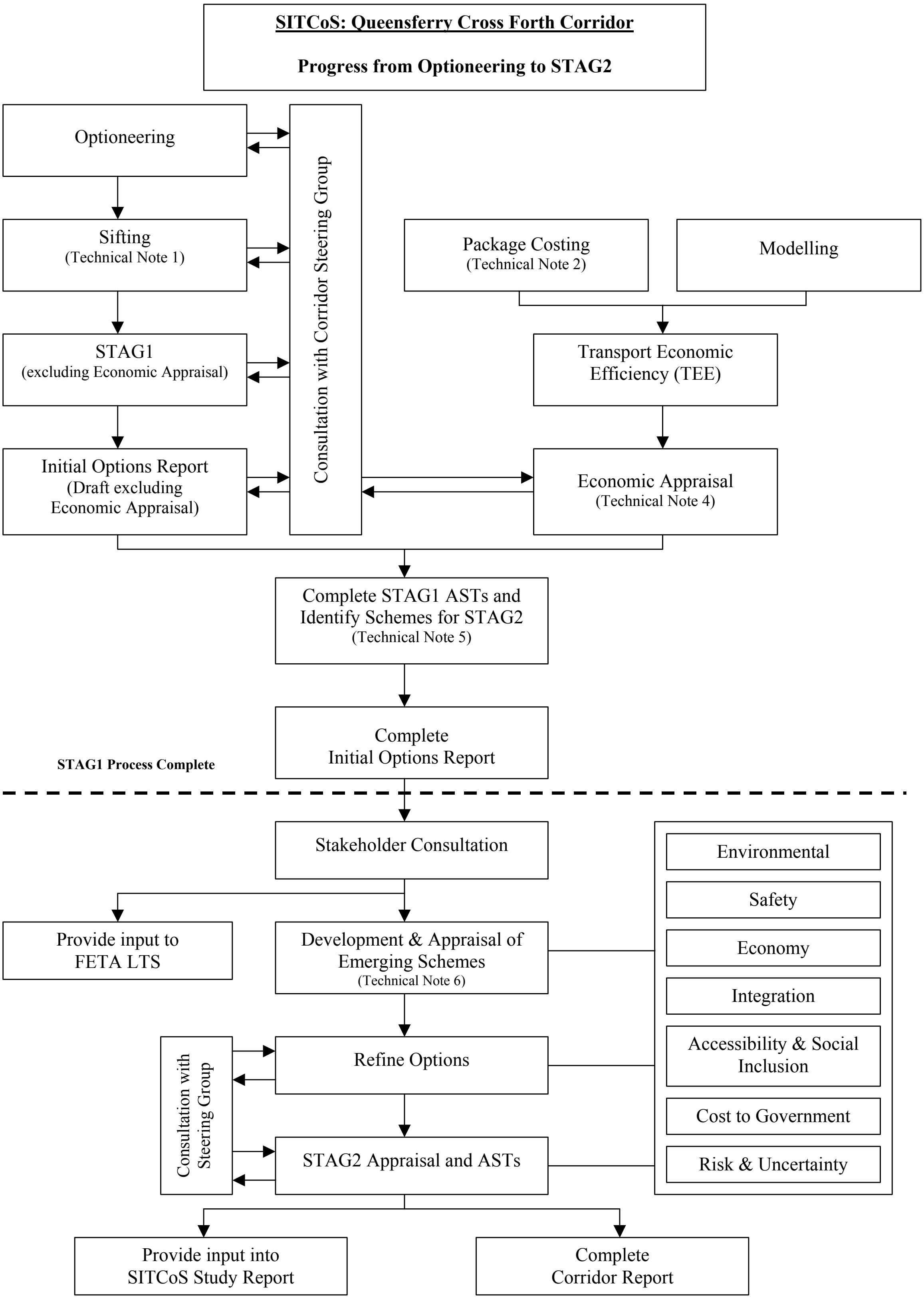
[1] Scottish Transport Appraisal Guidance (Scottish Executive, September 2003), section 14.1.3

Figure 1.2: Structure of Study Reporting



1.2.2 This document forms Volume 2 of the Technical Annex, and covers the comprehensive consultation on the schemes taken forward from Part 1 as well as the more detailed Part 2 Appraisal of those schemes. It is structured as follows:

Chapter 2	Describes the consultation process, particularly that following the initial identification of options considered worthy of more detailed assessment following the Part 1 appraisal.
Chapter 3	Sets out the detailed assessment of the schemes identified as meriting STAG Part 2 appraisal.
Chapter 4	Presents a review of risk and uncertainty leading up to the economic appraisal set out in Chapter 3.
Chapter 5	Provides an overview of the proposed monitoring and evaluation strategies.
Chapter 6	The report concludes with a brief synopsis of the project and its recommendations, including the Appraisal Summary Table.

1.2.3 Volume 2 follows on from Volume 1, which covered the STAG Pre-appraisal and Part 1 Appraisal processes.

1.3 Definitions

1.3.1 Throughout this Report the following definitions are used.

Options	All of the competent ideas raised at the Optioneering Workshop
Schemes	Those Options taken forward for sifting prior to STAG Part 1
Packages	Groups of Schemes appraised under STAG Part 1
Reference Case	A collection of projects outwith this Study remit which are either committed to be built in the future, or assumed to be almost certain to go-ahead. The appraisal of identified measures takes place against the background of this assumed Reference Case.
'Outside World' Transport Changes	Transport schemes beyond the scope of this Study's recommendations, but which could have a significant impact on demand in the study area if they occur
Scenario	Group of all the necessary Reference Case assumptions regarding land-use development, economy and 'outside world' transport changes
HOV (High Occupancy Vehicle)	A High Occupancy Vehicle for the purposes of this report is assumed to include all buses, coaches and HGVs, as well as taxis and private cars with more than one occupant.

Chapter 2

CONSULTATION

2. CONSULTATION

2.1 Initial Consultation

2.1.1 The initial inception process was set out in Volume 1. This included meetings with the wider SITCoS Steering Group as well as early discussions with the officers of authorities specifically affected by this corridor (Fife Council, Forth Estuary Transport Authority – FETA, City of Edinburgh Council and West Lothian Council).

2.1.2 A specific Steering Group was constituted for the Queensferry Cross Forth Corridor, comprising officers of the above authorities plus representatives of MVA and Scott Wilson. This met regularly at monthly intervals throughout the course of the study, in addition to other ad hoc meetings as necessary.

2.1.3 Feedback from all meetings was used to shape the definition of study objectives and the options to be appraised at both Part 1 and Part 2 levels, and agreement was obtained for each step in the study process culminating in the production of the Final Report.

2.1.4 Consultation also took place with Fife Independent Disability Network on 4th March 2004, and is recorded in study Information Note 15 issued by MVA. The views expressed in this consultation were taken into account when considering ways to maximise the attractiveness of public transport.

2.2 Consultation Workshops

2.2.1 Consultation on the emerging schemes following the STAG Part 1 appraisal took place on 5th & 7th May 2004 in Dunfermline. The workshop on 5th May 2004 comprised "professional" stakeholders and focused particularly on the benefits/disbenefits of the schemes, and sought informed comments on particular aspects of implementability. In addition attendees were encouraged to consider to what extent the emerging schemes met the ten objectives established for the study.

2.2.2 The workshop on 7th May 2004 included elected members and other community representatives, and focused particularly on the public acceptability of the emerging schemes. At both workshops attendees were given brief presentations on the emerging schemes in order to allow them to make informed and targeted comments. Following receipt of feedback, modifications were made to the emerging schemes taken forward for more detailed appraisal.

2.2.3 By their nature these workshops were wide-ranging, but to simplify this summary of the consultation outcomes the general conclusions are presented in the same order as the description of themes set out in Chapter 3.

2.2.4 In keeping with the need to work closely with FETA and their consultants regarding the FETA draft Local Transport Strategy, the consultation workshops were conducted jointly between the two groups ensuring a commonality of stance on all the main issues.

More Attractive Public Transport

Reduce some/all PT fares

2.2.5 Benefits:

- There is a significant difference between the first two (capping fares at RPI and RPI-1) and the last two (capping fares at 2006 levels and free PT). For many people travelling by PT, the first two are very small incremental changes and probably don't have a big impact, whereas free travel is of a significantly different motivational aspect; and
- Good marketing tool. Should be piloted.

2.2.6 Disbenefits:

- Not feasible;
- Impact on future investment capability;
- Difficulty with accommodating the new (high) demand with existing PT;
- Range of unexpected and undesirable disadvantages; "why would you go to Dunfermline town centre if you can get to Edinburgh for free or the Gyle for free. Some knock on effects that are quite widespread and difficult to predict";
- It would not be politically acceptable that well-off commuters and car-owners will also be subsidised; and
- In the long term what attracts people is reliability of the service.

2.2.7 Objectives:

- PT fares caped at RPI and RPI-1: slight positive impact (+1)
- PT fares capped at 2006 level: positive impact (+2)
- All cross-Forth PT free: strong positive impact (+3).

2.2.8 Implementability:

- Technically: Free travel may cause crowding on PT services; and existing ticket machines may not be able to handle many new fares (after all concessionary fares, discounted rates etc have been used).
- Operationally: Geographic boundary for free travel - where do you draw line?
- Financially: Who picks up the cost? Subsidy?
- Public: Politically difficult. Inequity – why are only certain movements subsidised? Also seen as subsidising the well-off.

Improve Rolling Stock and Travel Environment

2.2.9 Benefits:

- Travelling environment is a higher priority than the rolling stock in general; and
- Car parking facilities eg security instruments at train stations, provision of cycle facilities on the train and access at train stations are also important.

2.2.10 No disbenefits.

2.2.11 Objectives: Strong positive impact (+3)

2.2.12 Implementability:

- Technical: Trade off with capacity- "more leg or luggage room means less capacity"; and knock on effects of longer trains- requires longer platforms
- Operational: No difficulties identified
- Financial: Cost of new trains
- Public: The public will like it but the operators will not.

PT information/marketing

2.2.13 Benefits:

- The existing Traveline service is a good initiative that needs to be expanded and marketed properly:
- Commuters know where the buses go from and if there is a direct service to city centre, but they might not know about some of the options that are available to them when they need to travel somewhere else:
- All 44,000 bus stops in Scotland have been coded in an SMS pilot that can be used on mobile phones. The pilots are up and running and the whole of Scotland will have it by the end of the year, so it was a recognised that information provision and marketing is needed: and
- Knowing when the next service is expected (real time information) might encourage individuals to switch to PT.

2.2.14 Disbenefits/potential problems:

- It needs to be well-organised; and
- A one stop shop has to be well staffed or can lead to aggravation for the public.

2.2.15 Objectives: Strong positive impact (+3)

2.2.16 Implementability:

- Technical difficulties but they are being overcome, eg SMS system will be available soon.
- Operational: there are still issues about marketing and creating an image which are difficult to achieve with different operators and different modes between train and bus.
- Financial: None identified
- Public: Acceptable

Integrated ticketing

2.2.17 Benefits:

- Makes PT more convenient and easier to use. Highly beneficial.

2.2.18 Disbenefits:

- Technical and implementability difficulties in multi-operator PT environments.

2.2.19 Objectives: Strong positive impact (+3)

2.2.20 Implementability:

- Technically not a problem, particularly with smart card technology
- Operationally, needs to be more widely available, and difficult to implement as it depends on operators talking to each other
- Financially: not an issue
- Public: This would be popular

Improved Disabled Access to Public Transport

2.2.21 Benefits:

- Beneficial for a significant numbers of travellers who have difficulty using main interchange points like Waverley and/or Haymarket station.

2.2.22 Disadvantages:

- Pavements also need to be lowered to provide full DDA;
- Reduces capacity of buses and trains if space allocated for wheelchairs;
- Very expensive - politically unacceptable because of the disproportionate costs.

2.2.23 Objectives: One group argued that this issue affects more than just disabled people (e.g. elderly and mothers with push chairs and/or young children would also benefit) and gave a score of +2. Another group, however, thought it would have minimal impact on objectives.

2.2.24 Implementability:

- Technically: Adjusting bus stops and kerbside accordingly; adapting existing/Victorian stations can be difficult; while urban buses can provide good DDA, there is not yet a fully disabled-accessible coach
- Operationally: Crowding due to space required for disabled seats/areas; big operational difficulty with the side lift, 15 minutes at a stop to load and unload one disabled passenger – affects journey-time reliability; and health and safety issues – drivers not covered by insurance.
- Financially: Disproportionate cost; huge cost involved to upgrade Victorian stations, particularly where platforms are on a track curve ('Mind the gap' issues').
- Public: Providing wheel-chair spaces removes seating capacity for others.

Car Sharing

2.2.25 Benefits:

- It offers a choice and can be flexible;
- It targets the single occupancy issue. Even if a relatively small number of people take it up there would be a benefit;
- Car drivers who don't want to use public transport are far more likely to use this option. It halves the petrol and toll costs;
- There should be incentives, such as free parking and priority lanes for car-sharers;
- May be encouraged if a high occupancy vehicle lane was introduced;
- Motorists may prefer to car-share than wait for the bus; and
- Could be co-ordinated through employers - travel plan scheme.

2.2.26 Disbenefits:

- It is not always possible for a group of 4 people to begin and end work at the same time. 'Park and choose' is one solution to this problem:
- Issues relating to security and safety, particularly for women: and
- Problems in convincing the public – greater awareness and a selling point are needed.

2.2.27 Objectives: Small positive (+1 or +2) impact on objectives.

2.2.28 Implementability:

- Technically, not difficult
- Operational: Convincing major employers through travel plans; people don't like to car-share with strangers (so better within a workplace); and dispersed trip ends
- Financially: Cost attached to set up a scheme, although not massively costly
- Public: Security issues, and a major effort would be required to convince the public that it will work.

Cycle Facilities at Interchanges

2.2.29 Benefits:

- Focus on provision of cycle facilities on buses and trains, rather than at interchanges. Seen to be important to promote the use of inter-modal transport to Edinburgh.

2.2.30 Disbenefits:

- Only 2% of the population cycle, so disproportionate cost;
- Bikes could cause injuries and accidents and take up a lot of space;
- Increasing the number of people cycling was found to have very little impact on reducing congestion. Providing space on trains reduces the seating capacity; and
- Some thought if you encourage more people to cycle you may actually increase cyclist accidents. Therefore these are vulnerable road users and are more likely to have serious accidents and be seriously injured and killed.

2.2.31 Objectives: providing increased provision for bikes on buses and trains was thought to have at best slight (+1) positive impact on meeting objectives.

2.2.32 Implementability: Not discussed.

Dalmeny Interchange

2.2.33 Benefits:

- Park & Ride (as opposed to a bus or rail inter-change) was thought to be more beneficial, because current PT users are relying on Stagecoach services for coming south from Fife.

2.2.34 Disbenefits:

- The only disadvantage is thought to be taking everybody across the river first; and
- Do not need an interchange on both sides. If there are two interchanges everything is stopping twice to load and unload.

2.2.35 Objectives: One group thought this would have a slight (+1) positive impact on meeting objectives; however another group thought the benefit would be very limited.

2.2.36 Implementability: Not discussed.

Disabled Taxis

2.2.37 Benefits:

- Affordable door-to-door taxis felt to be more attractive that general PT for many disabled travellers.
- Assists with the social inclusion objective.

2.2.38 Disbenefits: None reported.

2.2.39 Objectives: Positive impact (+2) on meeting objectives.

2.2.40 Implementability: Financial issues.

Elected Members' Comments

2.2.41 Integrated ticketing encourages PT use. However, if the through-ticket is expensive it will be unattractive and have little impact on congestion levels.

2.2.42 Cost of car parking provided by City of Edinburgh Council has caused people to use more PT - further increases in the cost would force travellers to the city centre to look for alternatives other than their car.

2.2.43 Disabled access should be improved on PT in Fife.

2.2.44 It was noted that there was not much general awareness or understanding of the existing One Ticket scheme within the SESTRAN area.

Expanding Demand Responsive Transport/Feeder/Work Buses

Expanding Demand Responsive Transport

2.2.45 Benefits:

- Greater choice – provides alternative travel options;
- Convenient for users; and flexibility of origin/destination;
- Attractive to ABC car users;
- Personalised/bespoke method;
- Attractive for tourists, and airport potential (users with luggage);
- Single mode method;
- Social inclusion, e.g. good for people in rural areas;
- Good for evening/night travel when PT options are more limited.

2.2.46 Disbenefits:

- Questions about commercial viability, may need kick-start funding;
- Limited impact;
- Questions about whether it would generate new trips;
- Impact on taxi trade; and
- Possible transfer from rail.

2.2.47 Objectives: Positive, but limited, impact. Received a score of 0/+1.

2.2.48 Implementability:

- Technical: quite easy to implement
- Operational: no problems
- Financial: services may not necessarily be commercially viable and would require a start-up subsidy.
- Public: DRT has a positive image.
- Implementability score: 8/10

Feeder Buses to Employment Centres etc

2.2.49 Benefits:

- Inter-connected services encourage PT use; and
- Tackling interchange penalty.

2.2.50 Disbenefits:

- May detract from other buses/affect viability of existing services;
- Limited impact; and
- Coping with flexi-time/part time working hours for company buses.

2.2.51 Other points:

- Requires quality interchanges; must be reliable; must be long term.

2.2.52 Objectives: +2 or +1

Feeder Buses to Fife Interchanges

2.2.53 Benefits:

- Wider catchment population;
- Combined with joint ticketing, can be seamless; and
- Attractive to users (although, again, requires quality interchange).

2.2.54 Disbenefits:

- Commercial viability?
- Delays at interchange;
- Need to have reliable services at interchanges; and
- Reliant on frequency/sufficient capacity on core routes.

2.2.55 Objectives: Received a score of +2 or +1.

2.2.56 Implementability:

- Financial: If it was commercially viable it would already be running; issues because of the peaked nature of demand; Transport Act has made it a lot easier for Local Authorities to support schemes like this (eg kickstart money); need for a 2 – 3 year pilot; it should also incorporate a marketing strategy to convince the public.
- Technological: No major issues.
- Public: The size of vehicles could affect public acceptability issues – eg there would be problems trying to introduce a double decker bus through East Dunfermline; employers' buses more appealing - take you straight to your place of work with no interchange.
- Operational: No major difficulty. There are issues because of flexi-time etc – but no more difficult than organising any other bus; importance of real-time information at interchanges.
- Implementability scores: Employer feeder buses: 7/10, feeder buses to Fife interchanges: 6/10

Elected Members' Comments

2.2.57 All three of the schemes were seen as potentially beneficial.

2.2.58 Existing private car hire legislation does not allow complete demand responsive transport, whereby a taxi firm can ring round and arrange to pick up and drop off a group of people where they want to go. The yellow taxi bus can collect a group of people from a variety of destinations but must drop them in a single place.

Priority For High Occupancy Vehicles/Freight

Priority Vehicle Lane from Halbeath to Forth Road Bridge

2.2.59 Benefits:

- Should reduce the number of cars on the road;
- Would provide good incentives to single-occupant drivers who saw others travelling faster in the priority vehicle lane;
- Most would support company travel plans;
- The group also considered whether the goods vehicles should be given a priority. Allowing goods vehicles to use priority lanes in peak periods would have minimum impact, since majority of them currently travel outside peak hours;
- A bus priority lane would benefit bus operators and help make public transport more reliable; and
- It was noted that 30% of cars would use the HOV lanes – enforcement was thought to be significant issue.

2.2.60 Disbenefits

- If the HOV lane was used by buses stopping and starting to pick up passengers, this would reduce the speed of car traffic using this lane and the benefit of increased speed would be removed;
- Even if a third lane was put in from Halbeath, the road would still narrow to two lanes on the bridge and so there will still be a funnelling effect, causing congestion;
- Not cheap/easy to provide a third lane from Halbeath all the way to the Forth Road bridge, due to a number of rock outcrops close to the edge of the existing road;
- Concern that if the hard shoulder was used as an HOV lane, then there would be problems encountered when emergency vehicles needed to get past;
- Any spaces created by car sharing would be re-filled by new car trips diverting from PT;
- Priority vehicles still encounter the bottle neck over the FRB; and
- Safety issues associated with a mix of vehicles (HOV, HGVs etc) using a dedicated lane.

2.2.61 Objectives: Positive impact on objectives 1 and 7: One group scored +2, another gave a score of +3.

2.2.62 Implementability:

- Technical Issues: Problem at the southbound merge at north end of the bridge; signal control may be required; and ongoing enforcement (eg cameras) would be needed.
- Operational Issues: Needs enforcement – suggestions include cameras; and needs queue management at the bridge
- Financial Issues: The administration involved in issuing and chasing fines from people who use the priority vehicle lane inappropriately would be required; relatively low cost to paint the road; and financial implications will depend on whether an additional hard shoulder is needed
- Public Issues: Any under-used priority lanes would give perception of a waste of money (and/or road-space);
- Implementability score: 8.

Comprehensive 2-way bus 'right of way' between Fife and Edinburgh

2.2.63 Benefits:

- Would encourage car users to consider the bus as an option; and
- Providing a bus lane would achieve only a very small percentage shift from car to bus, with the bulk of the benefit going to existing bus users and travellers who switch from rail to bus.

2.2.64 Disbenefits:

- Cost in terms of land to have a bus lane all the way in?
- Not a huge impact?
- Once people have bought cars they are keen to make use of them to justify the expense; and
- Good short to medium term solution, but on its own not sufficient for medium to long term.

2.2.65 Objectives: One group gave a score of +1 (slight positive impact) whereas another group gave a score of +3 (Strong positive impact).

2.2.66 Implementability

- Technical: Land-take is technically possibly but not desirable; and enforcement and maintenance of the scheme would be potentially technically difficult and/or expensive
- Operationally difficult to put a priority bus lane in
- Public: under-utilised priority lanes could cause a public acceptability problem
- Implementability score: 6 (if we assume land-take rather than reallocation of existing road space).

Elected Members' Comments

2.2.67 Positive response to the development of bus priority measures, particularly for northbound buses travelling out of Edinburgh in the PM peak.

2.2.68 How to deal with the dispersed trip ends i.e. those people who cannot make use of the bus service because they work in Leith or South Gyle – i.e. the bus priority needs to be combined with extra bus services to West and North Edinburgh.

2.2.69 A permanent bus lane would reduce cars to single file and create congestion off peak.

2.2.70 The high occupancy lane including HGVs, taxis and buses was viewed as a marginal measure requiring no big investment, however resources would be required to enforce it - simply laying the tarmac would not be enough.

2.2.71 Car sharing is perhaps more viable than providing buses every ten minutes because car sharing can accommodate dispersed travel ends.

2.2.72 It was thought that there would be no public opposition against the high occupancy lane unless lots of money was pumped into it. It would be a waste of money to invest large chunks of money into such small infrastructure investments.

Additional Bus Services

Additional bus links to West Lothian from Fife

2.2.73 Benefits

- Would help to carry the demand generated in Fife to West Lothian over the bridge, which is the bottleneck and the main priority;
- Links to P&R, and to new Livingston Bus Station;
- People trust fixed routes; and
- Complements feeder services.

2.2.74 Disbenefits

- Buses will still sit in the congestion;
- Trying to cater for dispersed market; and
- Very peaked operation with limited off-peak demand – commercial issues.

2.2.75 Objectives: Positive impact (+2) on meeting SESTRAN objectives 1 and 3, and FETA objectives 2 and 8.

2.2.76 Implementability:

- Technical: OK
- Operational: Sufficient number of passengers to make it effective; quality of the road system at the southern end is an issue - at the moment, it's not easy to get to West Lothian from the bridge; and difficult with the existing congestion levels
- Financial: May need subsidy - initial funding might be necessary, because of low demand; and good marketing required to attract more passengers
- Public: Acceptable to the public
- Implementability score: 3/10

Additional bus links to North Edinburgh

2.2.77 Benefits:

- The end destination is more focused and less dispersed. More productive in delivering people to where they want to be.

2.2.78 Disadvantages:

- There are no bus lanes so the buses will sit in queues and only 16% of the cross-forth movement goes to N. Edinburgh.

2.2.79 Objectives: Slight positive impact (+1) on meeting SESTRAN objectives 1 and 3; and FETA objectives 2 and 8.

2.2.80 Implementability:

- Technical: lack of bus priority
- Operational: Enough passengers to justify the services? Delays due to existing congestion
- Financial: "Bus route development grant" is a good source of new money; and more likely than West Lothian scheme to become commercially viable if given some 'kick-start' funding.
- Public: Acceptable
- Implementability scores: 8/10 (with bus priority), 6/10 (without bus priority)

Additional bus links to West Edinburgh and Airport

2.2.81 Benefits:

- Potentially large numbers of people who might use it; and
- There is growing investment and employment in this corridor.

2.2.82 Disbenefits:

- Longer journeys to the airport because of the state of A8000. It will increase the congestion on A8000 as it is; and
- Its success depends on how well it is managed and how well it is done, eg providing quality interchanges.

2.2.83 Objectives: +2.

2.2.85 Implementability:

- Technical: Bus priority is also an issue for this scheme. Edinburgh Park buses already suffer from congestion (and possibly also a low profile).
- Operational: People going to the airport want to guarantee they will get there at a particular time. The service must be reliable.
- Financial: Who should fund it? Local Authorities? Should the private sector contribute?
- Public: acceptability was not seen to be a problem.
- Implementability scores: 9/10 (with bus priority), 6/10 (without bus priority)

Elected Members' Comments

2.2.86 A small subsidy to make a service viable is OK but subsidising something that runs empty causes unnecessary environmental damage and is a waste of resources.

2.2.87 If no one used the bus services then the privately owned companies would withdraw the service. The group would like the services serving popular destinations to be pump-primed and funded by the local council until the necessary modal shift is achieved.

2.2.88 Congestion at various points between Inverkeithing and the airport. Journey reliability was seen as particularly important for air travellers.

2.2.89 A bus travelling round Dalgety Bay to pick up passengers meeting the train did operate for a while but was mainly empty. This raised question of how new PT services could/should be marketed to current car users.

2.2.90 Some thought that the nature of the South Gyle/Edinburgh Park area meant that people that work there think they 'need' their car to drive to the shops etc at lunchtimes. This problem might also need to be addressed if significant reduction in car-commuting is to be achieved.

Park And Ride/Park And Choose

2.2.91 Benefits:

- A new Park and Ride/Park and Choose at Halbeath would be beneficial as long as it was part of a wider PT scheme.
- Park and Ride facilities should be multi-modal - gives more flexibility and is more attractive.
- Motorists are very sensitive to car park charges. One can manage park and ride charges so as to favour certain locations.

2.2.92 Disbenefits:

- It would encourage people to drive on congested roads to get there;
- Questionable economic benefit of an additional rail station?
- Where are local residents going to find space to park?
- Environmental impacts;
- A lot of Ferry Toll users are from the Dalgety Bay area, so Halbeath is not an attractive/realistic option for them;

- Using car park charges as a way of pushing back further up the road network. Can push them further up the line but can also push them back into their car; and
- One of drawbacks of Halbeath station is that it is less than half of the rail service at Inverkeithing.

2.2.93 Other comments:

- Services need to be dispersed rather than focused on central Edinburgh;
- Bus lanes are currently not policed strongly enough and haven't been for a number of years; and
- The bus should be there on time, depart on time and must not be held up en route, it must have priority right to into the centre.

Charging for Parking to Redistribute Demand

2.2.94 Disbenefits:

- Will tend to act against the objective of encouraging people to use more public transport.
- There was agreement that parking charges must be complemented by an increase in the cross Forth Road Bridge toll.

2.2.95 Implementability:

- Technical: No major issues
- Operational: New road links to Park and Ride might be a problem depending on the existing links
- Financial: Charging for parking might be an issue; and Park and Ride sites are expensive but do provide value for money.
- Public: There have been public objections for increasing parking at Inverkeithing so there is an issue there.

Elected Members' Comments

2.2.96 In favour of a Park and Ride / Park and Choose facility at Halbeath, close to the M90/A92 and including a new railway station.

2.2.97 More-feeder buses will be required if Ferrytoll and/or Inverkeithing are to be expanded further. Congestion in Inverkeithing was seen as major issue.

2.2.98 Residents of Inverkeithing currently obtained no financial benefit from the Park and Ride users. The introduction of a small parking charge was proposed, with the revenue ring-fenced for use in the communities affected by the congestion caused by the P&R users.

2.2.99 To complement a Park and Ride at Halbeath it will be necessary for the bus to be given priority (either via hard shoulder or an extra lane) to give it journey-time advantage over car.

2.2.100 The negative effect of building park and ride facilities is that they draw people into their cars and discourage them from using the bus service that comes past their house, thus increasing the congestion round the Park & Ride sites.

2.2.101 Buses were favoured over trains as they offer more flexibility, and since the train covers the main route into the city and the buses are running empty to the city centre the group were keen to see bus services meeting the demands of commuters to the edges of Edinburgh.

Demand Management

Selective Junction Closure

2.2.102 Disbenefits:

- Could lead to increased car journey length.

2.2.103 Implementability:

- Technically feasible
- Operational: Will junctions upstream cope with the increase in traffic? There is a need to look at the east-west movement as well as north-south.
- Financial: Inexpensive.

Differential Tolling

2.2.104 Disbenefits:

- Problems with implementation e.g. arguments over timing;
- Safety issues; and
- It would need to be a sliding scale.

2.2.105 Implementability:

- Technically: Feasible
- Operational: Issue of whether tolls could and should be lifted in times of a dramatic incident; and potential for abuse of system e.g. cardboard cut-outs in the car
- Financial: Inexpensive
- Public: There will be an initial reaction but it will become neutral later on.

Management of freight/deliveries

2.2.106 Generally happens already.

2.2.107 Implementability:

- Operationally: Difficult to police; option of limiting vehicles at certain times of the day; and impact on the industry.

Increasing Parking Charges in Edinburgh Area

2.2.108 Minimal impact, particularly if employers pay for parking.

2.2.109 Implementability:

- The public will not be happy.

Elected Members' Comments

2.2.110 Some thought that toll increases were just '*tinkering at the edges*' and that they won't make much difference to the increasing traffic demand – continuing growth in car traffic is almost inevitable.

2.2.111 CEC's £2 congestion charge would reduce AM peak southbound bridge traffic by less than 2%.

Optimisation Of Rail Services

Identify Better Use Of Existing Rail Capacity

2.2.112 Benefits

- More parking spaces at stations would encourage people to leave their car at a station rather than driving across the bridge;
- More-frequent services from Edinburgh in the evening to stations other than Inverkeithing would mean less congestion accessing Inverkeithing station to park in the morning; and
- Easier to persuade motorists to switch from car to rail than from car to bus?

2.2.113 Disbenefits

- Rail services have limited destinations. Improving bus services may be a better use of funds.

2.2.114 Objectives: Score +2 (positive impact)

2.2.115 Implementability

- Technical: Longer platforms will be needed
- Operational: Staff needed; capacity at Waverley station is an operational problem beyond the scope of this study; there will be a need for interchange i.e. buses taking people beyond the station.
- Financial: Costs are quite low for simply optimising stopping patterns, rather than buying new stock or laying additional track or upgrading signalling
- Public: The public may be sceptical about any changes actually taking place.
- Implementability score: 6

Create new Interchange site at Ferrytoll

2.2.116 Benefits:

- The success of Ferrytoll to date was recognised, but it was noted that it had only reduced FRB traffic by about 4%.

2.2.117 Disbenefits:

- The parking area is too small;
- This scheme would not help the congestion back from Ferrytoll – at the moment just getting to the Ferrytoll car park is a problem; and
- Cost of building a new rail station is high.

2.2.118 Objectives: Score +1 (slightly positive impact)

2.2.119 Implementability:

- Technical: Problem with not having rolling stock to use was discussed. Coaches are becoming available as new stock is built.

- Operational: Longer platforms needed in Fife – this will be implemented soon (6 carriages per platform); and need a balance between being cheap enough to get people out of their car but not so much it will create overcrowding on trains.
- Financial: Costs of building a new rail station in the vicinity of Ferry Toll were likely to be very high.
- Public: People would be sceptical about improved rail services until they were delivered, then they would be viewed positively.
- Implementability score: 8

Dunfermline to Stirling Rail Link and Dunfermline Chord

2.2.120 Benefits

- Moving freight via Kincardine might allow more passenger trains to go across the Forth Rail Bridge.

2.2.121 Disbenefits

- Lack of passenger demand for a service to Stirling; and
- Very costly to build, and minimal impact.

2.2.122 Objectives: No impact

2.2.123 Implementability:

- Technical: Line already exists so that makes it easier than starting a fresh; single track only – group seemed unsure about what exactly this scheme would require and why it had come about and who would use it; and signalling would be needed, track laid.
- Operational: Stations would need to be constructed where people need to get off
- Financial: Very expensive but cheap for a rail scheme.
- Public: Perhaps not a demand to drop from Dunfermline to Stirling but if the line took people to Glasgow it may be a benefit to the public.

Improve South Gyle station

2.2.124 Benefits

- If setting up a good interchange meant that people did not have to walk from the train station to work at the Gyle then this would be a worthwhile scheme.

2.2.125 Disbenefits

- Houses may need to be knocked down to create space;
- If the airport link was built there would be no need to make the Gyle an interchange; and
- Edinburgh Park has been built as an interchange - is there any need for another one so near?

2.2.126 Objectives: +2 (positive impact)

2.2.127 Implementability:

- Technical: It is feasible to improve it - no new technology is required although space is not available.

- Financial: Most railway schemes are expensive.
- Public: Not immediately obvious why passengers would want an interchange at the Gyle, it would need to be marketed as a scheme.
- Implementability Score: 8

Elected Members' Comments

2.2.128 If bus and train links were there for Edinburgh Park, people might use them. The proposed rail link joining the train line from the Forth Rail Bridge to Edinburgh airport and then going into Edinburgh Park would address this issue.

2.2.129 Suggested a single ticket price for all stations in Fife and increasing frequency at stations other than Inverkeithing on the Fife Circle to try to discourage people from using Inverkeithing to park rather than the station closest to their home.

2.2.130 An increase in the frequency of returning trains from Edinburgh to the Fife circle from the current 40 minute service would encourage travellers to use their local train station rather than driving to Inverkeithing.

2.2.131 Charging for parking at rail stations would tend to push Park and Ride users back to using their car.

Additional Road Capacity

New Multi-Modal Forth Crossing at Queensferry

2.2.132 Benefits

- Provides an alternative crossing. The Kincardine and Forth do not currently cater for peak demand;
- It would be a major benefit if the new crossing was wind-shielded;
- Any benefits will be accrued in about 10 to 15 years time; and
- Building a new bridge may actually address the problem of reducing Cross Forth travel by encouraging more businesses to locate in Fife.

2.2.133 Disbenefits

- Will do nothing to minimise the need to travel;
- It would just move the bottle neck of cars to another point such as the A8000 or Queensferry Road near the Barnton roundabout;
- Likely to increase single occupancy commuting;
- Will be contrary to maximising PT provision unless it includes a dedicated lane;
- Possible safety issues; and
- Without road space reallocation, the opportunity to encourage people to use sustainable transport is lost.

Road Space Reallocation

2.2.134 If a new bridge is built, it was agreed that road space reallocation has a very significant benefit and could help to mitigate objections.

2.2.135 It should also reduce the cost of maintenance on the existing bridge because work can be done on weekdays as well as weekends.

2.2.136 Freight, buses and taxis with passengers should be given priority.

2.2.137 Objectives: Two groups gave a score of +3 and one group +2 for meeting SESTRAN objectives 3, 4, 6, 7 and 9, and FETA objectives 1, 2, 3, 4 and 5.

2.2.138 Implementability:

- Technically it is feasible. Building a bridge is not a simple task but it is not new technology.
- Operational: Need a fast-action plan for clearing debris after accidents; the bridges would have to be managed centrally, by the same authority; will only work provided there is additional capacity provided elsewhere in the network; and enforcement required if modal restrictions were made on the new bridge.
- Financial: Predicted costs of around £300 million were suggested; question about how it would be funded: tolls, public purse, Local Authority?
- Public: Very controversial. There will be a polarisation of views from the public; there will be significant opposition from communities at the bridge heads; costing needs to be 'spot on' after fiasco of the Scottish Parliament; and more businesses locating in Fife would be seen as a good thing. A new bridge will benefit generations to come.
- Implementability score: 8.5 (assuming there is the political will to deliver).

Elected Members' Comments

2.2.139 Benefits:

- Some additional cross-Forth capacity was required to cope with the forecast increase in traffic; and
- Putting extra cross-Forth capacity and reliability will make Fife more attractive to businesses – this would help encourage employers to relocate to Fife, thereby reducing demand for cross-Forth commuting.

2.2.140 Disbenefits:

- If you put in extra road capacity, then more cars will fill it - a new bridge would tend to encourage car-based commuting; and
- A new bridge would just move the bottleneck of cars to areas such as Barnton and the A8000 so the new bridge will need to have better road space allocation elsewhere on the network if it were to succeed in reducing congestion.

2.2.141 Other comments:

- "Not building a new bridge is not an option" but "we can't keep on providing for increasing numbers of cars forever"; and
- Only way to make it politically popular for Edinburgh Councillors and to get round the objections from the "Green" lobby is to combine the new bridge with increased public transport provision- without this, it stands "no chance".

2.3 Linkages to FETA Local Transport Strategy

2.3.1 The Study Brief had highlighted the need to work in parallel with FETA's production of a draft Local Transport Strategy (LTS), the timescale for which did not allow for its preparation once the final recommendations of this Corridor Study were known.

2.3.2 Accordingly the consultants and Steering Group from this study liaised closely with FETA and it's consultants throughout the study period, and provided early indications of emerging results from the STAG appraisal to help inform the preparation of the FETA LTS. This included convening a joint consultation workshop, reported in more detail above.

2.3.3 The outcome of this close liaison is that the draft FETA LTS has been able to draw on the emerging recommendations of this study, albeit taking into account FETA's narrower remit and the different considerations applying to preparation of a LTS.

Chapter 3

STAG PART 2 (DETAILED) APPRAISAL

3. STAG PART 2 (DETAILED) APPRAISAL

3.1 Introduction

3.1.1 As suggested by STAG "*proposal details and background information will have been developed further since the initial Part 1 appraisal and it is necessary that key revisions be summarised.*"[2]

3.1.2 The latest background information used for STAG Part 2 purposes has been set out in Chapters 1 and 2.

3.1.3 Throughout the pre-appraisal process and Part 1 appraisal, the schemes were subject to increasingly detailed review, and this process continued for STAG Part 2.

3.1.4 Volume 1 of the Technical Annex outlined the combination of Schemes into Packages for STAG Part 1 appraisal. Following completion of the Part 1 appraisal it was necessary to identify more precisely those Schemes that would be subject to STAG Part 2 appraisal.

3.1.5 For ease of reference and clarity of audit trail Table 3.1 reproduces Table 4.4 from Volume 1 and sets out the relationship between Schemes and Packages for STAG Part 1. As can be seen, the decision not to consider Package III for STAG Part 2 results in the setting aside of the following Schemes, because they are not components of any other Packages:

- Scheme 22 – Fife only Guided Bus or Tram;
- Scheme 23 – Extend Edinburgh Tramline 2 to Fife;
- Scheme 24 – Tram on A90 Corridor to north Edinburgh;
- Scheme 25 – Tram on A90 Corridor to Edinburgh city centre;
- Scheme 26 – Tram on A90 Corridor to Edinburgh north & city centre;
- Scheme 47 – Convert north Fife Circle to LRT/joint running; and
- Scheme 48 – Convert south Fife Circle to LRT/joint running.

3.1.6 In addition the initial sifting process prior to STAG Part 1 appraisal had resulted in the decision to drop the following Schemes:

- Scheme 2 – Road space reallocation on existing Forth Road Bridge;
- Scheme 6 – Off-line PT alignment through north Edinburgh; and
- Scheme 40 – Other Cross Forth ferries.

3.1.7 Furthermore some of the original fifty Schemes had been re-categorised as "Outside World" Transport Changes during the sifting process, viz.:

- Scheme 15 – Rosyth By Pass; and
- Scheme 39 – Kirkcaldy & Leith Ferry.

3.1.8 Major increases to rail frequency were ruled out following STAG Part 1 appraisal, therefore any Schemes which were solely related to significant rail frequency improvements were also set aside, viz.:

- Scheme 19 – Reallocate rail capacity on the approaches to Edinburgh.

[2] STAG, September 2003, section 14.2.16

3.1.9 In the course of the Consultation Workshops there was no support for forcing freight deliveries to be outwith the peak travel periods (Scheme 41), or for the reinstatement of a Dunfermline – Alloa – Stirling rail link (Scheme 45). Consequently these two schemes were set aside before STAG Part 2. In addition it was identified that the two schemes relating to Ferrytoll/Ferryhill (Schemes 43 and 50) could be appraised as a single scheme.

3.1.10 Those Schemes not taken forward for STAG Part 2 appraisal are highlighted in Table 3.1.

3.1.11 This left 35 Schemes requiring to be considered in the STAG Part 2 appraisal process.

3.1.12 To simplify reporting and appraisal the Schemes to be assessed in Part 2 were grouped into Themes, presented broadly in order of deliverability with short term Themes first, followed by medium term Themes and culminating in long term Themes. These groupings were as follows, and the allocation of Schemes to Themes is also highlighted in Table 3.1 using the following key:

A Making Public Transport More Attractive
B Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes
C Feeder Bus Services
D Park & Choose
E Optimisation of Rail Services
F Demand Management
G Forth Multi-modal Crossing & Road Space Reallocation

3.1.13 The detailed definition of schemes for Part 2 appraisal is described below.

Table 3.1: STAG1 Packages taken forward to STAG2 Appraisal

Shaded schemes not taken forward to STAG2

Initial Schemes		Term	Bus & HOV Priority Measures I *Short*	Improved Rail Service II *Med*	Extensions to Edinburgh Tramlines 1 and/or 2 across Forth into Fife III *Long*	New Multi-modal Crossing with subsequent road space reallocation IV *Long*	Dropped from further consideration
2	Road space reallocation on existing Road Bridge	*Short*					✓
4	Comprehensive two-way bus priority between Fife and Edinburgh along A90/A823 Corridor	*Short*	**B**				
5	Priority vehicle lane – Halbeath to Road Bridge	*Short*	**B**				
7	Halbeath Park & Choose	*Short*	**D**	**D**			
8	Rosyth Park & Choose	*Short*	**D**	**D**			
9	Dalgety Bay Park & Choose expansion	*Short*		**D**			
10	Selective junction closures on Road Bridge approaches	*Short*	**F**				
11	Queue management	*Short*	**F**				
12	Differential tolling (including southbound)	*Short*	**F**	**F**	✓	**F**	
13	Car Sharing	*Short*	**D**	**D**	✓	**D**	
14	Charging for parking at Inverkeithing and Ferrytoll	*Short*		**F**			
16	Reduce/Reprofile PT fares	*Short*	**A**	**A**			
20	Increase/relocate parking at Inverkeithing (including "Travelator")	*Short*		**D**			
27	Demand Responsive Transport	*Short*	**B/C**	**B/C**	✓	**B/C**	
28	Feeder buses to employment centres	*Short*	**C**	**C**	✓		
29	Company transport links to interchange points	*Short*	**C**	**C**	✓		
31	Bus links to West Lothian from Fife	*Short*	**B**				
33	Northbound Park & Ride	*Short*	**D**	**D**	✓		
34	PT information provision plus marketing	*Short*	**A**	**A**	✓		
35	Integrated Ticketing	*Short*	**A**	**A**	✓		
36	Feeder buses to Fife interchanges	*Short*	**C**	**C**	✓		
38	Cycle access/facilities at Interchanges	*Short*	**A**	**A**	✓		
41	Management of freight/deliveries/trunking	*Short*	✓			✓	
42	Improve South Gyle station	*Short*		**A**	✓		
46	Greater provision of disabled taxis for access to PT	*Short*	**A**	**A**	✓		
49	Increase Edinburgh car parking charges in real terms	*Short*	**F**	**F**	✓	**F**	
17	Longer trains & associated infrastructure	*Med*		**E**			
18	Increase rail frequency	*Med*		**E**			
19	Reallocate rail capacity on approaches to Edinburgh	*Med*		✓			
21	Haymarket as "turn back" for rail	*Med*		**E**			
30	Dalmeny Interchange	*Med*	**D**	**D**	✓		
32	Improved PT rolling-stock and travel environment	*Med*	**A**	**A**	✓		
37	New road links to existing Park & Ride sites	*Med*	**D**	**D**	✓		
40	Other Cross Forth ferries	*Med*					✓
43	Ferrytoll rail station	*Med*		**D**			
44	Change patterns of rail services	*Med*		**E**	✓		
45	Dunfermline – Stirling rail link + Dunfermline chord	*Med*		✓	✓		
50	Expansion of Ferrytoll P&R and new Ferryhill P&R	*Med*	**D**	**D**			
1	New multi-modal crossing at Queensferry	*Long*				**G**	
3	Road space reallocation after new crossing opened	*Long*				**G**	
6	Off line PT through North Edinburgh	*Long*					✓
22	Fife only guided bus or tram	*Long*			✓1		
23	Extend Edinburgh Tramline 2 to Fife	*Long*			✓		
24	Tram on A90 corridor to North Edinburgh	*Long*			✓1		
25	Tram on A90 corridor to Edinburgh City Centre	*Long*			✓1		
26	Tram on A90 corridor to Edinburgh City Centre & North	*Long*			✓1		
47	Convert north Fife Circle to LRT/joint running	*Long*			✓		
48	Convert south Fife Circle to LRT/joint running	*Long*			✓		

Note 1: Also appraised as Guided Bus

3.2 Detailed Description of Schemes for STAG Part 2

Theme A: More Attractive Public Transport

Best Practice Review

3.2.1 The main Corridor Report considers the possible application of UK and European best practice to making public transport more attractive. This review is not reproduced here, but reference should be made to section 7.2 of the Corridor Report for more information.

Fares

3.2.2 The sensitivity of public transport demand to changes in fares was assessed, to maximise the attractiveness of public transport costs over car user costs. The following scenarios were tested:

1. Fares increased by Retail Price Index (RPI) +1% (the default situation, based on current understanding of the future Scottish Rail Franchise requirements);
2. Fares increased by RPI;
3. Fares increased by RPI -1%; and
4. Rail fares to/from Fife became "flat fares" in order to relieve pressure on Inverkeithing, which currently represents the cheapest readily accessible station in Fife for journeys to/from Edinburgh.

3.2.3 However it is probably pertinent to note the recent conclusions of SDG in work for SESTRAN that *"investment in reduced fares is unlikely to provide a good value approach to increase public transport usage."*[3]

Travel Environment

3.2.4 The Corridor Report contains detailed investigation of passenger aspirations relating to the travel environment, and reference should be made to that report.

3.2.5 Consideration was given to improved facilities at South Gyle station, making this a more attractive site for potential public transport users. However on reflection the site was considered to be badly located for a multi-modal interchange (with limited existing access and restricted available land for expansion) and Edinburgh Park (which was already ear-marked for an enhanced interchange role following the introduction of WEBS, EARL and Tramline 2) was clearly more suited to forming a west Edinburgh interchange function.

Marketing and Information

3.2.6 The benefits of providing improved marketing information, offering an integrated product through the Park & Choose interchanges and the impact of offering integrated tickets through the SESTRANS One Ticket range were all considered in order to identify their likely contribution to improving the attractiveness of Public Transport.

[3] SESTRAN Upfront Buses Appraisal (*Steer Davies Gleave for SESTRAN Authorities*, May 2004), section 7.19

Disabled Taxis

3.2.7 Consideration was given to the likely benefits of increasing the number of disabled access taxis, to increase access to public transport for any excluded social groups.

Cycle Access and Facilities

3.2.8 The provision of suitable access for cyclists to all identified interchanges throughout the study corridor was considered, along with the range of desirable facilities to maximise the use of cycling as a method of accessing core public transport services.

3.2.9 No attempt was made to quantify the benefits/disbenefits of carrying cycles on public transport.

Theme B: Comprehensive Bus Right-Of-Way

Bus Priority Measures

3.2.10 The detail of these proposed measures, including highways and junctions affected are set out in Appendix A, along with estimated costs totalling £4.6 million. In addition land acquisition between Barnton and Blackhall was estimated at £1 million, if required.

3.2.11 The alternative alignment via A8000 and A8 (required by Bus Service Ref. No. 3 below) had been provisionally costed at £18.75 million, although this includes significant interchange construction and land acquisition costs[4]. This bus service could be routed via Barnton and A902 instead of A8000/A8, the cost of associated priority measures being included in the figure quoted in Chapter 7, but this would reduce the public transport linkages between Fife and the A8 corridor (especially Edinburgh Airport and interchange with Tramline 2). Given the cost of this option, enhanced bus services along the A8 were appraised without bus priority measures.

3.2.12 Figure 3.1 provides an overview of the Bus Right-of-Way proposals.

Priority Vehicle Lane

3.2.13 A southbound Priority HOV Lane was assumed on the M90 between Halbeath (junction 2a) and the northern bridgehead of the Forth Road Bridge. The alignment is set out in Figure 3.2. The cost of providing this lane was estimated at £12.6 million (2003 prices) – see Appendix A.

Specification of Bus Services

3.2.14 Existing bus services in some parts of the area are already comprehensive. Around Rosyth the following bus services already operate, but should be re-routed to serve Rosyth Station adequately as this will form part of the Multi-modal Interchange network proposed.

[4] Work by SIAS for FETA Local Transport Strategy

Table 3.2: Existing Bus Services Re-routed to pass Rosyth Station

Ser. No.	Route	Daytime Frequency passing Rosyth Station
7	Dunfermline – Rosyth – Inverkeithing – Dalgety Bay – Kirkcaldy – Leven	Every 30 minutes
19	Rosyth (Babcocks) – Dunfermline – Ballingry	Every 10 minutes
X40	Dunfermline – Rosyth – Inverkeithing – Ferrytoll – Sighthill/Heriot Watt	Occasional peak hour only
X54	Dundee – Glenrothes – Dunfermline – Rosyth – Ferrytoll – Edinburgh	X54/55/55A combine to run every 20 minutes into Edinburgh
55/55A	Kelty – Dunfermline – Rosyth – Ferrytoll – Edinburgh	
73/73A	Crombie – Rosyth – Inverkeithing – Ferrytoll – North Queensferry	Approx one per hour **SEE FEEDER BUS PROPOSAL REF. NO. 106 IN TABLE 3.4**
79	Dunfermline – Rosyth – Inverkeithing – Dalgety Bay	Every 30 minutes

3.2.15 In addition to the existing bus services using the Forth Road Bridge, new/augmented services were assumed (shown on Figure 3.3 and described in Table 3.3).

3.2.16 These additional bus services were estimated to cost £3 million per annum, before allowing for revenue, but net of existing operating costs.

3.2.17 The work of Steer Davies Gleave for SESTRAN was reviewed and a good fit observed between the proposals set out above and the services assessed in their study[5].

[5] SDG, May 2004

Table 3.3: Specification of Bus Services for Modelling

Ref. No.	Origin	Destination	Intermediate Points	Buses per hour		Comments
				Peak	Off Peak	
1	Dunfermline	Livingston (Kirkton Campus)	Inverkeithing, Ferrytoll, Broxburn, Uphall	3	2	Existing E&M Horsburgh service X90
2	Dunfermline	Leith (Ocean Terminal/ Victoria Quay)	Halbeath P&R, Ferrytoll, Barnton	4	2	Existing Stagecoach Fife service X50
3	Dunfermline	Craiglockhart (Napier University)	Rosyth, Ferrytoll, A8000, A8, Edinburgh Airport, South Gyle, Edinburgh Park, Sighthill	3	2	Based on existing Stagecoach Fife service X40 but with alternative route based on FETA LTS
3A	Dunfermline	Edinburgh (Bus Station)	Rosyth, Ferrytoll, A8000, A8, Edinburgh Airport, South Gyle, Corstorphine, Corstorphine Road, Haymarket	3	2	
4	Dunfermline	Edinburgh (Bus Station)	DEX, Inverkeithing, Ferrytoll, Barnton, Drumbrae, Corstorphine, Corstorphine Road, Haymarket	4	2	
5	Dunfermline	Currie Station	Ferrytoll, Barnton, Gogar, Riccarton (Heriot Watt University)	2	1	Based on existing Stagecoach Fife service X40
6	Dunfermline	Falkirk	Ferrytoll, Linlithgow, (Bo'ness), Grangemouth	2	1	
7A	Kelty	Edinburgh (Bus Station)	Western Cowdenbeath, Halbeath P&R, Barnton	2	2	Combine to give high frequency (4 bph) service from Halbeath direct to Edinburgh
7B	Lochgelly	Edinburgh (Bus Station)	Cowdenbeath, Halbeath P&R, Barnton	2	2	

Bus Services without Priority Measures

3.2.18 In addition to testing the above bus services running on the proposed comprehensive right-of-way, a model run of the bus services set out in Table 3.3 was also undertaken without bus priority measures, for comparative purposes.

Upgradability to LRT

3.2.19 The bus services set out above are able to provide an immediate contribution to mitigating the worst aspects of Cross Forth road traffic congestion, and it is important that the provision of these bus services is fully integrated into wider transport-land use planning. Bus services, although they may lack the fixed route of rail-based public transport, can form significant transport corridors in their own right and they should not be viewed as some sort of "after-thought".

3.2.20 Development that focuses solely on car-based transport is likely to overload the transport infrastructure of South Fife and may therefore fail in its aim of encouraging expansion of the Fife economy. It is also likely to be a significant issue taken into account by the Reporter at any Public Inquiry into development proposals.

3.2.21 The need for sustainable transport is set out in recent Scottish Planning Policy documents, notably SPP2, SPP3 and SPP17, for example:

> *"New development areas should be easily accessible by public transport. Development plans should provide clear guidance on the requirements for public transport access to such areas."*[6]
>
> *"Wherever new [economic development] sites are being proposed, they should be accessible by walking, cycling and public transport."*[7]
>
> *"Patterns of Development should seek to reduce the demand for travel and reliance on the private car…. Preference should be given to locations which can be well integrated with existing and proposed public transport networks. Such locations should be developed at higher densities."*[8]
>
> *"Extensions [to existing settlements] should not be dependent solely or mainly on car access. Sustainable transport options should be considered as an integral part of the development process and the aim should be to provide opportunities for non-car access before houses are occupied and patterns of travel established…. The internal road layout should allow easy access by buses."*[9]

3.2.22 Further discussion of the impact of land use planning strategies on Cross Forth travel is set out later in Section 6.3.

3.2.23 Although the STAG Part 1 appraisal of options for mitigating Cross Forth traffic congestion ruled out LRT as a medium-term proposition, it remains possible that developments both in longer term demand and in new technology would combine to make LRT worth considering at some point in the future. Given the difficulties of retro-fitting LRT schemes into existing developments, it is right to consider these future possibilities to ensure suitable public transport alignments for bus, LRT and heavy rail are identified and (where appropriate) safeguarded.

[6] Scottish Planning Policy 17: Planning for Transport – Consultation Draft (*Scottish Executive*, January 2004), paragraph 28
[7] Scottish Planning Policy 2: Economic development (*Scottish Executive*, November 2002), paragraph 35
[8] Scottish Planning Policy 3: Planning for Housing (*Scottish Executive*, February 2003), paragraphs 35 & 36
[9] ibid, paragraphs 44 & 45

3.2.24 Figure 3.4 sets out the suggested alignments if future upgrading from Bus Right-of-Way to LRT is pursued. For comparison the Bus Right-of-Way network is also highlighted. All sections of routes shown are worthy of consideration for safeguarding in future Local Plans, for initial development as bus-based corridors and possible future upgrading to LRT.

Dual Running on Fife Circle

3.2.25 Dual Running (i.e. mixing heavy and light rail operations on the same tracks) had been considered at an early stage in the study. There are considerable operational and engineering obstacles to dual running including widely varying standards of signalling, track maintenance tolerances, platform infrastructure and provision of suitable overhead electrification for light rail.

3.2.26 Dual running has only been adopted once in the UK, on the Tyne & Wear Metro's Sunderland extension where tracks are shared between approximately 6 Metro trains and up to 3 other trains per hour. However it should be noted that the Tyne & Wear Metro has many characteristics of a heavy-rail service, including raised platforms and comprehensive signalling, and Metro trains are not suitable for on-street running; dual-running is not recommended for the Fife Circle. In the event that in the future light rail was considered in south Fife it would be necessary to:

- **either** withdraw the existing heavy rail service on sections of the Circle (e.g. Inverkeithing – Dunfermline – Thornton Junction) and replace it wholly with a light rail operation, hence disrupting the long-established operation on the Fife Circle, particularly north/east of Dunfermline;
- **or** route the light rail alignment away from existing heavy rail lines, in which case alignments would be along the proposed Comprehensive Bus Priority route.

3.2.27 These options are illustrated on Figure 3.4.

3.2.28 Alternatively it might be feasible to operate the heavy and light rail lines as parallel single-tracks using the existing double-track alignments, but this would severely constrain frequency and reliability on the single-track sections, and is not recommended.

Theme C: Feeder Buses

North of the Forth

3.2.29 Supplementing the existing bus and rail links a network of "station feeder" demand responsive transport were tested. The following bus feeders were considered (see also Figure 3.5).

Table 3.4: Specification of Feeder Bus Services North of the Forth

Ref. No.	Origin	Destination	Intermediate Points	Buses per hour		Comments
				Peak	Off Peak	
101	Dunfermline (Bus Station)	Ferrytoll	Dunfermline Town station, Abbeyview, Rosyth Station, Rosyth (Garden City), Europarc	4	2	
105	Dalgety Bay	Station	Circular route around Dalgety Bay linking to railway station	4	2	
106A	Culross	North Queensferry	Valleyfield, Cairneyhill, Crossford, Rosyth, Inverkeithing, Ferrytoll	1	1	Augment existing Stagecoach service 73. Provides improved service between Rosyth and Ferrytoll: • 4 bph peaks • 2 bph off-peaks.
106B	Culross	Ferrytoll	Valleyfield, Crombie, Charlestown, Limekilns, Rosyth, Inverkeithing	1	0	
106C	Rosyth (Ferryport)	Ferrytoll	Rosyth, Inverkeithing	1	1	
106D	Rosyth	Ferrytoll	Inverkeithing	1	0	

South of the Forth

3.2.30 Supplementing the existing bus and rail links a network of demand responsive transport to workplaces in the South Gyle area was considered.

3.2.31 The possibility of funding from employers for these feeders was also examined.

3.2.32 Explored within this category were any roles for Dalmeny and/or South Gyle as interchanges providing access from Fife to trip-ends in the West and North Edinburgh areas, reducing the need for additional bus services crossing the Forth.

3.2.33 The modelled public transport network reflected City of Edinburgh's plans for interchanges at Barnton, Edinburgh Airport and Edinburgh Park, served by all existing and planned public transport (including taxibus).

Theme D: Park & Choose

Park & Choose Concept

3.2.34 To maximise the range of options available to cross Forth travellers, the concept of "Park & Choose" was developed combining traditional Park & Ride sites with bus/rail/car interchange opportunities and facilities for Kiss & Ride.

3.2.35 The following potential sites were identified (see Figure 3.6 and Appendix B):

Halbeath	Requires development of completely new site.
Rosyth	Requires addition of car park, access roads and interchange facilities.
Dalgety Bay	Requires expansion of existing car park, improved access roads and provision of interchange.
Inverkeithing	Requires expansion of existing car parking, improved access roads and provision of interchange.
Ferrytoll	Requires expansion of existing car parking, provision of a railway station and improved access roads. May include use of Ferryhill site.

3.2.36 An unconstrained model run, with no maximum car park capacities specified for these locations, highlighted that the preferable location for Park & Choose was at Inverkeithing, even when rail fares to central Edinburgh from the rest of Fife were capped at the Inverkeithing level. When capacity constraints at Inverkeithing were removed then demand switched away from Ferrytoll, which showed reduced demand in the unconstrained modelling.

3.2.37 There was some background growth at Rosyth, suggesting a facility of between 70 and 100 cars would be useful, even before taking account of increased demand from Park & Choose, improved bus feeder services, etc.

3.2.38 Outline costs for each site were as follows (see Appendix B for greater detail):

- Halbeath Interchange £2.9 million;
- Rosyth Interchange £1.4 million;
- Dalgety Bay £0.5 million;
- Inverkeithing £4.4 million; and
- Ferrytoll Interchange £8.3 million.

3.2.39 Consideration of the costs associated with building a railway station at Ferrytoll, primarily due to its difficult location where the railway runs on a high viaduct, coupled with the fact that most rail demand was likely to be abstracted from existing bus users who park & ride at Ferrytoll, suggested that it was not sensible to proceed with the proposal to build a rail station at Ferrytoll. This also took account of the difficulties associated with inserting an additional station stop into existing trains at this point. However the benefits of increasing parking spaces at Ferrytoll in future years were assessed.

Associated Concepts

3.2.40 Assessment of the benefits of Car Sharing was undertaken. Investigation of Car "Pooling" (with a centrally-owned pool of cars available for cost-effective hire on an "as required" basis) also took place and is reported in the Corridor Reoport.

3.2.41 Consideration was given to the impact of introducing car parking charges in the northern bridgehead area (especially at Inverkeithing) to encourage greater use of upstream Park & Choose sites, maximising the use of public transport for journeys-to-work.

3.2.42 Finally the possibility of providing a suitable Park & Ride site in the southern bridgehead area was assessed, with a view to maximising the use of public transport for cross Forth commuter journeys into Fife.

Theme E: Optimisation Of Rail Services

Revised Pattern of Services

3.2.43 It was identified that a theoretical 12No. train paths per hour could be accommodated within existing Cross Forth infrastructure. At present, there are only 9No. passenger trains crossing the Forth Rail Bridge between 0730 and 0830 (being the critical time for arrivals into Edinburgh between 0750 and 0850). One of these paths is utilised for the Kirkcaldy – Glasgow service, which does not serve the Edinburgh commuter market. The overall pattern of service is not particularly attractive for travellers starting their journey by rail north of Inverkeithing, especially on the section of line between Rosyth and Cowdenbeath. This may contribute to making Inverkeithing a "honeypot" for Park & Ride.

3.2.44 Based on the above it appeared possible to provide some additional trains in the peak hour without any infrastructure work. These additional services would need to utilise the two additional paths between Haymarket and Waverley stations allocated to Fife trains as part of the Waverley Upgrade project. Whilst it would be possible to accommodate even more trains over the Forth Rail Bridge the constraints of pathing under the more complex post-EARL junction arrangements means it is not certain that these could be accommodated between Dalmeny and Haymarket, and in any case they would need to terminate at/start from Haymarket due to insufficient paths into Waverley.

3.2.45 The additional rolling stock was estimated to cost £2 million per 2-car train set. Additional operating costs were £0.5 million per annum for each additional train set in all-day service, based on consultants' experience on similar projects elsewhere. Of this Network Rail charges would account for circa £75,000 per additional train per annum.

Splitting the Fife Circle

3.2.46 The potential benefits of splitting the Fife Circle were previously identified in the South Fife and Forth Estuary Public Transport Study (SFFEPT)[10]. This remains a recommendation, but has not yet been acted upon.

3.2.47 However splitting the Circle to produce a clockface timetable would require an increase in resources above those currently committed to services on the Fife Circle, the costs of which would have to be met from additional demand attracted solely as a result of the improved "marketability" of a clockface timetable and improved services to Markinch. It would also be necessary to build a "turnback" facility at Markinch clear of the existing main lines.

[10] South Fife and Forth Estuary Public Transport Study (*MVA*, September 1999)

3.2.48 SFFEPT identified that splitting the Fife Circle would have a negative impact on rail's operating surplus equivalent to £320,000 per annum by 2011 (1997 prices), although this was more than offset by other benefits, resulting in net benefits of £690,000 per annum (1997 prices)[11].

3.2.49 For the purposes of this study it was assumed that an enhanced rail option would be offered from 2011 when EARL opens, by "Splitting the Circle" and adding 1No. additional train per hour via each of Kirkcaldy and Dunfermline, both operating via EARL in addition to the longer distance ScotRail services to Perth, Inverness, Dundee and Aberdeen.

3.2.50 Splitting the Circle will be justified from the benefits set out in SFFEPT; these benefits are not included in any of the benefits accruing to other schemes in this STAG Part 2 appraisal – there is no double-counting.

3.2.51 In summary the enhanced rail network from 2011 can be described as follows:

[11] ibid, Table 3.9

Table 3.5: Enhanced Rail Service Pattern from 2011

Ref. No.	Origin	Destination	Intermediate Points	Trains per hour AM Peak	Trains per hour Off Peak	Comments
201	Edinburgh	Cowdenbeath	Haymarket, South Gyle, Inverkeithing, Rosyth, Dunfermline South, Dunfermline Town, Dunfermline QM, Halbeath	0	1	Combined to form regular service between Edinburgh and Cowdenbeath
201A	Edinburgh	Glenrothes	Haymarket, South Gyle, Edinburgh Airport, Inverkeithing, Rosyth, Dunfermline South, Dunfermline Town, Dunfermline QM, Halbeath, Cowdenbeath, Lochgelly, Cardenden	1	1	
202	Edinburgh	Markinch	Haymarket, South Gyle, Inverkeithing, Rosyth, Dunfermline South, Dunfermline Town, Dunfermline QM, Halbeath, Cowdenbeath, Lochgelly, Cardenden, Glenrothes	3	1	
203	Edinburgh	Markinch	Haymarket, South Gyle, Dalmeny, North Queensferry, Inverkeithing, Dalgety Bay, Aberdour, Burntisland, Kinghorn, Kirkcaldy,	3	2	Combined to form regular service between Edinburgh and Kirkcaldy
203A	Edinburgh	Kirkcaldy	Haymarket, South Gyle, Edinburgh Airport, Dalmeny, North Queensferry, Inverkeithing, Dalgety Bay, Aberdour, Burntisland, Kinghorn	1	1	
204	Edinburgh	Aberdeen	Haymarket, Edinburgh Airport, Inverkeithing, Kirkcaldy, Markinch then as present	1	1	Service unchanged from present, except diverted via EARL
205	Edinburgh	Perth/ Inverness	Haymarket, Edinburgh Airport, Inverkeithing, Kirkcaldy, Markinch then as present	1	1	Service unchanged from present, except diverted via EARL
206	Kirkcaldy	Glasgow	As present	Withdrawn		**ScotRail direct service no longer required**
207	Edinburgh	Aberdeen/ Inverness	As present	As present		**GNER services unchanged**
208	Edinburgh	Dundee/ Aberdeen	As present	As present		**Virgin Trains services unchanged**

Additional Rail Stations

3.2.52 Augmenting the existing rail service by building additional railway stations was also considered, and identified on Figure 3.7. The stations considered were at "Abbeyview" (midway between Queen Margaret and Dunfermline Town) and "Dunfermline South" (midway between Dunfermline Town and Rosyth, adjacent to the existing Industrial Estate, but very convenient for the proposed western expansion of Dunfermline).

3.2.53 Consideration of the potential catchment area for "Abbeyview" showed that it would be likely to abstract demand from existing stations at Dunfermline Town and Dunfermline Queen Margaret, and was poorly located to attract significant new demand from the DEX area to its south. In addition the insertion of an additional station between the two existing Dunfermline stations would result in very low average speeds over this section, which would further curtail demand. Accordingly it was decided not to consider "Abbeyview" station any further.

3.2.54 Dunfermline "South" also exhibited some operating difficulties, being close to existing stations at Dunfermline Town and Rosyth. The present catchment area would not be likely to support the case for opening a rail halt at this location. However this might well change if plans to develop additional housing to the west of Dunfermline were implemented, and the station would also be well placed to benefit from one of the suggested alignments of the Rosyth Bypass. It is therefore recommended that "Dunfermline South" should be safeguarded as a station location if future developments go ahead, and consideration was therefore given to serving the station by an appropriate service.

3.2.55 The assumed service pattern at Dunfermline "South" is shown in Table 3.5.

Park & Ride

3.2.56 Investigations took place into potential Park & Ride/Interchange sites (referred to as "Park & Choose" sites) – see Theme D above.

Glasgow – Fife Direct Services

3.2.57 Previous work identified the potential for providing a frequent (up to hourly) direct train service between Fife and Glasgow via Falkirk and Cumbernauld, and that this could be operated with little or no public sector financial support[12]. Most of the other "quick-wins" from the SFFEPT study have already been followed through or are reflected in this study (e.g. Dunfermline – North Edinburgh, Dunfermline – Edinburgh Airport).

3.2.58 When the Edinburgh Airport Rail Link (EARL) is opened, then it will be possible to interchange between fast and frequent services at the new Airport station. It is likely that at least two such opportunities to travel between Fife and Glasgow will be created each hour, and it is anticipated that this will be more attractive than a slower direct service via Falkirk Grahamston and Cumbernauld.

[12] South Fife and Forth Estuary Public Transport Study (*MVA*, September 1999)

3.2.59 Consideration was therefore given as to whether a short term "interim" direct service should be provided, but it was concluded that it was difficult to identify spare capacity on some of the congested lines involved (particularly between Winchburgh Junction and Polmont Junction) and that potential demand was too low to justify the expense of an "interim" service and the possible disruption to other rail services.

Over Crowding

3.2.60 Where modelling predicted trains becoming over-crowded based on their existing train set formations, additional capacity was provided either by adding coaches to existing trains (at an assumed cost of £1 million per coach) or by providing additional trains as described above.

3.2.61 The rules of the new Scottish Rail Franchise require First ScotRail to ensure that no passenger has to stand for more than 10-minutes on Cross Forth services. It was assumed that the new franchisee took account of existing demand and background growth in delivering an acceptable franchise bid. However any increases in demand resulting from measures proposed in this study would need to account for any resulting over-crowding and the costs of compliance with the "10 minute rule".

3.2.62 The current capacity of most Fife Circle stations is for a maximum length of 6-car trains. If lengthening existing trains was required then work (costed at £12 million) would be required at a number of locations (see Appendix B). This was in addition to the capital cost of providing new train sets, and additional operating costs of around £80,000 per annum per train lengthened.

3.2.63 The overall need for increasing rail capacity is discussed in more detail in Chapter 6.

Impact of Edinburgh Airport Rail Link and Edinburgh Park

3.2.64 For the purposes of this study it has been assumed that EARL is completed and open by 2011, and as discussed above that it will be served by two additional Cross Forth trains from that time. The consideration of passenger demand has excluded demand originating at the Airport in the morning peak, or alighting at the Airport in the evening peak. It is possible that such passengers will exacerbate any predicted over-crowding, but this cannot be clarified until the demand modelling for EARL is completed (not within the timescale of this study). However the predicted surplus of seats over demand, even by 2026, seems likely to be sufficient to provide for EARL passengers over and above those identified in this study.

3.2.65 The new train services utilising EARL will also improve transport links to/from Edinburgh Park, but these have been taken into account in modelling future demand for rail.

Rail Fares

3.2.66 Because of the previous history of over-crowding on Cross Forth trains, there has been a policy of raising fares in real terms to attempt to "choke-off" demand and avoid the need for costly lengthening of trains and/or providing additional trains. Notwithstanding this there has been increased over-crowding on Cross Forth trains as already described.

3.2.67 One of the consequences of this approach has been an increasing use of Inverkeithing as a Park & Ride railhead as travellers minimise the rail fare element of their total journey costs. This, in turn, has made the bridgehead roads around Inverkeithing increasingly congested.

3.2.68 To overcome the "honeypot" problem of Inverkeithing, as well as providing enhanced rail services upstream of Inverkeithing, it is recommended that rail fares from south Fife are capped at the Inverkeithing level[13]. This should encourage travellers to access the nearest convenient railhead, rather than driving to Inverkeithing to minimise rail travel costs. The cost of this approach, in terms of lost revenue for First ScotRail, will be balanced by additional passengers carried as a result of capping the fares.

Theme F: Demand Management

Junction Closures and Queue Management

3.2.69 The benefits were considered of introducing peak-period junction closure affecting only low occupancy vehicles at the following junction on the M90:

- J1 – access to M90 southbound from A985 or A921 for HOVs/HGVs only.

3.2.70 However following review in conjunction with the development of the FETA Local Transport Strategy, it was concluded that the overall impacts on local road congestion were likely to be negative, it was difficult to implement technically and operationally, and that there was likely to be significant public, political and governmental opposition to such a scheme. Accordingly it was not appraised further in this study.

3.2.71 Instead it is recommended that best practices be adopted for queue management at Junctions 1 and 2 on the M90, along with Junctions 2a and 3 in the event of future problems of congestion arising from other proposals in the Halbeath area.

Increased/Differential tolling

3.2.72 The impact of introducing higher toll levels for some or components of the cross-Forth demand was assessed using the following broad principles and assumptions:

- At this stage the primary aim was to reduce congestion in the Queensferry corridor by attempting to constrain growth in peak-hour traffic (rather than, for example, increasing toll revenue simply to fund other schemes);
- the assumed starting position was all-day electronic northbound-only tolling at £1 per car & £2.50 for HGV's;
- differential tolling by time of day will be more-effective if southbound tolling is re-introduced but targeting the PM peak using existing northbound-only tolls was also tested;
- it was not feasible to reliably detect vehicle occupancy as vehicles pass through an electronic toll plaza, so enforcing differential tolling by vehicle occupancy will require accompanying segregated HOV lanes up and/or downstream of the toll plaza;

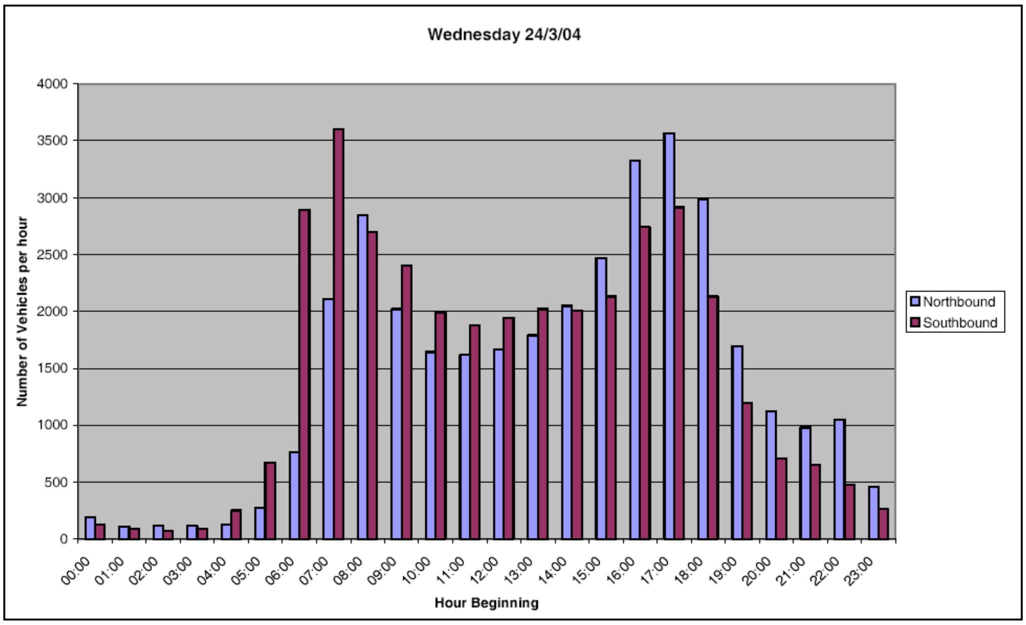
[13] Inverkeithing fares would continue to increase in line with current franchise assumptions (i.e. RPI+1%)

- the modelling did not consider the merits of differential tolling by different categories of HGV;
- the models could predict only route-choice impacts of higher goods vehicle tolls (i.e. changes in time-of-day or and/or trip frequency for goods vehicles were ignored);
- variations in PSV tolling would not affect either routing, frequency or mode-choice and therefore lie beyond the modelling - any change in PSV tolls was therefore simply considered as a transfer of toll-revenue between the PT operators and FETA; and
- if a new multi-modal crossing was provided the two bridges would charge the same tolls.

3.2.73 'Significant SOV 2-way tolls (namely £2/£1/50p per crossing for SOVs in peak/near-peak/off-peak after the new crossing opens) generate significant additional toll revenue which would easily cover the additional costs of MMC construction over the 60-year assessment period – see TEE table in section 3.7 for further details (showing construction costs exceeded by additional toll revenue).

3.2.74 Figure 3.8 illustrates a typical daily traffic flow.

Figure 3.8: Profile of Typical Daily Traffic Flow



3.2.75 When defining differential tolling by time of day in the modelling we identified four separate flow conditions, as follows:

- **Peak** (0700-0900 southbound) and (1700-1900 northbound)
- **Near-Peak** (0900-1000 and 1600-1900 southbound) and (0700-1000 and 1600-1700 northbound)
- **Inter-peak & week-ends** 1000-1600 (weekdays) and 0700-1900 (weekends); and

Off-peak – 1900-0700.

3.2.76 The definition of these time periods was constrained by the corresponding time periods in the CEC LUTI model – in reality the tolling profiles could be tailored to match the profile of actual traffic flows on the road bridge.

3.2.77 Five time-of-day differential tolling profiles were considered, as follows:

- **Low Flat Tolls** (Reference Case) – 50p per crossing for cars, £1.25 for HGVs in all time periods;
- **Double Flat Tolls** - £1 per crossing for cars, £2.50 for HGVs in all time periods;
- **'Moderate' Time of Day Tolling** – 50p/£1.25 for cars/HGVs in off-peak and inter-peak, rising to 80p/£2 in near-peak flows and £1/£2.50 in peak conditions);
- **'Significant' Time of Day Tolling** – 50p /£1.25 for cars/HGV's in off-peak and inter-peak conditions, rising to £1/£2.50 per crossing in near-peak and to £2/£5 per crossing at peak times;
- **'Aggressive' Time of Day Tolling** - £1/£2.50 per crossing for cars/HGV's in off-peak and inter-peak conditions, rising to £2/£5 per crossing in near peak and to £4/£10 per crossing in the peak times.

3.2.78 In the case of the two Flat Toll scenarios, southbound tolling was not required and the specified tolls could therefore be collected with existing northbound tolling infrastructure. The two Time of Day Differential Tolling variants were tested with both one-way tolling and two-way tolling variants. In the case of one-way tolling version, the stated tolls were doubled, but only the northbound demand profiles was used to determine the toll.

3.2.79 A tolling scenario was defined here by the choice of time-of-day tolling profile for each of following three vehicle types:

- Single Occupant cars;
- High Occupant cars; and
- HGVs.

3.2.80 The following nine tolling scenarios were tested initially:

- **TS1 - Reference case** (Low Flat Tolls (1-way) for all three vehicle types);
- **TS2 - Higher tolls** (Double Flat Tolls (1-way) for all three vehicle types);
- **TS3 – Moderate SOV Tolls 1-way** (Moderate Time of Day (1-way) tolling applied to SOV's , Low Flat tolls for the other two vehicle classes);
- **TS4 – Moderate SOV Tolls 2-way** (ModerateTime of Day (2-way) tolling applied to SOV's , Low Flat tolls for the other two vehicle classes);
- **TS5 – Significant SOV Tolls 2-way** (Significant Time of Day (2-way) tolling profile applied to SOVs, Low Flat tolls for the other two vehicle classes);
- **TS6 – Moderate Time of Day Tolling (1-way)** – Moderate Time of Day (1-way) tolling profile applied to all three vehicle classes;
- **TS7 – Significant SOV + Moderate Time of Day tolling 1-way** – Significant Time of Day (1-way) Tolling applied to SOV's, Moderate Time of Day (1-way) tolling profiles applied to the other two classes;
- **TS8 – Significant SOV + Moderate Time of Day tolling 2-way** – Significant Time of Day (2-way) Tolling applied to SOV's, Moderate Time of Day (2-way) tolling profiles applied to the other two classes; and

- **TS9 – Aggressive Time of Day Tolling (2-way) –** Aggressive Time of Day (2-way) Tolling Applied to all three vehicle classes.

3.2.81 TS1, TS2 and TS6 could be implemented using Reference Case northbound electronic tolling infrastructure (charging twice the stated toll), with no need to distinguish between SOV's and HOV's .

3.2.82 TS3 and TS7 required infrastructure/enforcement measures to distinguish between SOV's and HOV's in the northbound direction.

3.2.83 TS4, TS5 and TS8 required both southbound tolling infrastructure and SOV/HOV enforcement in both directions.

3.2.84 TS9 required southbound tolling infrastructure.

Reintroducing Southbound Tolling

3.2.85 This topic was discussed comprehensively in a previous work on tolling by Hyder, which indicated that reintroduction of southbound tolling would either require a second toll plaza or the adoption of "free-flow" tolling. Hyder recommended that FETA should not consider southbound tolling without future evaluation once technology facilitating "free-flow" tolling has been developed further[14]. Southbound tolling could be re-introduced if a new southbound toll plaza was constructed, however this does present difficulties in identifying a feasible site and providing appropriate infrastructure.

3.2.86 It is not feasible to locate a southbound toll plaza adjacent to the existing toll plaza at the southern bridgehead. Costs for providing a new southbound toll plaza in the northern bridgehead have been estimated at £5 million for infrastructure[15] plus £1 million for civil engineering/traffic management, and £4 million for land acquisition.

3.2.87 Assuming that "free-flow" tolling was adopted for southbound toll collection the following capital costs are anticipated for a two-lane highway[16].

[14] Forth Road Bridge Toll Equipment Replacement – Strategy Development (*Hyder for FETA*, September 2003), Chapter 8 and particularly section 8.3.17
[15] See e-mail from Alastair Andrew to Neill Birch (6th July 2004)
[16] Hyder, September 2003, Chapter 13 supplemented by data from Alastair Andrew (FETA)

Table 3.6: Outline Costs for Free-flow Southbound Tolling

Description	Quantity	Rate	Total
ETC Antenna	2	£2,000	£4,000
ETC lane control sub-system	2	£6,000	£12,000
Proximity Smartcard reader	4	£500	£2,000
Lane Processor	3	£13,500	£40,500
Over-lane VMS (status indicator)	2	£20,000	£40,000
Lane height restrictor	2	£2,000	£4,000
Axle & dual tyre detectors	2	£10,800	£21,600
Laser classification system	2	£29,000	£58,000
Dual Exit loops	2	£1,250	£2,500
VES exit camera, IR illumination & fixings	2	£3,000	£6,000
VES front-facing camera	2	£2,750	£5,500
VES image capture & processing system	2	£5,000	£10,000
Local Area Network & cabling	1	£28,000	£28,000
Variable Message Signs & work (wider area)	1	£195,000	£195,000
Overhead gantry	1	£175,000	£175,000
			£564,100

3.2.88 It is assumed that the centralised administration and supervision systems will be capable of handling tolling on two southbound lanes without additional capital costs.

3.2.89 Current toll collection costs are circa £1 million per annum[17]. Whilst some of these costs are fixed regardless of the scale of tolling operation, it is unlikely that an additional toll plaza could be introduced without substantially increasing costs. For the purposes of this study the "marginal operating cost" of a second toll plaza has been estimated at 75% of the existing plaza, viz. £750,000 per annum. With "free-flow" tolling it is assumed that there are no operating costs additional to those necessary to support northbound electronic tolling.

Electronic Differential Tolling

3.2.90 Hyder concluded that electronic differential tolling was feasible by vehicle type and/or time of day, but that at the time of writing (September 2003) there was no reliable means of automatically detecting the number of occupants in a vehicle[18]. This would mean that differential tolling by vehicle occupancy would need to rely on manual toll collection, and in turn means that southbound differential tolling by vehicle occupancy would require construction of a second toll plaza at the costs set out above in section 3.2.86. However, as discussed later in connection with enforcement of HOV lanes, a project is currently underway to develop methods of identifying the number of vehicle occupants automatically, using infra-red technology, so it will be necessary to continue to review the opportunities for electronic differential tolling.

3.2.91 In the meantime, FETA accepted that peak period differential tolling using a manual system (i.e. under the direct supervision of the Bridge Officers) was feasible.

[17] ibid, page 30
[18] ibid, Table 9 (page 99)

Impact of Tolling Regimes

3.2.92 The following two graphs (Figures 3.9 & 3.10) give an indication of the likely impact on SOVs using the Forth Road Bridge of SOV Tolls and SOV Time Increases respectively.

Figure 3.9: Impact of SOV Tolls on SOVs using Forth Road Bridge

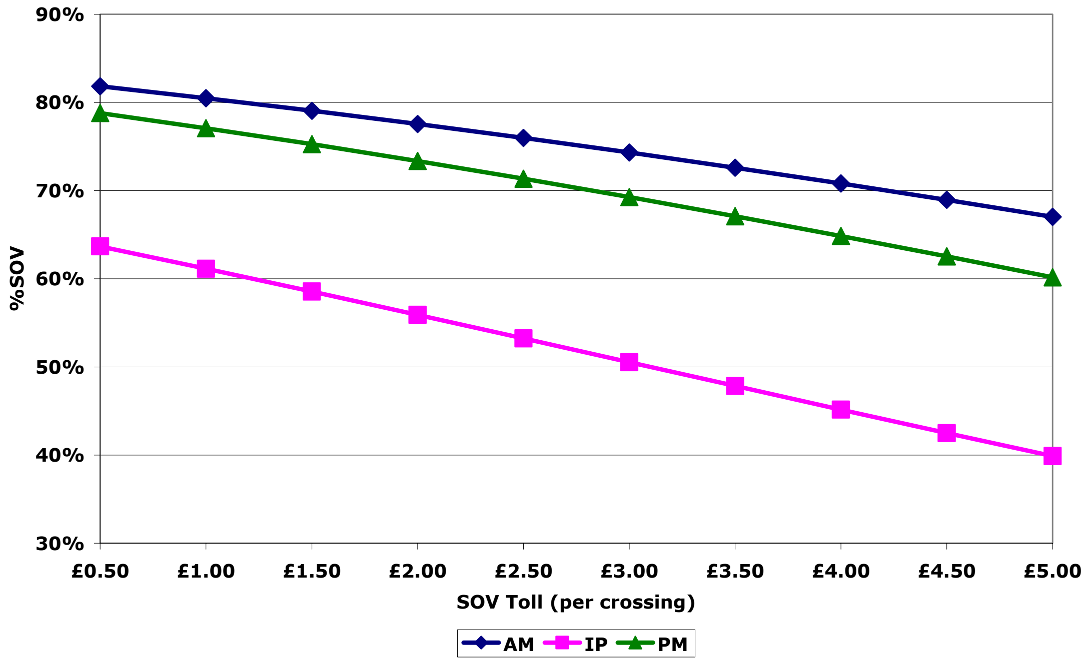
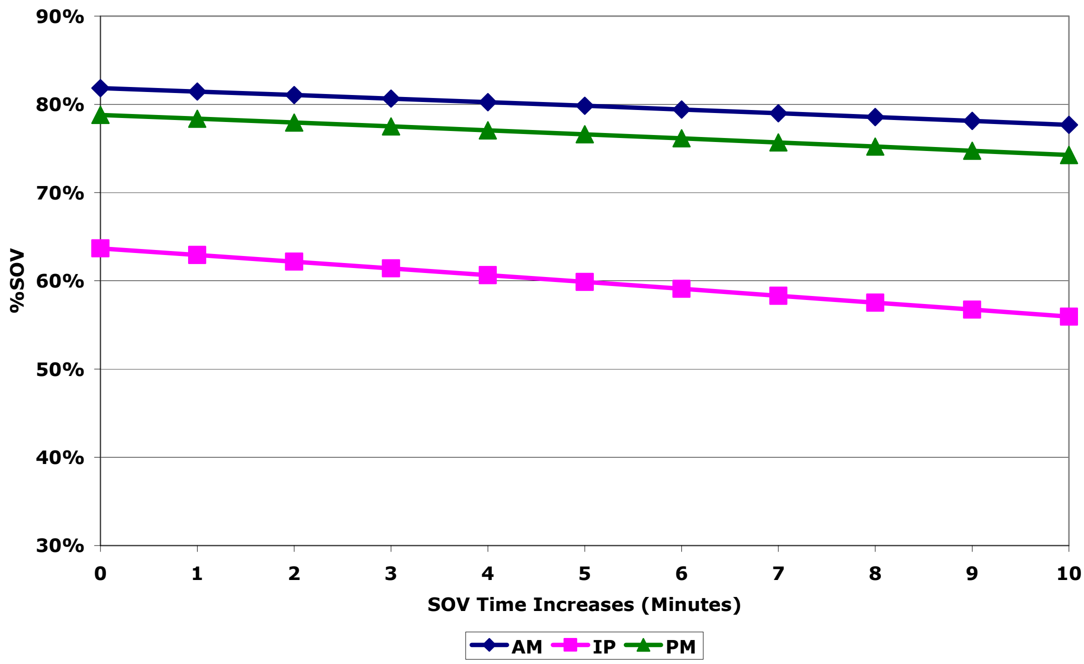


Figure 3.10: Impact of SOV Journey Times on SOVs using Forth Road Bridge



3.2.93 This demonstrates that Cross Forth SOV use is relatively price elastic in the Inter-Peak (IP) period, and less elastic in the peaks. Nevertheless an increase in one-way toll from 50p to £2 would be expected to reduce the proportions of SOVs in the AM peak from 82% to 78%, with increasingly higher impacts with higher tolls. However it is considered likely that increasing tolls beyond £2 **one-way** is unlikely to be generally acceptable for political reasons. Use of SOVs seems much less sensitive to increases in travel time (Figure 3.10) – to achieve the same reduction as an increase in one-way toll to £2 would require journey times for SOVs to increase by 10-minutes.

3.2.94 It is therefore concluded that if a Demand Managed strategy is pursued then the principal component of such a strategy must be the tolling regime.

City Centre Parking Charges

3.2.95 Assessment of the sensitivity of cross Forth traffic to City Centre "access costs" in Edinburgh was undertaken, to highlight any benefits from increasing parking charges in real terms. This formed part of the overall sensitivity tests of Cross Forth demand for car travel to the proposed City of Edinburgh Congestion Charge.

Theme G: Forth Multi-Modal Crossing & Road Space Reallocation

Scheme Definition

3.2.96 FaberMaunsell were commissioned by FETA to provide detailed cost estimates for a third Forth crossing with future multi-modal capability. This included the associated road links, and the proposed alignment is set out in Figure 3.11.

3.2.97 A cost estimate was provided by FaberMaunsell[19] that identified a cost of £300 million for a road-only structure. Previous work for STAG1 identified the following additional costs for associated road links:

- Toll plaza - £11 million;
- M9 link road - £27 million;
- M9 spur - £2 million; and
- Northern approach roads - £55 million.

3.2.98 The £55 million cost of providing the northern approach roads included the provision of sufficient carriageway width to allow for provision of the HOV lane that is considered separately in this study.

Upgradability

3.2.99 It was agreed with the Steering Group that consideration would be given to designing the new third crossing in such a way that it would be upgradable to include either LRT or heavy rail in the course of its design life.

[19] Second Forth Road Crossing, Review of Proposed Multi-Modal Bridge (*FaberMaunsell for FETA*, June 2004)

3.2.100 FaberMaunsell reported the following costs for providing a suitable crossing incorporating upgradability:

Upgradable to suitable structure for LRT on the deck	£360 million
Upgradable to suitable structure for LRT inside the deck	£398 million
Upgradable to suitable structure for heavy rail	£580 million

3.2.101 These figures were simply to provide a structure suitable for possible future upgrading, based on existing design standards. They did not include the costs of providing the LRT or heavy rail infrastructure necessary to provide a future service, nor the land-side access for rail to the bridge.

3.2.102 On the basis of the figures set out in section 3.2.100, the Forth MMC was appraised on the basis of upgradability to include a future LRT on the deck.

3.2.103 The total cost of providing this structure and the associated access roads (listed in section 3.2.97) was therefore £442 million (assuming the southbound HOV lane between Halbeath and the northern bridgehead had already been completed).

Recurring Costs

3.2.104 Operating costs for the new Forth MMC were assumed to be similar to the existing bridge, with a modest allowance for economies of scale. Maintenance costs were assumed to comprise routine regular inspections and minor rectification work in the first 30-years. The costs of this work plus the operating costs were estimated at £1.25 million per annum.

3.2.105 Following the initial 30-year period, annual maintenance costs of £8 million were assumed, based on experience with the current Road Bridge[20].

Road Space Reallocation

3.2.106 This Scheme would only be implemented following completion of the Forth MMC. It is shown on Figure 3.12.

3.2.107 The scheme comprises provision of the following HOV lanes:

HOV Lane across the Road Bridge to link into existing A90 and new A8000, plus HOV Lane from A90/new A8000 junction northwards across Forth Road Bridge to M90 junction 1;

And HOV Lane on northern bridgehead approach roads onto new Forth MMC, and across the Forth MMC to link into M9, plus HOV Lane from proposed M9 junction northwards across new Forth MMC to M90 junction 1.

3.2.108 The number of lanes would be the same under the Multi-Modal Crossing as under the road-only crossing, but some of the lanes provided would be allocated permanently to HOVs. There is therefore no additional capital cost associated with this Scheme compared to a road-only bridge. The overall impact will be that there is no net increase in unrestricted road space compared to the existing situation (two unrestricted lanes available for general use in both directions), but considerable

[20] FETA Local Transport Strategy (*SIAS/WSP for FETA*, June 2004), Figure 5.1

additional provision for HOVs (two HOV Lanes in each direction). This will augment the support for HOVs started by the Halbeath – Road Bridge HOV Lane.

Enforcement Costs

3.2.109 With any HOV lane there will be a need to ensure only entitled vehicles are allowed to use the lane. Whilst occasional transgressions may be acceptable, the priority offered to high occupancy vehicles will be undermined if enforcement is insufficiently robust. In the Leeds "2+ Lane" the City Council has funded additional policing for enforcement through a partnership arrangement with West Yorkshire Police. Three years after implementation, lane violations accounted for 6% of traffic recorded in the Leeds HOV Lane[21].

3.2.110 In all existing HOV schemes it is necessary to rely on the appropriate local police force to enforce legitimate use of the HOV lanes. Discussions with these forces would be necessary to identify what can be offered as a contribution to enforcement, and what the likely cost of such measures would be. At the toll plaza(s) a further opportunity for enforcement would arise, where bridge officers or technology could be used to verify entitlement to use the HOV lanes.

3.2.111 A HOVMON (High Occupancy Vehicle Monitoring) project is currently underway, and trials are taking place in Leeds utilising infra-red technology to verify the number of occupants in a vehicle. Although teething troubles have been encountered, it is anticipated that these can be overcome. The technology is too recent for likely capital and operating costs to be presented[22].

3.3 Scoping, Planning Objectives and Implementability

Scoping following Part 1 Appraisal

3.3.1 It is recognised that *"the detail contained in the Part 2 appraisal will be determined by the complexity of the proposals and the findings of the Part 1 scoping exercise."*[23] Reference to the Part 1 report shows that all the schemes assessed required detailed scrutiny of their Transport Economic Efficiency (TEE) before they could be considered to demonstrate obvious value-for-money. The third crossing also raised issues of adverse environmental impact. Integration and accessibility/social inclusion also varied considerably between schemes, although to a lesser extent than environmental impacts, whilst all schemes were likely to moderately improve safety.

3.3.2 Nevertheless, in keeping with STAG recommendations for Transport Corridor Studies[24], the most detailed appraisal feasible in the time available has been undertaken. The detail available for each scheme varies, particularly with regard to the accuracy of modelling outputs and associated economics. Accordingly while a full STAG Part 2 Appraisal Summary Table (AST) is presented for the recommended package of measures, the detailed appraisal applied to each of the components varies from scheme to scheme.

[21] Case Study: HOV Lanes – A647 Stanningley Road, Leeds on *www.buspriority.org*
[22] See HOVMON – High Occupancy Vehicle Monitoring on *www.laseroptical.co.uk*
[23] STAG, section 14.2.15
[24] STAG, Appendix D, section D11.3

3.3.3 STAG also envisages that planning objectives may need to be revisited, and that the more detailed schemes should be reviewed against these Planning Objectives. Similarly the implementability assessment from Part 1 should be reviewed in the light of the Part 2 schemes. These reassessments are set out below.

Planning Objectives

3.3.4 Following a review of the Planning Objectives set out in Volume 1, it was considered that these remained suitable for the more detailed appraisal now undertaken. Particular emphasis would be placed on the corridor specific objectives, viz.:

9. ***To stabilise (in the short term) and improve (in the long term) accessiblity to cross-Forth movement for people and goods; and***
10. ***Ensure land-use planning is integrated with transportation plans.***

3.3.5 In line with the nesting set out in Volume 1 the reassessment of schemes against Planning Objectives is reported under each Government Objective heading.

Review of Implementability

3.3.6 Volume 1 sets out a comprehensive review of the implementability of the four schemes considered in the Part 1 appraisal. However it was considered appropriate to review the findings from Part 1 and apply a greater level of scrutiny to each of the seven Themes. Table 3.9 below summarises the results of reviewing the initial Part 1 assessment, as well as providing an assessment of the implementability for the Themes.

Table 3.9: Review of Implementability

Schemes	Issues			
	Technical	**Operational**	**Financial**	**Public**
Making Public Transport More Attractive	No obvious technical barriers.	Focuses on re-education through “hearts & minds”, which may prove a long-term project. Delivering the re-education packages is a radical step into relatively untried territory.	Re-education campaign must be backed by an annual budget in terms of marketing and human resources. Long-term commitment essential for efficacy.	No disbenefits. Public may be initially sceptical, and this will be initial focus of the marketing campaign. Best Practice highlights a need for programme stability achieved through political consensus.
Comprehensive Bus “Right-of-Way” & Priority Vehicle Lanes	Simple, tried and tested infrastructure. Automatic detection technology for HOV lanes not yet well developed.	Operators may require “pump-priming” particularly for higher frequency services. HOV concept requires education of potential users. Enforcement may be problematic.	Modest capital costs, and ongoing costs restricted to requirements to subsidise bus services. Likely to require funding of enforcement measures.	Few disbenefits, therefore likely to be welcomed.
Feeder Bus Services	No obvious technical barriers.	No obvious barriers.	Will require “pump-priming” and possibly longer-term support. No capital costs.	No disbenefits, therefore public likely to be supportive.
Park & Choose	Simple, tried and tested construction technology.	Park & Ride well established – extension into Park & Choose relatively untried and although it poses no obvious operational issues it will require support of a significant marketing and information campaign.	Modest capital costs associated with providing Park & Choose Interchanges. Will require supportive marketing and information measures, probably as part of the “making public transport more attractive” campaign.	No disbenefits. Public may be initially sceptical, and this needs to be overcome through initial marketing campaign.

Schemes	Issues			
	Technical	**Operational**	**Financial**	**Public**
Optimisation of Rail Services	Infrastructure work and rolling stock procurement is based on tried and tested methods.	Requires negotiation with TOC and Network Rail, but no abnormal difficulties foreseen.	Additional infrastructure and rolling stock will require financing. Renegotiation of franchise likely to increase subsidy requirements.	Welcomed by existing users, and new users should be attracted to share benefits. No obvious disbenefits.
Demand Management	May require investigation of technology for re-introducing southbound tolling. Otherwise no significant technological issues.	Reintroduction of southbound tolling may pose operational problems. Tolling régime will be more complex than at present, but no significant problems anticipated.	Southbound tolling will require infrastructure investment, but fundable through existing tolling.	Likely to be unpopular – “sticks” are always less attractive for existing travellers. Even recent proposed modest toll increase was unpopular.
Forth Multi-modal Crossing & Road Space Reallocation	Major infrastructure required, bridging a river estuary. Technology tried and tested, but site may pose unique problems.	Operations of a new toll bridge straightforward; unlikely to encounter significant problems.	Major capital project, backed by tolls. Unique site increases risk of financial uncertainty. Operating costs low and certain; toll revenue reasonably predictable.	Expansion of road space likely to be widely welcomed by travelling public, but environmental impacts may result in a wider opposition.

3.4 Approach Adopted for STAG Part 2 Appraisal

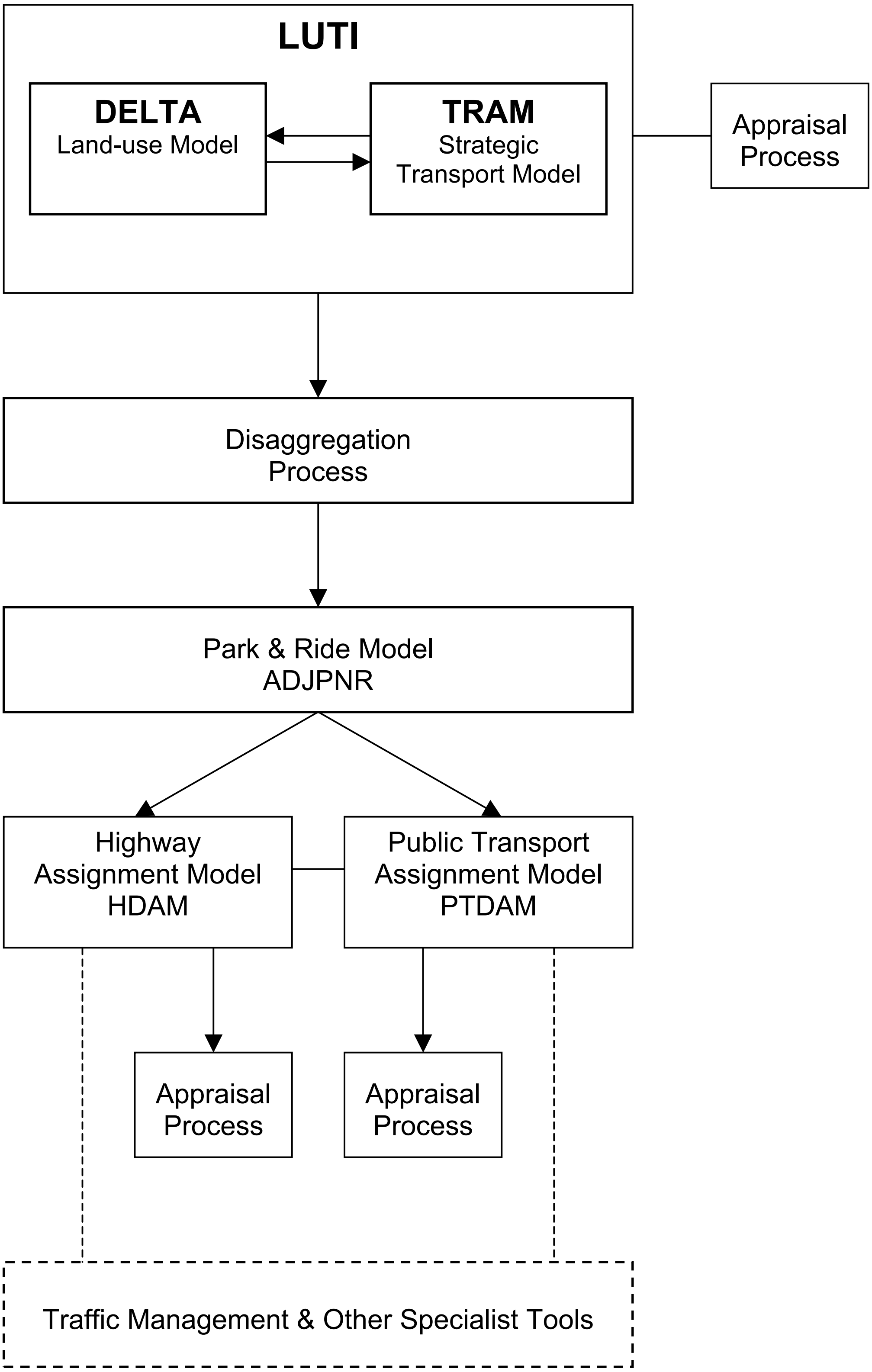
3.4.1 As described in Section 3.1 and in Table 3.1 35 schemes were carried forward from the STAG Part 1 appraisal for more detailed consideration. Section 3.2 has described how these were then grouped into seven "Themes". Analysis of these Themes was then carried out using the CEC LUTI model. This is a suite of inter-linked components, as follows[25]:

- **DELTA** – a land-use model involving various sub-models that predict changes in demographics, car ownership, employment and economic conditions, and combines these with the travel cost impacts of new transport infrastructure to predict changes in future land-use and the corresponding changes in the demand for weekday travel;
- **TRAM (Traffic Restraint Analysis Model)** – an 88-zone strategic transport model used to predict changes in travel behaviour resulting from the changes in transport supply and/or demand for travel (e.g. mode-choice, time-of-travel, destination choice) and to output resultant travel costs changes;
- A disaggregation process to apply the changes predicted by the strategic model to the more-detailed road and public transport network models;
- **Park & Ride (ADJPNR)** – a model to provide detailed modelling of formal Park & Ride services (by bus, rail and/or LRT);
- **Highway DAM (DAM-H)** – a detailed highway assignment model to predict route choice and provide corresponding predictions of traffic flows and link/junction delays resulting from these on the road networks; and
- **PT-DAM** – a detailed public transport (PT) assignment model to predict sub-mode and route choice for public transport impacts at a service-to-service level.

3.4.2 The LUTI model process can be summarised as shown in Figure 3.13.

[25] CEC Land-Use and Transport Interaction Model (MVA, August 2003), section 2.1.1. Readers requiring more information on CEC LUTI are advised to refer to this document.

Figure 3.13: Summary of the CEC LUTI model



3.4.3 The ongoing process through CEC LUTI was used to inform the emerging strategies, identifying those most likely to have positive impacts with regard to the Planning Objectives and the Government Objectives.

3.4.4 Wherever possible appraisal took place in terms of the seven Themes outlined in section 3.2. However as the appraisal proceeded it became apparent that groupings of Themes into strategies capable of short, medium or long-term implementation were emerging. In presenting the results for STAG purposes in the following sections, a grouping of Themes by implementation timescales has been adopted.

Short:	**A**	Making Public Transport More Attractive
	B	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes
	C	Feeder Bus Services
	D	Park & Choose
Medium:	**E**	Optimisation of Rail Services
	F	Demand Management
Long:	**G**	Additional crossing of the Forth including Road Space Reallocation

3.4.5 The Short Term Strategy comprises Themes A to D; the Medium Term Strategies supplements the Short Term Strategy by the incremental addition of Theme E then Theme F. Two Long Term Strategies were investigated, in each case building on the appropriate Medium Term Strategy:

- Roads-based – Medium Term Strategy (without Theme F) plus a new crossing without road space reallocation; and
- Balanced Strategy – Medium Term Strategy including Theme F, with the addition of Theme G.

3.4.6 Chapter 7 gives details of the recommendations for short, medium and long-term strategies.

Note on Modelling of Park & Choose and Car Sharing

3.4.7 The strategic CEC LUTI model used to predict the high-level responses (Time-of-day, Destination Choice and Mode Choice etc) resulting from changes in transport infrastructure currently does not include a specific car-sharing response. As a result it cannot predict the impacts of priority measures or differential tolls designed to give differential benefits to High Occupancy cars.

3.4.8 To overcome this gap in the modelling functionality, an additional "car-sharing" matrix adjustment step has been added between the strategic model and the final detailed peak-hour traffic assignment model. This car-sharing sub-model uses the size of the differential between SOV and HOV (either time-savings or per-person tolls or both) to estimate the likelihood that existing SOV drivers will switch to car-sharing. Estimates of the impact of this predicted car-sharing response to increasing SOV tolls and HOV journey time reductions (e.g. from HOV lanes) are shown on Figures 3.9 and 3.10 respectively.

3.4.9 The effect of this car-sharing is to reduce the number of cars and to increase their average occupancy, but with no net change in the number of people making any journey by car.

3.4.10 Since this car-sharing response is predicted outside the strategic CEC LUTI model, its forecasts (like those of the P&R sub-model) are excluded from the data which are used to predict peak period (0700-1000 and 1600-1900) cross-Forth person trip flows. There is therefore an inconsistency between any reported results covering the peak periods and the more-detailed peak hour highway assignment traffic forecasts, which do include the predicted Park and Ride and Car-sharing impacts of the proposed packages.

3.4.11 In addition, since these Park and Ride and Car-Sharing responses occur after Time-of-Day choice in the transport model, any spare cross-Forth road capacity created by the switch to Park and Ride or Car Sharing is not re-filled in the resulting peak-hour traffic model. In reality, any spare peak-hour cross-Forth road capacity is likely to be taken up by vehicles currently travelling on either side of the peak hour, resulting in a reduction in the duration of the overall peak, rather than an observable drop in the peak-hour traffic flow.

3.4.12 It should also be noted that the separate Park and Ride and Car-Sharing sub-models work independently of each other and therefore exclude the benefits of the additional flexibility for travellers to car-share in the morning and return by public transport or vice versa. The models are therefore likely to slight underestimate the benefits of packages designed to encourage this form of Park and Choose behaviour.

3.4.13 It is important to bear these limitations in mind when reviewing the transport model predictions.

3.5 Environment

Government Objective[26]*:*	To protect our environment and improve health by building and investing in public transport and other types of efficient and sustainable transport which minimises emissions and consumption of resources and energy.
Planning Objectives:	Reduce the number of people commuting in single occupancy vehicles within South East Scotland – especially for journeys to and from Edinburgh; but also for journeys to destinations outwith the SESTRAN area. Minimise the overall need for travel, especially by car.

3.5.1 In addition to the Planning Objectives set out above, consideration will also be given to the Government Objective under the Environment heading.

Planning Objectives for the Environment

Single Occupancy Vehicles

3.5.2 Particular measures were considered to encourage improvements in vehicle occupancy rates, particularly through the themes of Making Public Transport More Attractive, promoting Park & Choose and by penalising single-occupant cars through the demand management strategy. Table 3.10 illustrates the potential impact of increasing car occupancy rates – further discussion of car occupancy is set out in section 7.6 of the Corridor Report.

[26] Government Objectives are quoted from Scotland's Transport Future (White Paper, 2004)

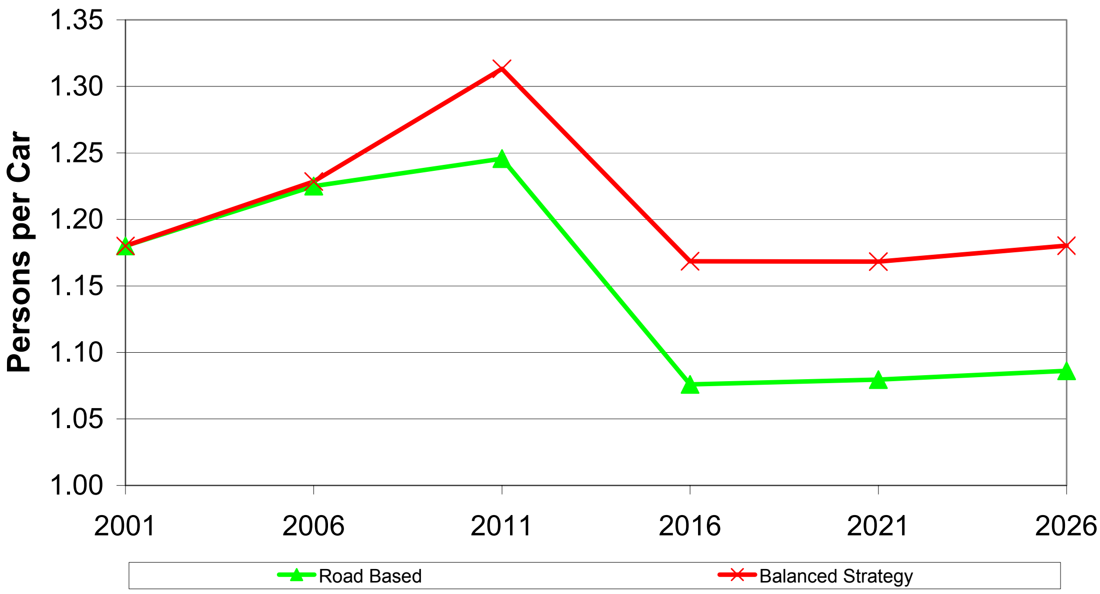
Table 3.10: Impact of Increasing Car Occupancy Rates

Average Vehicle Occupancy Rate	Total Number of Vehicles in a.m. Peak Hour	Change in Cross Forth Vehicle Trips
1.18	3,952	
1.20	3,886	-2%
1.30	3,587	-9%
1.35	3,454	-13%
1.40	3,331	-16%
1.50	3,109	-21%
1.75	2,665	-33%
2.00	2,332	-41%

Average Vehicle Occupancy Rate	Total Number of Vehicles in p.m. Peak Hour	Change in Cross Forth Vehicle Trips
1.28	3,585	
1.30	3,530	-2%
1.35	3,399	-5%
1.40	3,278	-9%
1.50	3,059	-15%
1.75	2,622	-27%
2.00	2,294	-36%

3.5.3 As described in section 3.4 assumptions were made regarding the positive impacts of car-sharing and these are reflected in the modelling outputs – the relative impact of a balanced long-term strategy (incorporating elements such as demand management, improved public transport and a third crossing of the Forth) is illustrated in Figure 3.14 below.

Figure 3.14: Comparison of Trends in Car Occupancy Rates (for 0700-1000)



3.5.4 **Caution:** The above illustration is based on very broad-brush assumptions regarding trends in traffic and people movements and the impact of the tolling strategy (shown in Figure 3.9) on vehicle occupancy. The modelling approach means that it is not really possible to take results directly from the TRAM model as the SOV tolling effects are not explicitly modelled. In TRAM the SOV tolls were determined using a logit model to adjust the toll to give a single value for all vehicles to reflect the effects of the strategy. Any changes to occupancies are then lost within all the other choices within the model. The illustration in Figure 3.14 is therefore not directly comparable with the other graphs in this report.

Minimise Need to Travel

3.5.5 Section 7.3 of the Corridor Report incorporates a discussion of "non-travel impacts" such as teleworking, teleconferencing and home shopping. This concluded that a reduction in overall demand for travel could be reduced by such impacts in the future, but that this was either likely to be negligible or non-quantifiable at this stage. Accordingly they are excluded from any of the schemes under appraisal and, as illustrated in graphs throughout this report, in fact demand to travel will continue to rise throughout the modelled time period.

Government Objective for the Environment

3.5.6 For the purposes of the STAG appraisal process, the environment objective is split into sub objectives as follows:

- Noise and Vibration
- Air Quality -(CO2, PM10, NO2)
- Water quality, drainage and flood defence
- Geology
- Biodiversity
- Visual Amenity
- Agriculture and Soils
- Cultural Heritage
- Landscape

3.5.7 The Scottish Executive requires that the environmental impacts appraisal of a proposal for which it is to provide funding, is well documented and auditable, and has complied with all statutory requirements.

3.5.8 This section is divided into the above sub-objective headings and an appraisal is carried out for each one. For the purpose of this study, geology, agriculture and soils have been combined into one sub-section.

3.5.9 The study is based on desktop and initial site survey information to satisfy the requirements of the STAG process. Further supporting information will be provided when the scheme is developed and further consultations are carried out. The scheme lies within the Fife Council and City of Edinburgh Council administrative areas, and has the ambition of improving the provision of cross-Forth journeys.

3.5.10 The Appraisal Summary Table (AST) described in this STAG assessment is shown in section 7.8.

Methodology

3.5.11 The STAG guidance states that the process should be seen as complementary to statutory planning guidance and where there is no legal requirement to carry out an environmental impact assessment the STAG guidance methodology should be followed. Each sub-objective section follows the same format and assessment hierarchy in accordance with the STAG guidance, which consists of five stages as follows:

- Scoping - defining potential impacts and assessment methods. Within each sub-objective this includes specific methodologies and a definition of the study area.
- Baseline – information about the environment in the year of project commencement and foreseeable developments.
- Assessment – identifying the likely environmental impacts and magnitude of these impacts. All types of impacts are assessed which may be positive or negative, permanent or temporary, direct, indirect, short, medium or long term, secondary, cumulative and synergistic. The base year is 2010 and the assessment of effects is at construction, at year 1 and at year 15 of operation unless other timescales are used for specific sub-objectives.
- Appraisal – determining the significance of the impacts. The STAG guidelines state that a seven-point scale should be used to determine the magnitude of effect as follows: Negative large, negative moderate, negative slight, neutral, positive slight, positive moderate and positive large. The recommended thresholds for significance of effect (a judgement of magnitude against sensitivity) are as follows: Major negative impact, moderate negative impact, small negative impact, no impact, small positive impact, moderate positive impact and major positive impact.
- Reporting – presenting the results which includes the use of the Appraisal Summary Table (AST). The information is presented in the form of the AST with supporting information in order to highlight significant beneficial and adverse impacts, which should be considered in decision-making. Suggested mitigation measures (to avoid, minimise or offset adverse impacts) and residual impacts (those likely to remain after mitigation) are reported.

Consultations

3.5.12 The statutory consultees recommended by the STAG guidelines were consulted. A summary of the responses is given in Table 3.11. Consultations with non statutory bodies have been undertaken as required at this stage, but further consultations would need to be carried out as part of a more detailed assessment as the scheme develops.

Table 3.11: Summary of replies from Consultation Bodies for the scheme

Consultee	Comments
Scottish Natural Heritage	Information provided regarding numerous designated sites and suggested organisations that may be able to provide additional information. SNH also advised of the implications for development ofthe Conservation Regulations and the Wildlife and Countryside Act.
Scottish Water	Response awaited
Scottish Environment Protection Agency	Response awaited
Health and Safety Exec.	Response awaited
Historic Scotland	Provided a CD with Scheduled Ancient Monument data.
Scottish Executive Development Department	Response awaited
Fife Council	Information provided regarding Biodiversity, Cultural Heritage, Landscape, and Strategic/Development plan issues. Response received also in relation to archaeology and biodiversity.
City of Edinburgh Council	Written response providing information regarding, the issue of a second crossing at Queensferry; the potential for a ferry connection from Fife to Leith; the impacts upon the proposed upgrading of the A8000, M9, and A90; the proposed Edinburgh Tram route; proposed housing allocations within the study corridor; proposed economic development sites within the study corridor, the future of Edinburgh Airport; proposed rail infrastructure projects; the presence of natural heritage designations; and the importance of the West Edinburgh Planning Framework.
Fife Environmental Recording Network	Information provided on notable species that have been recorded within the study corridor.

Noise and Vibration

Scoping

3.5.13 A strategic level appraisal was carried out to determine any potentially significant noise impacts as a result of the proposed SESTRANS project in the Queensferry corridor.

3.5.14 In appraising the environmental impacts on the Queensferry corridor, three possible long-term strategies were assessed, each comprising various project elements as described in detail earlier, viz:

1. Demand Management – continuing to try and control demand, primarily through tolling, and without an additional Cross Forth bridge;
2. Road Based – building a second Forth Road Bridge, with associated expansion in general road capacity ; and
3. A Balanced Strategy – continuing with all pro-public transport measures and demand management, but supplementing them with an additional Forth Multi-Modal Crossing featuring new capacity targeted specifically at High Occupancy Vehicles.

Methodology

3.5.15 A Traffic Impact Assessment covering just under 6000 road links was carried out for 2006, 2011, 2016, 2021 and 2026 by MVA, covering the future baselines and the three scenarios. The assessment included the estimation of the Basic Noise Level for each road link ($L_{A10,18\ hour}$ at 10 metres from the nearside carriageway, as defined in CRTN).

3.5.16 For the baseline and each option, the Basic Noise Levels for the road links were combined with zonal population densities to provide estimates of the changes in numbers of people annoyed due to the implementation of the scenario. Changes in population annoyed were estimated for each zone, and summed to provide changes in population annoyed for each sector (75 zones and 10 sectors in total). The method used was that given in Section 6.11 of STAG version 1.0 for a Part 2 Strategic Level Assessment. The sector results were provided in the form of Worksheets N1 and Appraisal Summary Tables as given in STAG.

3.5.17 STAG references GOMMMS (now Transport Analysis Guidance) as the source of the method, which in turn references Design Manual for Roads & Bridges (DMRB), which provides a methodology for relating traffic noise levels to the likelihood of annoyance.

Assessment

3.5.18 The results of the assessment for the three scenarios are given in Table 3.12, which gives the increase in number of people annoyed by traffic noise over the future baseline.

Table 3.12: Increase in number of people annoyed by traffic noise over the future baseline

Option	Assessment Year				
	2006	2011	2016	2021	2026
Demand Managed	-20	-92	-158	-149	-170
Road Based	-20	-27	302	303	245
Balanced Strategy	-20	-111	190	158	129

Appraisal Summary

3.5.19 Examination of the data in Table 3.12 indicates that all three scenarios provide a **Positive Minor** impact in the years 2006 and 2011. For the Demand Managed option, this **Positive Minor** impact is maintained in the years 2016, 2021 and 2026.

3.5.20 For the Road Based and Balanced Strategy scenarios, the implementation of these options provides a **Negative Minor** impact in the years 2016, 2021 and 2026. The most impacts, in terms of increases in number of people annoyed occur as a result of the Road Based scenario.

Air Quality

Scoping

3.5.21 The purpose of the following strategic level appraisal is to determine any potentially significant impacts on air quality as a result of the proposed SITCoS project in the Queensferry corridor. Any change in road traffic conditions due to the implementation of SESTRANS will change the total quantity of the pollutants NOx and PM10, and the greenhouse gas CO2, emitted by road traffic in the study area. In addition, changes in road traffic conditions can also affect public exposure to pollution depending on the location of increases/decreases in emissions relative to population density.

Methodology

3.5.22 A Traffic Impact Assessment covering just under 6000 road links has been carried out for 2006, 2011, 2016, 2021 and 2026 by MVA. In the Quennsferry corridor the Traffic Impact Assessment considers three operational scenarios, based on project elements listed above:

- Demand Management;
- Road Based; and
- Balanced Strategy.

3.5.23 Baseline and operational emissions of NOx, PM10 and CO2 have been predicted for each road link in the Traffic Model for the baseline scenario and each of the three options in each of the five assessment years. The predictions have been carried out using the latest version of the DMRB regional methodology (v1.02), issued by the Scottish Executive. It should be noted that the DMRB model predicts emissions of NOx whereas the STAG worksheets and AST refer to NO2. As a conservative approach it has been assumed that NOx emissions are equal to NO2 emissions.

3.5.24 The total change in emissions of PM10, NO2 and CO2 in the whole study area, between the baseline and operational scenario, for each assessment year is calculated by summing the change in emissions from each link. An overall reduction in emissions compared to the baseline indicates an overall beneficial impact, an overall increase in emissions indicates an overall negative impact. The significance of the impact depends on the magnitude of the change in total emissions.

3.5.25 In addition, the strategic level appraisal methodology attempts to relate NO_2 and PM_{10} emissions to population exposure. Population density data for the study area has been provided by MVA for 75 zones, therefore, the zone in which each road link is located has been identified and the total emissions for each zone calculated. The STAG 'Index' value is then calculated for each zone by multiplying the annual emissions of NO_2, or PM_{10} for the zone by the population density of the zone. The change in the Index value between the baseline and operational scenario is then calculated. An overall increase in the Index value suggests an overall increase in public exposure to pollution emissions, an overall decrease in the Index value suggests an overall decrease in public exposure.

3.5.26 It is not possible to accurately determine the number of people which experience an improvement or worsening in local air quality, as in a strategic appraisal population data is only available at the zonal scale, rather than for each road link. However, the number of people located in zones that experience an overall improvement or worsening of emissions due to a scenario can be determined.

Baseline

3.5.27 The total predicted baseline emissions of NO2, PM10 and CO2 in the study area in 2006, 2011, 2016, 2021 and 2026 are provided in Table 3.13. In addition, the baseline NO2 and PM10 Index value is provided.

Table 3.13: Baseline Emissions and Index values

	Total NO_2 emissions Tonnes/yr	Total PM_{10} emissions Tonnes/yr	NO_2 Index	PM_{10} Index	Total CO_2 emissions Tonnes/yr
2006	9289	296	15112419	514008	1433943
2011	6137	169	9798602	277327	1427338
2016	4726	125	7163954	189049	1444829
2021	4661	125	6598974	175280	1533964
2026	4948	136	6747943	183045	1634504

Assessment

3.5.28 The total predicted operational emissions of NO2, PM10 and CO2 in the study area in 2006, 2011, 2016, 2021 and 2026 for the three operational options are provided in Table 3.14. In addition, the operational NO2 and PM10 Index value is provided.

Table 3.14: Operational Emissions and Index values

	Scenario	Total NO_2 emissions Tonnes/yr	Total PM_{10} emissions Tonnes/yr	NO_2 Index	PM_{10} Index	Total CO_2 emissions Tonnes/yr
2006	1	9195	292	15041545	510784	1416933
	2	9195	292	15041545	510784	1416933
	3	9195	292	15041545	510784	1416933
2011	1	6011	166	9610907	272773	1400021
	2	6278	172	10019434	281855	1437095
	3	6233	171	9817933	276449	1428360
2016	1	4845	127	7226566	189722	1464074
	2	4912	130	7282242	191571	1488234
	3	4709	126	7041652	187215	1447778
2021	1	4703	125	6628407	174853	1533490
	2	4632	126	6529247	174798	1534539
	3	4372	119	6241909	166943	1448299
2026	1	4983	135	6754168	181864	1631575
	2	4907	136	6643764	181527	1633719
	3	5024	137	6855305	184039	1644657

3.5.29 In 2006 all three scenarios in the Queensferry corridor have the same impact, in 2011, scenario 1 (Demand Management) results in the lowest emissions and population exposure. In 2016 and 2021 scenario 3 (Balanced Strategy) results in the lowest emissions and population exposure, and in 2026 scenario 2 (Road Based) results in the lowest emissions and population exposure. However, the magnitude of the difference in NO_2, PM_{10} and CO_2 emissions and the NO_2 and PM_{10} Index values between scenarios are relatively small in all assessment years.

Appraisal

3.5.30 The percentage change in total predicted emissions of NO_2, PM_{10} and CO_2 in the study area in 2006, 2011, 2016, 2021 and 2026 for the three operational scenarios are provided in Table 3.15. In addition, the percentage change in the operational NO_2 and PM_{10} Index value is provided.

Table 3.15: Percentage Change in Emissions and Index values (Operation – Baseline)

	Scenario	% change				
		Total NO_2 emissions Tonnes/yr	**Total PM_{10} emissions Tonnes/yr**	**NO_2 Index**	**PM_{10} Index**	**Total CO_2 emissions Tonnes/yr**
2006	1	-1.0	-1.1	-0.5	-0.6	-1.2
	2	-1.0	-1.1	-0.5	-0.6	-1.2
	3	-1.0	-1.1	-0.5	-0.6	-1.2
2011	1	-2.1	-1.8	-1.9	-1.6	-1.9
	2	2.3	1.5	2.3	1.6	0.7
	3	1.6	0.7	0.2	-0.3	0.1
2016	1	2.5	1.6	0.9	0.4	1.3
	2	3.9	3.6	1.7	1.3	3.0
	3	-0.4	0.7	-1.7	-1.0	0.2
2021	1	0.9	-0.2	0.4	-0.2	0.0
	2	-0.6	0.6	-1.1	-0.3	0.0
	3	-6.2	-5.0	-5.4	-4.8	-5.6
2026	1	0.7	-0.4	0.1	-0.6	-0.2
	2	-0.8	0.3	-1.5	-0.8	0.0
	3	1.5	0.9	1.6	0.5	0.6

3.5.31 In 2006 all three possible long term strategies in the Queensferry corridor have the same **Positive Minor** impact, in 2011, scenario 1 (Demand Management) results in a **Positive Minor** impact and scenarios 2 and 3 a **Negative Minor** impact. In 2016 and 2021 scenario 3 (Balanced Strategy) results in a **Positive Minor** impact and scenarios 1 and 2 a **Negative Minor** impact. In 2026 scenario 2 (Road Based) results in a **Positive Minor** impact and scenarios 1 and 3 a **Negative Minor** impact. However, the magnitude of the change in total emissions and the Index values between the baseline and operational scenarios is minor at most for all options in all assessment years.

Summary

3.5.32 In the long term (2026) scenario 2 (Road Based) has the greatest beneficial impact, scenario 1 (Demand Management) also has a beneficial impact on emissions of PM_{10} and CO_2. In the long term scenario 3 (Balanced Strategy) has an adverse impact on NO_2, PM_{10} and CO_2 emissions and population exposure to NO_2 and PM_{10}. However, the magnitude of the overall predicted impact across the study is minor at most for all options and assessment years.

Water quality, drainage, and flood defence

Scoping

3.5.33 This section investigates the potential for the proposed scheme to impact upon water quality, drainage, and flooding. The Baseline Data sub section identifies and describes the significant water resources features in proximity to the proposed scheme. The baseline conditions were evaluated from a brief desktop investigation, OS maps, flow and water quality data from the SEPA website, and ground water data from British Geological Survey maps. Identification of the range and location of potential impacts was based on a review of similar projects and the professional experience of the assessment team. Impacts on surface water resources were considered over a generic area, as definitive details of the Scheme proposals have yet to be confirmed. Groundwater features and impacts were considered using regional information and an overview of current land use along the scheme corridor.

3.5.34 In terms of the magnitude of an impact, a "Negative Large" would, for example, be the degrading of water quality classification, and a "Negative Slight" could be measurable changes in some water quality parameters but no effect on overall classification. In regard to sensitivity of a receptor, it is proposed that an assessment of the present water quality classification, the flow rates, and the amenity value of the water resource be made to derive an impression of the resilience of the water resource to cope with changes resulting from an impact. The assessment of potential impacts has assumed that standard mitigation measures have been "built in".

Baseline

3.5.35 The water resources baseline data is given in Table 3.16.

Table 3.16: Baseline Data

Receptor	Water Quality Classification	Flow Rate (m3/s)	Amenity Use	Overall Sensitivity
Brankholme Burn	Overall B1 (sampled 2003) A1 for Aesthetics and pH	Unknown	Unknown	Minor
Kiething Burn	Overall C (sampled 2003) Various classifications for A1 and A2	Unknown	Unknown	Negligible
Dolphington Burn	Overall B (sampled 2003) Various classifications of A1 and A2	Unknown	Unknown	Minor
River Almond	Overall B (sampled 2003) Various classifications of A1 and A2	Unknown	Unknown	Minor
River Forth	B – C – B (sampling date unknown	High (42.8)	High e.g. Fishing, boating, canoeing, national ecological designations, etc.	Moderate
Ground Water	Hydrogeological Map of Scotland (1988) shows that the study area contains aquifers in which flow is dominantly in fissures and other discontinuities. There are other areas of potentially highly productive aquifers though these are not extensive.			

The following note relates to the table above; [1] Quality Classification is the Estuarine Classification

3.5.36 Based on the requirements of the Water Framework Directive, which are broadly to prevent deterioration in the status of water bodies and to restore water bodies to good ecological status by 2015, any deterioration of water quality in the watercourses in question as a result of the scheme is unlikely to be acceptable.

Assessment

Park & Ride site at Halbeath

3.5.37 It is unlikely that any water features will be affected by development here. Groundwater is unlikely to suffer from any significant negative impacts. Though this will depend on the implementation of SUDS principles when dealing with additional surface runoff.

HOV lane

3.5.38 The designation of high occupancy vehicle lanes is unlikely to lead to any adverse impacts on water features or groundwater.

Bus priority measures in Fife

3.5.39 The introduction of bus priority measures is unlikely to lead to any significant adverse impacts on water features or groundwater.

Enhanced bus services

3.5.40 The enhancement of bus services is unlikely to lead to any significant adverse impacts on water features or groundwater.

Additional Trains

3.5.41 The enhancement of train services is unlikely to lead to any significant adverse impacts on water features or groundwater.

Expansion of Park & Ride facilities at Inverkeithing, Ferrytoll, Rosyth and Dalgety Bay

3.5.42 The enhancement of bus services is unlikely to lead to any significant adverse impacts on water features or groundwater, though this will depend on the implementation of SUDS principles when dealing with additional surface runoff.

Bus priority measures on A90

3.5.43 The enhancement of bus services is unlikely to lead to any significant adverse impacts on water features or groundwater.

Multi-Modal Crossing

3.5.44 The construction of a new multi-modal crossing over the Forth Estuary is likely to have significant impacts on water resources, with the Firth of Forth itself experiencing a number of considerable negative impacts.

Appraisal

Park & Ride site at Halbeath

3.5.45 Assuming that best practice principles are employed during design and construction, it is likely that temporary construction impacts will be **Neutral-Minor Negative** at worst, as there may be effects as a result of groundbreaking work. Permanent impacts relating to the potential increase in surface run-off will be **Neutral-Minor Negative** at worst.

HOV lane

3.5.46 Potential impacts on groundwater during construction are likely to be **Neutral.** There is unlikely to be any permanent impact on groundwater or local water features, so this is assessed as **Neutral**.

Bus priority measures in Fife

3.5.47 Potential impacts on groundwater during construction are likely to be **Neutral.** There is unlikely to be any permanent impacts on groundwater or local water features, so this is assessed as **Neutral**.

Enhanced bus services

3.5.48 Potential impacts on groundwater during construction are likely to be **Neutral.** There is unlikely to be any permanent impacts on groundwater or local water features, so this is assessed as **Neutral**.

Additional Trains

3.5.49 The operational aspect of additional trains is unlikely to lead to any significant impacts and is therefore assessed as **Neutral**.

Expansion of Park & Ride facilities at Inverkeithing, Ferrytoll, Rosyth and Dalgety Bay

3.5.50 Assuming that best practice principles are employed during design and construction, it is likely that temporary construction impacts will be **Neutral-Minor Negative** at worst at all potential sites, as there may be effects as a result of groundbreaking work. Permanent impacts relating to the potential increase in surface run-off will be **Minor Negative** at worst at all potential sites.

Bus priority measures on A90

3.5.51 The operational aspect of additional buses is unlikely to lead to any significant impacts and is therefore assessed as **Neutral**.

Multi-Modal Crossing

3.5.52 The construction stage of the proposed multi-modal crossing could have **Moderate-Major Negative** impact on water resources, due to the extensive ground breaking work, construction activity in the Firth of Forth itself, and the possibility of accidental contamination from run-off. However, these impacts will be temporary and the implementation of best practice principles will ensure that the negative effects are moderate at worst.

3.5.53 The operational phase of the crossing is likely to have **Negative Minor-Moderate** impacts on the channel characteristics of the Firth of Forth, though this is dependant on the final design of the bridge superstructure.

Summary

3.5.54 The construction of a new multi-modal crossing is likely to have significant impacts on both groundwater and water features (primarily the Firth of Forth), though the scale of these impacts is dependant on the implementation of best practice during construction, and the quality of the final design of the bridge and therefore its effects on the mechanics of the river channel.

Geology, Agriculture and soils

Scoping

3.5.55 The sub objectives of Geology and Agriculture and Soils have been combined in this section.

Agriculture

3.5.56 The study area consists of both urban and rural areas, with agricultural land comprising much of the rural environment. The loss of any Prime Agricultural Land may be considered as a significant impact.

Geology and Soils

3.5.57 The soils and underlying geology are important factors in determining many of the physical attributes of an area, such as the physical appearance of the environment, water quality and land use. Soils and the underlying bedrocks can contain valuable resources, including economically valuable mineral and water reserves. Consideration should be given to whether a planned development reduces or affects the resource base or inhibits future use of such resources. Proposed infrastructure works can impact on geological or geomorphological features, which are considered valuable in their own right (e.g. for academic or research purposes) or designated sites.

3.5.58 At this stage no detailed investigation of geology or soils has been carried out. This assessment is based on a desktop study of relevant geological mapping and information contained in local plans. It will serve to highlight any important issues, which may need further investigation. The level of confidence by which the predicted impact has been assessed is **low** i.e. the predicted impact and its level are best estimate. More information may be required to improve the level of confidence.

Baseline

Geological Features

3.5.59 At this stage we are not aware of any specific geological features that are of statutory designated importance along the route of the Scheme. There are no Regional Sites of Geological Significance (RIGS) identified in the Local Plans. Further consultation is required to identify whether the route will affect any other non-designated sites of value as geological features and mineral reserves.

3.5.60 There are two Sites of Special Scientific Interest (SSSIs) designated for geological value within the study area. The Ferry Hills SSSI has been designated partly as it is in a Permo Carboniferous Igneous Province, and the Firth of Forth SSSI comprises a mosaic of sand, shingle, rock and boulder geology.

Underlying Geology and Superficial Deposits

3.5.61 Solid Geology is generally a mixture of Upper Oil Shale Group, consisting of mudstones, sandstones and marine and freshwater limestones; and Lower Oil Shale Group consisting of sandstones, siltstones and mudstones. There are other areas of Carboniferous Sedimentary rocks comprising Olivine Basalt.

3.5.62 Drift Geology predominantly comprises Boulder Clay with minor areas of Alluvium flood plains.

Made Ground

3.5.63 There are undoubtedly areas of made ground within the study area, though these would have to be confirmed at a later date through more detailed site visits.

Geomorphology

3.5.64 Large areas of the study area are adjacent to the Firth of Forth and its associated flood plain.

Contaminated Land

3.5.65 It is expected that contaminated land will be present within any areas of made ground. Further investigation would be required at a more detailed stage.

Water Reserves

3.5.66 Hydrogeological Map of Scotland (1988) shows that the study area contains aquifers in which flow is dominantly in fissures and other discontinuities. There are other areas of potentially highly productive aquifers though these are not extensive.

Agricultural Land and Soils Land

3.5.67 The study area includes varying quality of agricultural land, including a proportion of Prime Agricultural Land (Class 2). It is likely that some land take will be required for the temporary and permanent construction of infrastructure works, though at this point in time the exact extent cannot be determined.

Assessment

Park & Ride site at Halbeath

3.5.68 It is unlikely that any geological features will be affected by development here. Groundwater is unlikely to suffer from any significant negative impacts, though this will depend on the implementation of SUDS principles when dealing with additional surface runoff.

HOV lane

3.5.69 The designation of high occupancy vehicle lanes is unlikely to lead to any adverse impacts on geological features or groundwater.

Bus priority measures in Fife

3.5.70 The introduction of bus priority measures is unlikely to lead to any significant adverse impacts on geological features or groundwater.

Enhanced bus services

3.5.71 The enhancement of bus services is unlikely to lead to any significant adverse impacts on geological features or groundwater.

Additional Trains

3.5.72 The enhancement of train services is unlikely to lead to any significant adverse impacts on geological features or groundwater.

Expansion of Park & Ride facilities at Inverkeithing, Ferrytoll, Rosyth and Dalgety Bay

3.5.73 The enhancement of bus services is unlikely to lead to any significant adverse impacts on geological features or groundwater, though this will depend on the implementation of SUDS principles when dealing with additional surface runoff.

Bus priority measures on A90

3.5.74 The enhancement of bus services is unlikely to lead to any significant adverse impacts on geological features or groundwater.

Multi-Modal Crossing

3.5.75 The construction of a new multi-modal crossing over the Forth Estuary is likely to have significant impacts on water resources, with the Firth of Forth SSSI itself experiencing a number of considerable negative impacts as a result of construction activity.

Appraisal

Park & Ride site at Halbeath

3.5.76 Assuming that best practice principles are employed during construction, it is likely that temporary construction impacts will be **Neutral-Minor Negative** at worst, as there may be effects as a result of groundbreaking work.

HOV lane

3.5.77 Potential impacts on groundwater during construction are likely to be **Neutral.** There are unlikely to be any permanent impacts on groundwater or local geology, so this is regarded as **Neutral**.

Bus priority measures in Fife

3.5.78 Potential impacts on groundwater during construction are likely to be **Neutral.** There is unlikely to be any permanent impacts on groundwater or local geology, so this is regarded as **Neutral**.

Enhanced bus services

3.5.79 Potential impacts on groundwater during construction are likely to be **Neutral.** There is unlikely to be any permanent impacts on groundwater or local geology, so this is regarded as **Neutral**.

Additional Trains

3.5.80 The operational aspect of additional trains is unlikely to lead to any significant impacts and is therefore regarded as **Neutral**.

Expansion of Park & Ride facilities at Inverkeithing, Ferrytoll, Rosyth and Dalgety Bay

3.5.81 Assuming that best practice principles are employed during construction, it is likely that temporary construction impacts will be **Neutral-Minor Negative** at worst at all potential sites, as there may be effects as a result of groundbreaking work.

Bus priority measures on A90

3.5.82 The operational aspect of additional trains is unlikely to lead to any significant impacts and is therefore regarded as **Neutral**.

Multi-Modal Crossing

3.5.83 The construction stage of the proposed multi-modal crossing will have **Moderate-Major Negative** impact on geological resources, due to the extensive ground breaking work, construction activity in the Firth of Forth itself, and the designation of the Firth of Forth SSSI for geological reasons. However, these impacts will be temporary and the implementation of best practice principles will ensure that the negative effects are moderate at worst.

3.5.84 The operational phase of the crossing is likely to have **Minor-Moderate** Negative impacts on the channel characteristics of the Firth of Forth, though this is dependant on the final design of the bridge superstructure.

Summary

3.5.85 The construction of a new multi-modal crossing is likely to have significant impacts on both groundwater and geological features (primarily the Firth of Forth SSSI), though the scale of these impacts are dependant on the implementation of best practice during construction, and the quality of the final design of the bridge and therefore its effects on the mechanics of the river channel and associated geomorphology.

Biodiversity

Introduction

3.5.86 This section deals with the potential ecological impacts associated with the proposed improvements that together make up the proposed Queensferry crossing development. The biodiversity features that are considered and assessed include: designated sites (statutory and non-statutory), protected species, other notable species and habitats of ecological value (watercourses, woodlands, species-rich grasslands, potential protected species habitats, wetlands, marshland, inter-tidal mudflats).

Scoping

3.5.87 This ecological appraisal is based on the Scottish Transport Appraisal Guidance (STAG) for conducting Part 2 environmental assessments. The findings are based on a site visit undertaken on 25 October 2004, Phase 1 habitat survey results commissioned by the City of Edinburgh Council and completed in 2002-2003, and consultation with local ecological experts. Specific discussions were held with Scottish Natural Heritage, Lothian Wildlife Information Centre and Fife Environmental Recording Network and data was also collated from the West Lothian Biodiversity Action Plan, Fife Biodiversity Action Plan and Scottish Environment Protection Agency website, to identify potential protected habitats and species issues that may arise with this scheme.

3.5.88 The options considering bus priority lanes and an increase in the frequency of rail services have not been assessed for their potential impacts upon ecological receptors, as these options will not involve any landtake and will involve only minor improvements to existing infrastructure.

Baseline

Multi-modal crossing

3.5.89 The proposed crossing spans the Firth of Forth on the west side of the existing Forth Road Bridge, from the A90 near Jamestown, to the western edge of Queensferry. The crossing itself will pass through areas of semi-natural and plantation woodland, coastal reedbed, saltmarsh, intertidal mudflats, grassland, agricultural land and areas of standing water. The associated links and spur roads pass through areas of semi-natural and plantation woodland, grassland, agricultural land and several burns.

3.5.90 There are a number of statutory and non-statutory sites located within 1km of the proposed developments (and one non-statutory site more than 1km from the proposed site which will also be considered), as well as the potential for the presence of several protected species.

3.5.91 There are two Special Protected Areas (SPA), one Ramsar site, four Sites of Special Scientific Interest (SSSI), six Scottish Wildlife Trust (SWT) sites and nine Sites of Importance for Nature Conservation (SINC). These are listed below:

3.5.92 **Forth Islands SPA**. Designated for supporting internationally important breeding populations of sandwich tern (*Sterna sandvicensis*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*) and for supporting internationally important migratory populations of gannet (*Morus bassanus*), cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*), lesser black-backed gull (*Larus fuscus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda*) and puffin (*Fratercula arctica*).

3.5.93 **Firth of Forth SPA and Ramsar site.** Designated for its wintering populations of red-throated diver (*Gavia stellata*), slavonian grebe (*Podiceps auritus*), golden plover (*Pluvialis apricaria*), bar-tailed godwit (*Limosa lapponica*), pink-footed goose (*Anser brachyrhyncus*), shelduck (*Tadorna tadorna*), knot (*Calidris canutus*), redshank (*Tringa tetanus*) and turnshank (*Arenaria interpres*) and its passage population of sandwich tern (*Sterna sandvicensis*). It further qualifies for its wintering wildfowl assemblages of great-crested grebe (*Podiceps cristatus*), cormorant (*Phalacrocorax carbo*), scaup (*Aythya marila*), eider (*Somateria mollissima*), long-tailed duck (*Clangula hyemalis*), common scoter (*Melanitta nigra*), velvet scoter (*Melanitta fusca*), goldeneye (*Bucephala clangula*), red-breasted merganser (*Mergus serrator*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), dunlin (*Calidris alpina*), curlew (*Numenius arquata*), wigeon (*Anas Penelope*), mallard (*Anas platyrynchos*) and lapwing (*Vanellus vanellus*).

3.5.94 **Firth of Forth SSSI.** Designated for biological and geological features, the Firth of Forth comprises an extensive mosaic of intertidal and coastal habitats. Mudflats, sand, shingle, rock and boulders make up the extensive intertidal habitats. Associated coastal habitats include saltmarsh, grassland and sand dunes. The mudflats are rich with invertebrates and form an important feeding ground for a number of wintering wildfowl and wader species. The site is also designated for its geological and geomorphological interest.

3.5.95 **St Margaret's Marsh SSSI.** Designated for its coastal habitat, which supports an extensive area of coastal reedbed, saltmarsh, tall herb vegetation and scrub.

3.5.96 **Ferry Hills SSSI.** Designated for its species-rich unimproved calcareous and neutral grassland. The site is also designated for its permo-carboniferous igneous province geological interest.

3.5.97 **Carlingnose SSSI and SWT site.** Designated for its herb-rich calcareous grassland and the transitional habitat from dry calcareous grassland to dwarf-shrub heath.

3.5.98 The following sites are non-statutory sites designated for their local conservation value, but no detailed information regarding features of interest is provided:

- **Inch Garvie SWT**
- **Hopetoun Road SWT/SINC**
- **Burn Craigs Wood SWT**
- **Canal Wood SWT**
- **Union Canal SWT**
- **Inverkeithing SINC**
- **Jamestown Pond SINC**
- **Pepper Wood SINC**
- **Coastline SINC**
- **Linn Mill Burn SINC**
- **Newbridge/ south SINC**
- **Dundas Estate SINC**
- **Dalmeny Gardens SINC**

3.5.99 There are also a number of protected species that need to be considered as there is potential for a range of protected species to be present including: badger (*Meles meles*), otter (*Lutra lutra*), water vole (*Arvicola terrestris*), Atlantic salmon (*Salmo salar*), great crested newt (*Triturus cristatus*), birds, bats, invertebrates, and marine species.

HOV Lane

3.5.100 The proposed southbound high occupancy vehicle (HOV) priority lane is approximately 8km long and will be developed between Halbeath and North Queensferry in Fife. The proposal will involve redesigning the existing hard shoulder on the M90 to the HOV lane and building a replacement hard shoulder to the east of the existing lanes. The northern stretch of the route corridor passes through a largely agricultural area of arable fields, grasslands, running watercourses, pockets of woodland and several areas of standing water. The lower route corridor passes through the more urban areas around Rosyth and Inverkeithing before ending at the northern bridgehead in North Queensferry.

3.5.101 There are a number of statutory and non-statutory sites within 500m of the route corridor as well as the potential for the presence of several protected species.

3.5.102 There are two Special Protected Areas (SPA), one RAMSAR site, three Sites of Special Scientific Interest (SSSI), and two Sites of Importance for Nature Conservation (SINC). These are listed below:

3.5.103 **Forth Islands SPA**. Designated for supporting internationally important breeding populations of sandwich tern (*Sterna sandvicensis*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*) and for supporting internationally important migratory populations of gannet (*Morus bassanus*), cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*), lesser black-backed gull (*Larus fuscus*), kittiwake (*Rissa tridactyla*), guillemot (*Uria aalge*), razorbill (*Alca torda*) and puffin (*Fratercula arctica*).

3.5.104 **Firth of Forth SPA and Ramsar site.** Designated for its wintering populations of red-throated diver (*Gavia stellata*), slavonian grebe (*Podiceps auritus*), golden plover (*Pluvialis apricaria*), bar-tailed godwit (*Limosa lapponica*), pink-footed goose (*Anser brachyrhyncus*), shelduck (*Tadorna tadorna*), knot (*Calidris canutus*), redshank (*Tringa tetanus*) and turnshank (*Arenaria interpres*) and its passage population of sandwich tern (*Sterna sandvicensis*). It further qualifies for its wintering wildfowl assemblages of great-crested grebe (*Podiceps cristatus*), cormorant (*Phalacrocorax carbo*), scaup (*Aythya marila*), eider (*Somateria mollissima*), long-tailed duck (*Clangula hyemalis*), common scoter (*Melanitta nigra*), velvet scoter (*Melanitta fusca*), goldeneye (*Bucephala clangula*), red-breasted merganser (*Mergus serrator*), oystercatcher (*Haematopus ostralegus*), ringed plover (*Charadrius hiaticula*), grey plover (*Pluvialis squatarola*), dunlin (*Calidris alpina*), curlew (*Numenius arquata*), wigeon (*Anas Penelope*), mallard (*Anas platyrynchos*) and lapwing (*Vanellus vanellus*).

3.5.105 **Firth of Forth SSSI.** Designated for biological and geological features. The firth of Forth comprises an extensive mosaic of intertidal and coastal habitats. Mudflats, sand, shingle, rock and boulders make up the extensive mudflats. Associated coastal habitats include saltmarsh, grassland and sand dunes. The mudflats are rich with invertebrates and form an important feeding ground for a number of wintering wildfowl and wader species. The site is also designated for its geological and geomorphological interest.

3.5.106 **St Margarets Marsh SSSI.** Designated for its coastal habitat, which supports an extensive area of coastal reedbed, saltmarsh, tall herb vegetation and scrub.

3.5.107 **Ferry Hills SSSI.** Designated for its species-rich unimproved calcareous and neutral grassland. The site is also designated for its permo carboniferous igneous province geological interest.

3.5.108 The following sites are non-statutory sites designated for their local conservation value, but no detailed information regarding features of interest is provided:

- **Jamestown Pond SINC**
- **Calaiswood Muir SINC**

3.5.109 There are also a number of protected species that need to be considered as there is potential for a range of protected species to be present including: badger, otter, water vole, great crested newt, bats, birds, invertebrates and marine species.

Park and Ride at Halbeath

3.5.110 This development would involve the construction of a bus-based Park and Ride site at Halbeath, between the A92 road and the railway line to the north, at grid reference NT 134 889. The proposals would involve the construction of a new park and ride facility in an area that is currently agricultural land, with arable and improved grassland fields, and which generally have low ecological value.

3.5.111 There are no statutory or non-statutory sites designated for nature conservation within 1km of this site, but there is the potential for protected species to be present within the area. At the time of survey, no access could be gained to the pond to the north of the railway. There is the potential for this pond to be habitat for either water voles (*Arvicola terrestris*) or great crested newts (*Triturus cristatus*), and this would only be revealed following further detailed survey work. The planted broadleaved woodland and agricultural land within the immediate area also have the potential for the presence of badger (*Meles meles*) setts. Improved grassland and arable areas, noted above, are ideal habitat for badger foraging. There are two small areas of woodland within 500m of the proposed site that are listed on the semi-natural woodland inventory.

Expansion of Existing Park and Ride Facilities

3.5.112 To maximise the range of options available to cross-Forth travellers, the following potential sites have been identified for the possible expansion of park and ride facilities:

- Halbeath – requires the development of a completely new site, as noted above;
- Rosyth – requires the addition of a car park, access roads, and interchange facilities;
- Dalgety Bay – requires the expansion of existing car parking, improved access roads and interchange facilities;
- Inverkeithing - requires the expansion of existing car parking, improved access roads and interchange facilities;
- Ferrytoll – requires the expansion of existing car parking, provision of a railway station and improved access roads.

3.5.113 The ecological baseline for the proposed Halbeath site is described above.

3.5.114 There are no statutory or non-statutory designated sites within close proximity to the proposals at Rosyth. However, there is a watercourse immediately adjacent to the existing station, which has the potential to be suitable habitat for water voles. It is also likely that badgers are present within the area, and further baseline data for both of these species would have to be established if this scheme progresses. There are also areas of woodland listed on the ancient woodland inventory and the semi-natural woodland inventory, within close proximity to the proposed site.

3.5.115 There are no statutory or non-statutory designated sites within close proximity to the proposals at Dalgety Bay, though there is the potential for protected species to be present in the immediately adjacent area. There are a number of watercourses e.g. Mill Lade Burn, that could provide suitable habitat for both water voles and otters, though this could only be confirmed following further detailed surveys. Also, the adjacent Letham Hill Wood and Clinthill Plantation could provide suitable habitat for both badger setts and their foraging activity. These woodlands are listed on the ancient woodland inventory, the semi-natural woodland inventory, and are protected by tree preservation orders.

3.5.116 There are no statutory or non-statutory designated sites in close proximity to the proposals for the extension to the Inverkeithing park and ride facility. The large pond and associated watercourses immediately north of the existing facility has the potential to be habitat for water voles and otter. There is a small fragment of woodland listed on the semi-natural woodland inventory immediately adjacent to the existing site.

3.5.117 The proposed site for the expansion to the Ferrytoll park and ride facility, has a number of statutory and non-statutory sites designated for their nature conservation value, within 500m. These are listed below:

3.5.118 **Firth of Forth SPA and RAMSAR site**. Full details are noted above.

3.5.119 **Ferry Hills SSSI.** Designated for its species-rich unimproved calcareous and neutral grassland. The site is also designated for its permo-carboniferous igneous province geological interest.

3.5.120 **St Margaret's Marsh SSSI.** Designated for its coastal habitat, which supports an extensive area of coastal reedbed, saltmarsh, tall herb vegetation and scrub.

3.5.121 **Jamestown Pond SINC** is a non-statutory site designated for local conservation value, but no detailed information is available at this stage.

3.5.122 Other important features include woodland that is listed on the SNH Scottish semi-natural woodland inventory, which is also likely to have populations of badger and bats within the habitat. However, this can only be confirmed following further detailed survey work.

Assessment

Multi-modal crossing

3.5.123 There are likely to be direct impacts to the Firth of Forth SPA, Ramsar site and SSSI during the construction of the crossing, and depending on the design these could be permanent impacts throughout the operational phase. St Margaret's Loch SSSI is also within the corridor that could be impacted during construction and by permanent placement of new structures within the Firth of Forth. The area west of the existing bridge has large areas that have tree preservation orders or are listed on the ancient woodland inventory and semi-natural woodland inventory. This area has the potential habitats for a number of protected species such as bats, otters, badgers, and water voles. There is the potential for direct loss of these habitats or disturbance during construction activities. It is not certain exactly what species will be present in the area until detailed surveys are undertaken. There is potential for passage of Atlantic salmon populations to be impacted upon during construction and operation, depending on the design and type of works carried out within the Forth channel. Overall, there is the potential for large negative impacts upon all of the receptors listed.

High Occupancy Vehicle Lane

3.5.124 Neither the Forth Islands SPA or the Firth of Forth SPA, Ramsar site, or SSSI will be directly or indirectly impacted by the extra carriageway that is proposed to the east of the existing M90. However, the Ferry Hills SSSI, designated for its grassland and geological interest, could be directly affected by the construction of this proposal. There is the potential for indirect impacts upon St Margaret's Marsh SSSI during the construction period, possibly from the disturbance and pollution incidents. The 8km length of new carriageway leading north to Halbeath could also directly impact upon a number of other habitats with the potential for protected species. However, this could only be confirmed following further detailed surveys. The magnitude of the impact has been assessed as large negative with the information that is currently available.

Park and Ride at Halbeath

3.5.125 No statutory or non-statutory sites will be affected by the development at this location. If the construction activity at Halbeath remains between the railway and the A92, there would be a direct loss of habitat, which could be used for foraging by badgers. Whether or not the site is used by badgers can only be confirmed following detailed surveys. However, there would no direct impacts upon the pond and woodland to the immediate north of the railway. This would prevent possible direct impacts upon any water voles or great crested newts within the wetland area. The magnitude of impact at this site has been assessed as slight negative, as the habitats that could be directly affected are widespread within the wider area.

Expansion of Existing Park and Ride Facilities

3.5.126 No statutory or non-statutory sites would be impacted, either directly or indirectly, by the development at Rosyth. However, development could impact upon water vole and badger habitat. Water vole habitat is afforded protection under the Wildlife and Countryside Act (1981), though badger foraging habitat currently has no legal protection. The magnitude of impact has been assessed as slight negative, but this would only be confirmed following detailed survey work.

3.5.127 No statutory or non-statutory sites would be impacted, either directly or indirectly, by the development at Dalgety Bay. There is the potential for indirect or direct impacts upon otter, water vole and badger habitat, caused by construction activity. Shelters for otter, water voles and badger are legally protected under the Wildlife and Countryside Act (1981). The magnitude has been assessed as slight negative, but this would only be confirmed following detailed survey work.

3.5.128 No statutory or non-statutory sites would be impacted, either directly or indirectly, by the development at Inverkeithing. There is the potential for indirect impacts upon otter or water vole habitat, caused by construction activity. Shelters for both otters and water voles are legally protected under the Wildlife and Countryside Act (1981). The magnitude has been assessed as slight negative, but this would only be confirmed following detailed survey work.

3.5.129 Ferry Hills SSSI, designated for its grassland and geological interest, could be directly or indirectly affected during the construction of the new facilities at Ferrytoll. There is also the potential for Jamestown Pond SINC or the area of semi-natural woodland to be impacted by the scheme, depending on the final design. There is the potential for water voles and great crested newts within the wetland habitats, and for badger and bat species within the woodland. Detailed baseline studies would have to be undertaken to determine the impacts, but at the current time the magnitude of impact has been assessed as moderate adverse. All of the species listed are afforded some protection under the Wildlife and Countryside Act (1981).

Appraisal

3.5.130 The appraisal of impacts on the ecological resources is given in the AST table in section 7.8. There is potential overall for a major negative impact with this scheme before mitigation.

3.5.131 SPAs are designated under the EC Directive (79/409/EEC) on the Conservation of Wild Birds. This sets out the general rules for conservation of wild birds, their eggs, nests and habitats, and requires member states to designate SPAs for regularly occurring migratory species and certain key species. The aim is to classify, and thus protect, sufficient habitat to ensure the survival and reproduction of these species in their area of distribution. There is considerable overlap between SPAs and Ramsar sites, many of which are designated in common.

3.5.132 Ramsar Sites are designated under the Ramsar Convention on the conservation of wetlands of International Importance especially as waterfowl habitat. Governments who have ratified the Convention (including the UK Government) have undertaken to conserve wetlands generally and Ramsar sites in particular. The means of designation is through a Parliamentary announcement and notification to the Ramsar bureau. Whilst the requirements of the Convention cannot be enforced through any court, the Government is firmly committed to protecting these valuable habitats and their nature conservation importance should be taken into account when developing road schemes.

3.5.133 SSSIs are designated under section 28 of the Wildlife and Countryside Act 1981 and amendments. In Scotland, the Wildlife and Countryside Act has been amended by the Nature Conservation Act 2004. SSSIs are areas of land identified by the statutory bodies, in accordance with published guidelines, as being of particular value for their fauna and flora and geological and physiographic features.

Multi-modal crossing

3.5.134 This element of the scheme has the potential for direct and indirect impacts upon the Firth of Forth SPA, Ramsar site, SSSI and associated Atlantic salmon populations both during the construction and operation phase of the scheme. The wooded area to the west of the existing crossing would also suffer significant impacts during construction, and potentially provides habitat for a number of protected species. As the Firth of Forth site is of high sensitivity, and the impacts have been assessed as large negative for magnitude, the significance is assessed as **Negative Major**.

HOV Lane

3.5.135 There are potential direct impacts upon Ferry Hills SSSI during the construction stage and potential for impacts upon St Margaret’s SSSI during the construction and operational stages. The significance of impact has therefore been assessed as **Negative Major**. There is also the potential for impacts upon protected species, if further detailed survey work highlights that they are present within the M90 corridor.

Park and Ride at Halbeath

3.5.136 The significance of the impact is **Negative Minor**, due to the low ecological sensitivity of the site. At the current time there would not appear to be any legal obligations regarding the ecological interest of this site.

Expansion of Existing Park and Ride Facilities

3.5.137 The greatest impact arising from these proposals would appear to be at Ferrytoll, where the potential impacts upon Ferry Hills SSSI, Jamestown Pond SINC and the woodland has been assessed as of **Negative Moderate** significance. The significance of the impacts upon the other park and ride sites have been assessed as small negative. This is due to the potential of each of the schemes to have impacts upon different protected species that potentially inhabit these areas. Further surveys may have to be undertaken, and the species mentioned above are all afforded some protection under the Wildlife and Countryside Act 1981.

Summary

3.5.138 The multi-modal crossing and the HOV elements of this scheme have the potential to cause major adverse effects to the ecological receptors within the study area. The park and ride scheme at Ferrytoll has been assessed as potentially moderate negative. The other park and ride schemes are assessed as causing small negative impacts. Detailed baseline studies for all of the ecological receptors listed above would have to be undertaken to further define the likely impacts, before detailed mitigation could be prepared. Further consultation will also be required with statutory and non-statutory agencies, to inform the detailed ecological assessment process. It is possible that some of the impacts noted above could be scoped out at the detailed design stage.

Visual Amenity

Scoping & Methodology

3.5.139 The methodology is based on the recommended STAG methodology and best practice guidance from the 'Guidelines for Landscape and Visual Impact Assessment' Second Edition, The Landscape Institute/Institute of Environmental Management and Assessment (Spon Press 2002) (GLVIA). The information is based on a desk top study and a field survey. The assessment uses the following timescale:

- Existing conditions before the proposal (baseline);
- Year 1 to show the scheme as implemented;
- Year 15 to show the established project with vegetation maturity; and
- Construction phase to show the temporary effects.

3.5.140 The proposed implementation of the scheme is phased in three stages thus: 2006- improvements to the existing rail service; 2011- completion of infrastructure; and 2016-bridge opening. For each of these phases the baseline will be the current situation and year 1 will be 2007, 2012 and 2017 respectively to show each stage of implementation.

3.5.141 The visual effects are assessed as they relate to groups of receptors identified during the field survey, and are reported in the AST in section 7.8. Their sensitivity to visual change rating is a judgement determined by their proximity to the site, the extent to which they are screened by vegetation, topography etc. the importance of views and whether the property is in residential or business use.

3.5.142 Suggested mitigation measures are reported in the AST under qualitative information to enable mitigation to be considered at an early stage in the development of the project.

Baseline

Additional Trains

3.5.143 The railway bridge currently has frequent train services throughout the day. It is a large landmark structure which is highly visible from a wide area including the Forth banks, the river and the nearby road bridge. There are many receptors including residential, commercial and recreational receptors.

Bus priority measures in Fife/on A90

3.5.144 The proposed priority lanes will be provided on existing routes largely within built up areas but also include the Forth road bridge. The routes are viewed by a large number of receptors from adjacent properties, which comprise mixed uses including residential, commercial and recreational uses. The routes are also viewed by other road users.

HOV lane

3.5.145 The Priority vehicle lane will use the existing southbound hard shoulder area and involve the construction of an additional lane into the landscaped road margin. The existing margin comprises cuttings and embankments through different sections of the route. This section of the route is largely located in a rural area with relatively few residential receptors and a small number of commercial receptors. The majority of the receptors would be other road users including recreational receptors.

Expansion of Park & Ride facilities at Inverkeithing

3.5.146 The site is located adjacent to the M90 interchange at Inverkeithing. It is currently divided into three portions with an existing surface car park on the southern portion, a construction site on the central portion and the former railway sidings on the northern portion of the site. The site nestles between a steep east facing wooded slope which forms the western boundary and the elevated railway viaduct which forms its eastern boundary. These features provide effective screening so the site is only visible from the immediate vicinity. The main receptors are the industrial/commercial premises which overlook the site from high level on the western boundary, train travellers and other road users.

Multi-Modal Crossing – Alignment and Associated Links, A8000/M9 Spur

3.5.147 The proposed link roads and associated interchanges would be located in undulating countryside with blocks of plantation policy woodland associated with Dundas Castle and Duntarvie estates. The area is dissected with minor roads bounded by hedgerows which link farms and small settlements which would be the main receptors along with road users. The zone of visual influence of the proposed third crossing alignment and the A8000/M9 spur varies with local topography, woodland and access. There are a number of major routes through the area linking the existing Forth road bridge and the motorway network.

Multi-Modal Crossing

3.5.148 The site is open and highly visible from a wide area including the Forth banks, the river and the nearby road and railway bridges. There are many receptors including residential, commercial and recreational receptors.

3.5.149 Fife Council has requested that consideration should be given to the Queensferry/ Cross Forth corridor as a major gateway to Fife as perceived by north bound travellers across the Forth.

Assessment

Construction

3.5.150 Temporary effects would comprise:

- The movement of construction vehicles, machinery etc;
- General site clearance and topsoil strip of the site;
- Siting of the contractor's main offices and works compound areas;
- Scaffolding, fencing, roadworks, signing etc; and
- Security lighting at night.

3.5.151 Specific effects on the individual receptor groups would need to be assessed at a later stage when detailed arrangements have been determined, however the construction of the Third Forth Crossing is likely to have major visual effects over a relatively long construction period owing the scale of the project, its height and visibility.

Operation

3.5.152 The specific visual effects on the receptor groups are reported in the AST (section 7.8). They are summarised below.

Additional Trains

3.5.153 Although the railway bridge is highly visible the proposals are minor, representing a small intensification of an existing service and will have a negligible effect. No mitigation measures are recommended.

Bus priority measures in Fife/on A90

3.5.154 As the proposals will affect an existing route the receptors who have medium (residential and recreational) and low (commercial) sensitivity will only experience minor changes to their view. No mitigation measures are recommended.

HOV Lane

3.5.155 At year 1 the existing road users will experience moderate changes to their views. As the changes comprise a widening of an existing route there will be a small adverse effect. Nearby residential receptors will have varying sensitivity and experience variable changes to their views depending on their proximity to the route. Similarly any adverse effects will vary depending on the scale of the cutting and embankment required. The effects on commercial receptors, with low sensitivity, will also vary according to these factors.

3.5.156 Mitigation should be carried out in accordance with the recommendations contained in, "Cost Effective Landscape: Learning from Nature" (The Scottish Office, Feb 1998). At year 15 planting and slope/rock treatment will have softened the appearance of the scheme and reduced any adverse effects.

Expansion of Park & Ride facilities at Inverkeithing

3.5.157 As the site is well screened by topography and the railway viaduct and there are relatively few receptors with low sensitivity, receptors will experience changes to their views but there will be only small adverse effects at year 1 which will reduce to negligible effects at year 15 when mitigation has taken effect. It is recommended that the design of the additional car park deck should use the slope, and planting should be provided in order to set the proposals into the landscape.

Multi-Modal Crossing – Alignment and Associated Links, A8000/M9 Spur

3.5.158 The proposals will represent an extension to the existing major route network which has been successfully integrated into the landscape of the rural area south of the Forth. Sections of the route would be visible from the immediate vicinity and from medium range from local elevated areas therefore the nearby residential receptors (with high sensitivity) and users of the minor roads (with medium sensitivity) will experience changes to their view. Some residential receptors located close to the proposed works will experience major adverse effects.

Multi-Modal Crossing

3.5.159 The proposed bridge will have a major visual impact over a wide area. It could be viewed as a change with positive beneficial and no adverse effects by many receptors and become a landmark structure. The proposal would enhance the gateway to Fife. The most sensitive receptors who would experience adverse effects would be those residential properties on the Forth banks located under and adjacent to the proposed bridge. The structure would dominate their view and cause some overshadowing. The final assessment under this criteria is effectively personal and heavily dependent on the final design, which cannot be known at this stage.

Summary

Enhanced Rail Services: Negligible effects.

Bus priority lanes: Negligible effects.

HOV Lane (M90): Some adverse effects on nearby receptors.

Expansion of Park and Ride facilities at Inverkeithing: Minor adverse effects at year1.

Multi-Modal Crossing – Alignment and Associated Links, A8000/M9 Spur: Some major adverse effects on adjacent residential receptors.

Multi-Modal Crossing: Major visual impact. Some major adverse effects.

Cultural Heritage

Introduction

3.5.160 This section of the STAG Appraisal relates to the assessment of cultural heritage issues, with particular respect to local archaeology, listed buildings, Scheduled Ancient Monuments (SAMs) and the historic built environment within the study area.

3.5.161 Cultural heritage offers a tangible link to the past, which might be permanently affected by development. To prevent needless damage and destruction, care must be taken either through design or mitigation measures to ensure that negative impacts are kept to a minimum.

Scoping

3.5.162 The scoping of cultural heritage issues relates to the proposed study area and the factors that are requiring assessment. A generic study area was identified within each study corridor so that the cultural heritage assessment could identify those locations, which may potentially be affected by the Scheme.

3.5.163 In addition, consultation responses received from Historic Scotland and Fife Council have highlighted the importance of Listed Buildings, SAMs and other statutory designations, locally designated sites, and known archaeological sites.

Baseline

3.5.164 The baseline reported below relates to the existing situation, the year of opening and 15 years after opening. It is unknown as to what future designations will be made and what archaeological finds will be discovered. In addition, surveys have not been carried out for this assessment, so the cultural heritage appraisal is based on a desk study and consultations as described above.

3.5.165 Within the generic study area, there are a number of SAMs that may potentially be affected by development within the transport corridor. There are also a number of Listed Buildings within the study area that may also be affected.

HOV Lane (M90)

3.5.166 The construction of a High Occupancy Vehicle (HOV) lane will affect the setting of two SAMs, namely:

- Middlebank House, to the North East of Junction 2 of the M90
- Inverkeithing Market Cross in Inverkeithing Town Centre.

3.5.167 There is one Conservation Area that is adjacent to the proposed HOV that may be affected by the HOV Lane at:

- Inverkeithing Town Centre.

3.5.168 Within the study area there are a number of Listed Buildings that are recorded within the Dunfermline and the Coast Local Plan (April 2002) Appendix A. The Rural West Edinburgh Local Plan (2003) does not contain a schedule of listed buildings, consultation responses received from Historic Scotland and Fife Council do not provide any data on listed buildings

3.5.169 There are also a number of locally designated sites within the study area namely:

- 6 Sites of regional Archaeological importance at Calais Muir Wood, Mastertown, Inverkeithing, North Queensferry and 2 sites in Inverkeithing town centre area, adjacent to study area.
- 1 Medieval Burgh at Inverkeithing

Multi-Modal Crossing

3.5.170 The construction of a new multi-modal crossing and associated infrastructure will affect the setting of twelve SAMs at:

- Inverkeithing Town Centre (Inverkeithing Market Cross) – adjacent to study area
- South Queensferry (Queensferry Tolbooth)
- Two sites at Dundas Castle
- Cramond Brig (the Old Bridge)
- Near Clove Quarry (Craigie Hill Fort)
- North of A8 at Gogar (Gogar Castle)
- South of A8 at Easter Norton (standing stone)
- North side of Edinburgh Airport (Carlowie Cat Stane)
- Ratho Station (Lochend Farm standing stone)
- Newbridge (Huly Hill tumulus)
- North of M9 (Duntarvie Castle – restored)

3.5.171 There are four Conservation Area that are within, or adjacent to the study area that may be affected by a new bridge and infrastructure. These are:

- Inverkeithing town centre
- South Queensferry
- Dalmeny
- Kirkliston

3.5.172 Within the study area there are a number of Listed Buildings that are listed within the Dunfermline and the Coast Local Plan (April 2002) Appendix A. The Rural West Edinburgh Local Plan (2003) does not contain a schedule of listed buildings, consultation responses received from Historic Scotland and Fife Council do not provide any data on listed buildings.

3.5.173 Locally designated sites that are also potentially affected are:

- 3 Sites of Regional Archaeological Importance at Inverkiething, and 2 sites at Inverkiething town centre.
- 1 Medieval Burgh at Inverkiething

HOV Lane (Associated with Multi-Modal Crossing)

3.5.174 It is likely that the HOV lane will not require any further additional infrastructure works, as this element will be incorporated into the new Multi-Modal Crossing and associated link roads.

Enhanced Bus Services and Bus Priority Measures

3.5.175 It is likely that the enhancement of bus services and bus priority measures will not require any further additional infrastructure works, as this work will be incorporated into other elements of the corridor study. This element will just be making use of the existing/additional carrying capacity of the infrastructure links.

3.5.176 The works may affect the setting of the following Conservation Areas:

- New Town
- Dean
- Dunfermline
- North Queensferry

Enhanced Rail Service

3.5.177 It is unlikely that the enhancement rail services will give rise to significant cultural heritage issues.

Expansion of Park and Ride Sites

3.5.178 The following cultural heritage features are found:

- Dalgety Bay
  - Cemetery (Hillend Cemetery)
  - No Local Plan cultural heritage references

- M90 east of Junction 3
  - No cultural heritage references (either OS map or Local Plan)

- M90 north-east of Junction 1 – "Triangle"
  - No cultural heritage references (either OS map or Local Plan)

- Pitreavie
  - Archaeological Site of Regional Importance (St. Margaret's Stone)
  - Scheduled Ancient Monument (site of Battle of Pitreavie)

- Inverkeithing
  - Cemetery
  - "Cultivation Terraces" in Inverkeithing – see Dunfermline and the Coast Local Plan Proposal Map No.8.

- Jamestown
  - Archaeological Site of Regional Importance (Inverkeithing Ship Yard)

Assessment

Statutory designations

3.5.179 The construction phase is likely to affect the statutory designations within the corridor. The conservation areas would experience extensive short term negative impacts with regard to setting as a result of construction (further information on the impact of the options package on conservation areas can be found in Chapter 9 – Landscape). SAMs will also experience negative effects on their settings, and it will be of major importance to protect the SAM sites during construction so that they are not directly impacted upon during construction. Construction impacts are also likely to affect the setting of Listed Buildings. However, at this stage it is not anticipated that any listed buildings will require demolition as part of the finalised scheme.

3.5.180 The operational phase will largely affect the setting of statutory designations, such as SAMs, conservation areas and listed buildings. There are not expected to be any significant physical impacts on any Listed Buildings or SAMs.

Non-statutory designations

3.5.181 It is likely that some of the Sites of Regional Archaeological Importance within the study corridor will experience direct short-term negative impacts as a result of the construction works. Additionally, it is likely that the setting of all the Sites of Regional Archaeological Importance will be affected, but it is unlikely to be of any great significance. It is not known at this stage whether the Medieval Burgh at Inverkeithing will be impacted upon.

Archaeological remains

3.5.182 The impact of the Scheme on uncharted archaeological remains is not quantifiable at this time, and survey work will be required to fully assess the likely impacts and their significance.

Appraisal

3.5.183 The full appraisal of cultural heritage impacts is reported in the AST (see section 7.8).

3.5.184 Construction impacts are likely to affect the setting of the Conservation Areas, Listed Buildings, and two SAMs, with the range of these effects being dependent on the scale of construction activity. The magnitude of effect on statutory designations could range from Slight Negative to Large Negative. However, based on the information available for this study the significance of effects is considered likely to be **Negative Minor** at worst.

3.5.185 Construction impacts will have less of a magnitude of effect on non-statutory sites and uncharted archaeological remains, with the majority being of Slight Negative or Moderate Negative. In general, the significance of effects is **Neutral-Negative Minor**.

3.5.186 Operational effects are likely to have permanent impacts on the setting of Conservation Areas, Listed Buildings and SAMs, that may be potentially significant. However, this is dependant on the final Scheme design being sympathetic to the surrounding environment, and is considered to be **Negative Minor**. Other areas will experience effects of a lesser magnitude and will also be potentially less significant and likely to be **Neutral-Negative Minor**.

Summary

3.5.187 The cultural heritage assessment identified those cultural and archaeological resources within a broad study area that may be affected by the development of the proposals for the Queensferry Corridor. There were a number of statutory designations identified including a number of conservation areas, listed buildings and Scheduled Ancient Monuments.

3.5.188 Overall, both construction and operation stages of the proposals are likely to have only minor impacts on the setting of designated features. Mitigation should ensure that statutory designations are not directly affected by construction activity.

Landscape

Scoping & Methodology

3.5.189 The methodology is based on the recommended STAG methodology and best practice guidance from the 'Guidelines for Landscape and Visual Impact Assessment' Second Edition, The Landscape Institute/Institute of Environmental Management and Assessment (Spon Press 2002) (GLVIA). The information is based on a desk-top study and a field survey. The assessment uses the following timescale:

- Existing conditions before the proposal (baseline);
- Year 1 to show the scheme as implemented;
- Year 15 to show the established project with vegetation maturity; and
- Construction phase to show the temporary effects.

3.5.190 This assessment uses the five point scale in accordance with the DMRB Volume 11: Environment Assessment i.e. high quality, very attractive, good landscape, ordinary landscape and poor landscape. The sensitivity rating is a judgement based on the presence of landscape designations and the capacity of the landscape to absorb development.

3.5.191 Suggested mitigation measures are reported in the AST under qualitative information to enable mitigation to be considered at an early stage in the development of the project.

Baseline

Planning Context, Landscape and Visual Designations

3.5.192 Information was obtained from the following local plans:

- Dunfermline and the Coast Local Plan, Adopted April 2002. (DCLP)
- Central Edinburgh Local Plan, Adopted May 1997. (CELP)
- West Edinburgh Local Plan, Approved for Consultation 2001. (WELP)
- Rural West Edinburgh Local Plan, Finalised 2003. (RWELP)

3.5.193 In accordance with the Fife Structure Plan (July 2002) Proposal PN1 landscape plans have been prepared for selected areas commissioned by Fife Council. The relevant plans would need to be taken into consideration at the design stage.

3.5.194 Fife Council has requested that consideration should be given to the Queensferry/ Cross Forth corridor as a major gateway to Fife in minimising adverse impacts on the character and quality of the landscape.

Designations:

- **Rail Improvements:** *No landscape designations*.
- **Enhanced Bus Services and Bus Priority Measures:**
  - *New Town Conservation Area (within) (CELP);*
  - *Dean Conservation Area (adjacent) (CELP);*
  - *Dunfermline Conservation Area (within) (DCLP);*
  - *North Queensferry Conservation Area (adjacent) (DCLP);*
  - *Dalmeny Estate Area of Outstanding Landscape Quality (adjacent) (RWELP);*
  - *Areas of Great Landscape Value and Green Belt within west Edinburgh (crosses) (WELP);*
  - *Open spaces of outstanding landscape quality and townscape significance within central Edinburgh (crosses) (CELP).*
- **HOV Lane:** *No landscape designations.*
- **Expansion of Park and Ride Sites:** *Site zoned as an established employment area (DCLP).*
- **Multi-Modal Crossing – Associated Links, A8000/M9 Spur:** *The proposed routes are close to Duntarvie Castle A-Listed building and areas of Outstanding Landscape Quality at Dundas Hill and Humbie. The A8000/M9 spur is within the Green Belt and is identified as a road improvement scheme in the Local Plan (RWELP).*
- **Multi-Modal Crossing:** *No landscape designations.*

- **Landscape/Townscape Character**

  The Lothians landscape character assessment (No. 91) and the Dunfermline and District landscape assessment (No.19) which form part of the national landscape character assessment prepared by SNH categorise the landscape into individual landscape character areas (LCA) and groupings of landscape character types (LCT). The areas affected by the proposals for the Queensferry corridor are within the following categories:

  - *Areas within Queensferry and to the south -Linlithgow/Queensferry Farmlands LCA and the Coastal Margins LCT (Lothians);*
  - *Areas within the city of Edinburgh – unclassified;*
  - *Road and Rail bridges – unclassified;*
  - *Areas within Fife – Ferry Hills LCA within the Coastal Hills LCT and Central area north east of Dunfermline LCA within the lowland Hills and Valleys LCT(Dunfermline and District);*

3.5.195 The landscape baseline is described in Table 3.17 below which includes the relevant characteristics of the LCA's in relation to the proposed sites.

Table 3.17: Landscape Baseline

LCA/LCT (Lothians)	**Linlithgow/Queensferry Farmlands LCA and the Coastal Margins LCT.**
SNH LCA characteristics	Gently rolling lowland with arable farming or improved pasture. Field boundaries of clipped or overgrown hedges, lines of broadleaved trees, fences and stone walls. Policy woodland, shelter belts and mature parkland trees associated with large estates influence the landscape character. The busy transport network disrupts the rural character.
SNH Key strategic aim (Lothians)	Conserve the rural character which is under threat from expansion of residential /industrial development and expansion of the transport network.
LCA/LCT (Dunfermline and District)	Ferry Hills LCA within the Coastal Hills LCT
SNH LCT characteristics (no characteristics are given for individual LCA's)	A series of hills sloping gradually towards the Forth with panoramic views of the estuary. Large, regular and open arable landscapes with linear shelterbelts and policy plantings.
LCA/LCT (Dunfermline and District)	Central Area north east of Dunfermline LCA within Lowland Hills and Valleys LCT
SNH LCT characteristics	Subtle, varied , complex, mature , settled landscape with a series of low hills and valleys characterised by open, regular patterns of medium scale arable and grassland fields with woodlands and tall hedges with hedgerow trees.
Local characteristics	Enhanced Rail Service: The railway bridge is a famous and distinctive landmark structure which is a key component of the character of the Forth area. Bus priority lanes: The routes would be introduced on existing roads. The routes are largely located within built up areas with mixed land uses. A section of the route crosses the rural area south of the Dalmeny Park designed landscape which contains policy plantation woodlands. HOV Lane: The additional lane would use the existing hard shoulder area and involve the construction of an additional lane into the landscaped road margin

LCA/LCT (Lothians)	Linlithgow/Queensferry Farmlands LCA and the Coastal Margins LCT.
	which comprises cuttings and embankments. Much of this section of the route is located in a rural area which is an open, gently undulating agricultural landscape with scattered blocks of plantation woodland. The southern section of the route enters the northern edge of Inverkeithing in an industrial/commercial area. Expansion of Park & Ride facilities at Inverkeithing: The site is located adjacent to the M90 interchange at Inverkeithing within an industrial/commercial area adjacent to a railway viaduct. It is currently divided into three portions with an existing surface car park on the southern portion, a construction site on the central portion and former railway sidings on the northern portion of the site. The site is well screened by the viaduct and an east facing wooded slope which form its boundaries. Multi-Modal Crossing - Alignment and Associated Links, A8000/M9 Spur: These proposals would be located in undulating countryside with blocks of plantation policy woodland associated with Dundas Castle and Duntarvie estates. The area is dissected with minor roads bounded by hedgerows which link isolated farms and small settlements. There are a number of major routes through the area linking the existing Forth road bridge and the motorway network. Multi-Modal: Open estuary with distinctive maritime character. Areas of development on the banks. The two existing crossings, the Forth rail and Forth road bridges are famous landmark structures which are key components of the landscape character.
Planned and committed developments	The A8000/M9 spur is identified as a road improvement scheme in the local plan (RWELP).
Value	The landscape setting of the Queensferry corridor proposals are classified as follows: Enhanced Rail Service: High quality - landmark structure Bus priority lanes: Ordinary landscape for much of the route, some high quality areas – some Conservation Areas and areas with landscape designations. HOV Lane (M90): Ordinary landscape Expansion of Park & Ride facilities at Inverkeithing: Ordinary landscape Multi-Modal Crossing – Alignment and Associated Links/ A8000/M9 Spur: Very attractive/good landscape Multi-Modal Crossing: Good landscape
Sensitivity	Enhanced Rail Service: High Bus priority lanes: Medium to low sensitivity for much of the route, some areas with high sensitivity HOV Lane (M90): Medium Expansion of Park & Ride facilities at Inverkeithing: Low Multi-Modal Crossing – Alignment and Associated Links/ A8000/M9 Spur: Medium to high Multi-Modal Crossing: High

Assessment

Construction

3.5.196 Temporary effects would comprise:

- The movement of construction vehicles, machinery etc;
- General site clearance and topsoil strip of the site;
- Siting of the contractor's main offices and works compound areas;
- Scaffolding, fencing, roadworks, signing etc; and
- Security lighting at night.

3.5.197 Specific effects on the landscape would need to be assessed at a later stage in relation to detailed design. The proposed new bridge would create major changes in the landscape for a protracted construction period.

Operation

3.5.198 The specific landscape effects on the designated areas are reported in the AST.

Enhanced Rail Services: Although the railway bridge is a prominent structure, the proposals are minor, representing a small intensification of the existing service and will have a negligible effect. No mitigation measures are recommended.

Bus priority lanes: The proposals will affect an existing route. Although the lanes will be introduced in some sensitive areas there will be negligible landscape effects.

HOV Lane (M90): As the proposed widening is to an existing route, there will be little change to the landscape character. Mitigation should be carried out in accordance with the recommendations contained in, "Cost Effective Landscape: Learning from Nature"(The Scottish Office, Feb 1998).

Expansion of Park & Ride facilities at Inverkeithing: as the site is well screened by topography and the railway viaduct and the proposals are an extension to existing uses, there will be little change to the landscape character. It is recommended that the design of the additional car parking deck should use the slope and that planting should be provided in order to set the proposals into the landscape.

Multi-Modal Crossing – Alignment and Associated Links/ A8000/M9 Spur: The proposals will represent an extension to the existing major route network which has been successfully integrated into the landscape of the rural area south of the Forth. The capacity of the landscape is quite high owing to screening by topography and woodland, however careful design is required to avoid cumulative effects. The scheme may affect the setting of Duntarvie Castle (A-listed) but the estate has already been compromised by the existing routes. The initial sketch route alignment together with the proposed new bridge alignment offers an elegant solution.

Multi-Modal Crossing: The proposed new bridge would create a major change in the landscape but has the potential, with good design, to introduce a striking new landmark feature which would make a positive contribution to the character of this area of the Forth and provide an enhanced gateway to Fife. The impact is ultimately subjective and depends on good design and mitigation to minimise intrusion.

Summary

Enhanced Rail Services*:* Intensification of existing use. Negligible effects

Bus priority lanes*:* minor change to existing route. Negligible effects.

HOV Lane (M90): small change to the landscape. Little effect on character.

Expansion of Park & Ride facilities at Inverkeithing*:* Extension to existing uses. Little change to the landscape character.

Multi-Modal Crossing – Alignment and Associated Links/ A8000/M9 Spur: Extension to the existing major route network. Design to avoid cumulative effects.

Multi-Modal Crossing*:* A range of impacts is possible, depending on final design, and could range from Major Negative to Major Positive change in the landscape depending on personal preference. Based on a "landmark" design it is assumed that the impact will be minor positive, acknowledging the role of personal opinion in the appraisal.

3.6 Safety

Government Objective:	To improve safety of journeys by reducing accidents and enhancing the personal safety of pedestrians, drivers, passengers and staff.
Planning Objective:	Improve safety for all road and transport users.

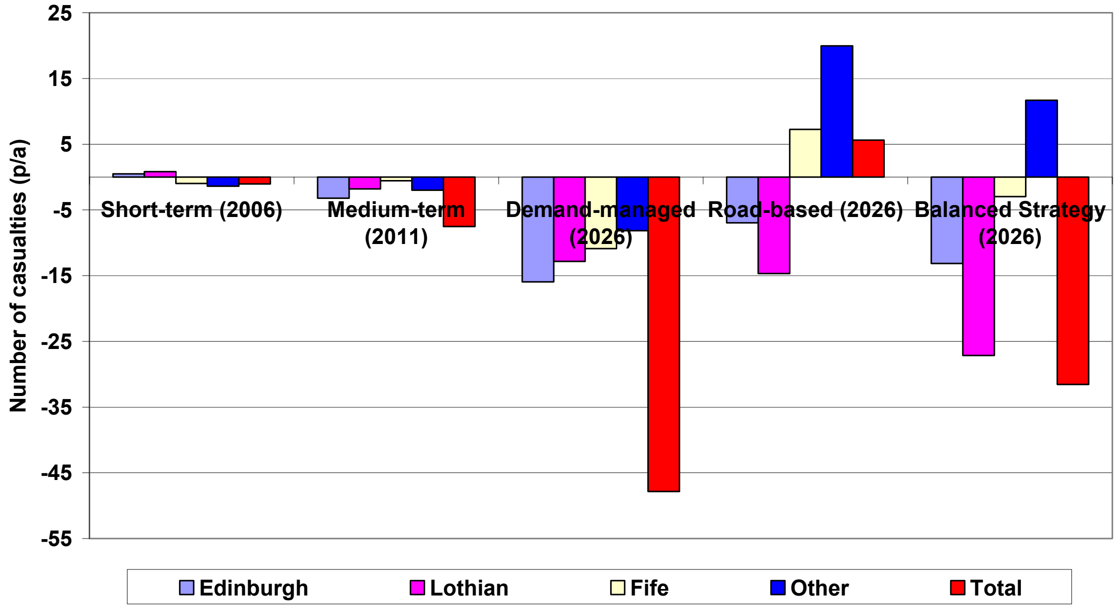
3.6.1 The Planning Objective categorised under this heading is analogous with the Government Objective, and both can be considered together. STAG requires the consideration of Safety under two sub-headings, viz.:

- Accidents; and
- Security.

Accidents

3.6.2 Accident rates for a variety of short, medium and long-term packages were calculated by applying latest available estimates of road traffic accident costs and rates (as specified in NESA/COBA) to predicted future-year traffic flows and can be summarised as follows (NB These calculations exclude any changes in rail-related accident costs).

Figure 3.15: Accident Rates for each Package of Measures



3.6.3 This demonstrates that the "immediate" short and medium term packages generally reduce the numbers of casualties in all areas (apart from the Lothians in the short-term package), although at a relatively modest level.

3.6.4 In the longer-term, there is a stark contrast between a strategy founded solely on long-term enhancements to general road capacity, where casualties show a net increase, compared to more balanced strategies. These place greater emphasis on public transport and in particular the demand-managed strategy (without a new crossing) shows a significant reduction in casualties in 2026. The balanced strategy is not as successful, but nevertheless demonstrates a net reduction in annual casualties.

Security

3.6.5 In Part 1 all the schemes appraised were assessed as being neutral overall with regard to security. Part 2 appraisal requires use of the methodology set out in GOMMMS[27]. A review of this suggests that detailed appraisal is unlikely to be meaningful given the scale of the schemes under appraisal and the criteria for assessment in GOMMMS Worksheet 5.1; for example it seems reasonable to assume that any new interchanges provided will be to the highest design standards, but they cannot be appraised objectively against existing facilities as the interchanges do not exist at present.

3.6.6 In order to avoid introducing "apparent" improvements in security simply because schemes introduce facilities that do not exist at present it is proposed to carry forward a neutral assessment of the safety sub-objective from the Part 1 appraisal. Appraisal of specific, targeted improvements to facilities will be addressed under the integration objective.

[27] Guidance on the Methodology for Multi-Modal Studies, Volume 2 (*DETR*, March 2000), section 5.3

Overall Appraisal against Government Objective

3.6.7 Taking into account the sub-objective appraisals provided above, the following overall appraisal has been reached.

Making Public Transport More Attractive	Minor Benefit for Safety
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Moderate Benefit for Safety
Feeder Bus Services	Minor Benefit for Safety
Park & Choose	Moderate Benefit for Safety
Optimisation of Rail Services	Moderate Benefit for Safety
Demand Management	Major Benefit for Safety
Forth Multi-modal Crossing & Road Space Reallocation	Major Benefit for Safety

3.7 Economy

Government Objective:	To promote economic growth by building, enhancing, managing and maintaining transport services, infrastructure and networks to maximise their efficiency.
Planning Objectives:	Maintain existing infrastructure properly in order that it can be fully utilised.
	Enhance movements of freight, especially by rail and other non-road modes.
	Sustain the economic health of the SESTRAN region.

3.7.1 STAG requires appraisal of economic impacts under two sub-headings:

- Transport Economic Efficiency (TEE); and
- Economic Activity and Location Impact (EALI).

3.7.2 Taking account of the Planning Objectives appraisal therefore took place under the following four sub-headings:

- Maintenance of existing infrastructure;
- Freight movements;
- Transport Economic Efficiency (TEE); and
- Economic Activity and Location Impact (EALI), including a commentary on possible impacts on the Economic Health of the SESTRAN region.

Maintenance of Existing Infrastructure

3.7.3 For the purposes of this section of the appraisal, "existing infrastructure" is taken to refer to the two bridges and their immediate access networks. Maintenance will obviously be eased by the following circumstances:

- Reduced load on the bridge, either through reduced numbers of crossings or reduced weights of vehicles crossing; and/or
- The availability of an alternative diversion during routine or emergency maintenance.

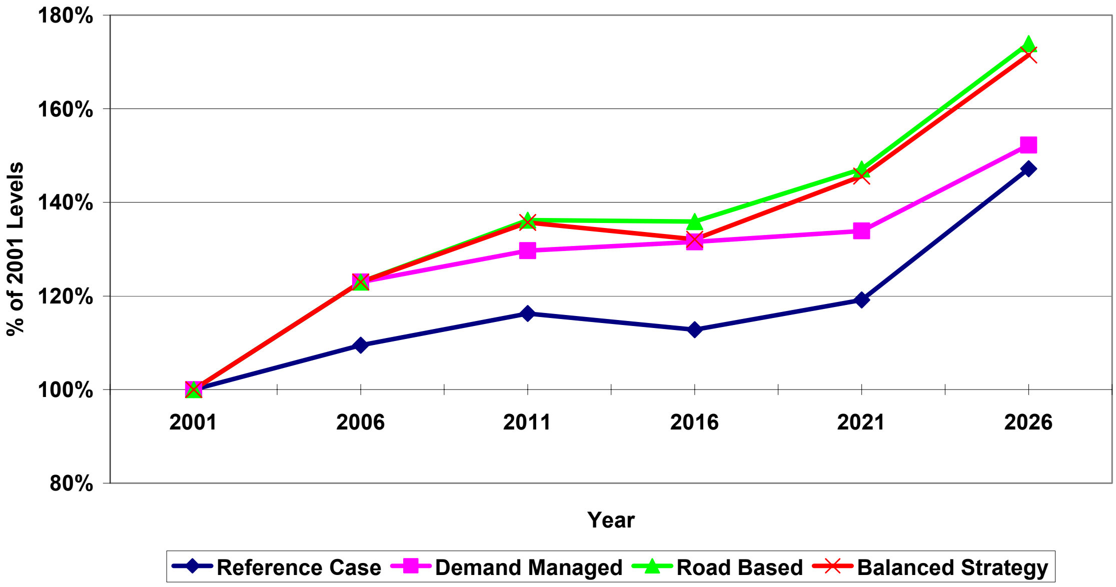
Forth Rail Bridge

3.7.4 In the Short Term the principal emphasis is on attracting Cross Forth person movements away from SOVs and into HOVs and public transport generally. This will impact modestly on total person movements across the Forth Rail Bridge, but this is unlikely to have a significant impact on the ability to maintain the structure.

3.7.5 In the Medium Term two additional trains per hour are planned in each direction across the Forth. Based on the two criteria set out above this will have an adverse impact on the ability to maintain the existing structure, and in the event of unplanned/emergency maintenance the impacts will be of even greater severity than at present given the higher peak hour frequencies anticipated, which will be towards the upper limit of the existing signalling infrastructure capability.

3.7.6 The Long Term strategies anticipate no additional trains beyond those in the Medium Term Strategy, nor do they provide for the provision of alternative rail routes across the Forth. They all, however, anticipate more use of rail for Cross Forth person trips, and this will be accommodated by operating trains with more carriages. These longer (and therefore heavier) trains will exacerbate the existing difficulties in maintaining the rail bridge.

Figure 3.16: Cross Forth Rail Passenger Flows (Southbound AM Peak Hour)

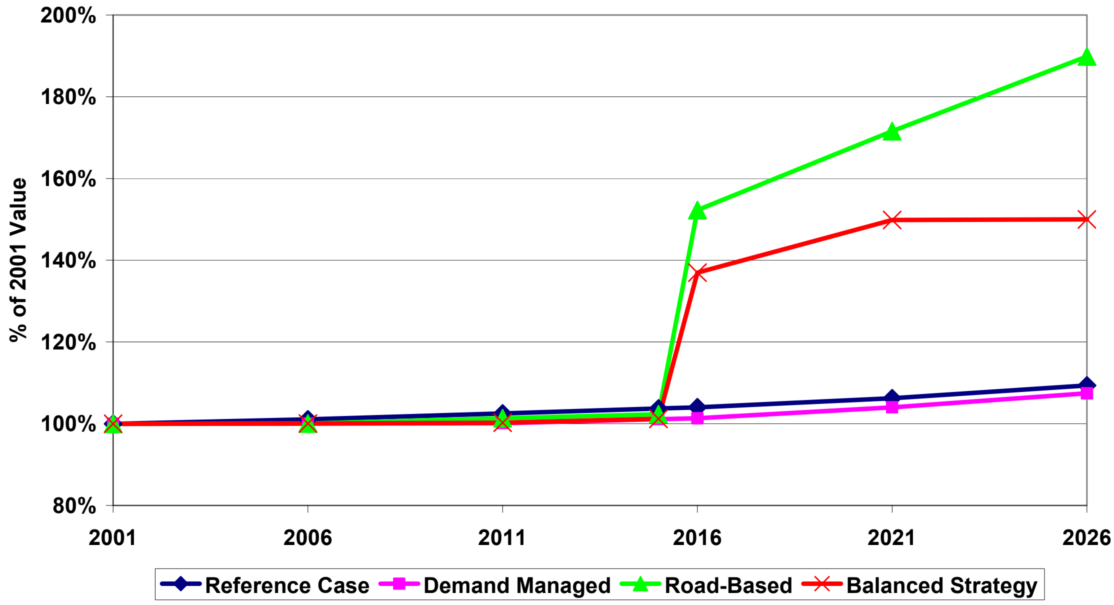


3.7.7 This can be illustrated in the graph above, which shows that by 2026 Cross Forth rail passenger flows could have increased by 70% or more compared to current levels. It is clear, therefore, that all of the strategies are likely to put increasing strain on the ability of Network Rail to maintain the Forth Rail Bridge.

Forth Road Bridge

3.7.8 A similar graph illustrating Cross Forth vehicle movements on the road bridge is presented overleaf, along with an indication of changes to Cross Forth person movements by car in a 12-hour period (0700-1900).

Figure 3.17: Cross Forth Car Flows (Southbound 0700-1000)



3.7.9 The Short Term Strategy of encouraging HOVs and providing better/more attractive public transport has a positive impact on Cross Forth vehicle movements in the peak-hour[28], which will be of benefit to the maintenance of the Forth Road Bridge. The introduction of the Demand Management is also beneficial under all Strategies ensuring that Cross Forth vehicle flows are below those anticipated under the Reference Case.

3.7.10 In the Long Term strategies, the addition of a new crossing has an obvious impact on vehicle flows. In the Road-Based Strategy by 2026 anticipated traffic has increased by almost 90% compared to 2001, but against a background of 100% increase in available road capacity. There will, therefore, be positive benefits for maintenance of the existing road infrastructure as well as flexibility to accommodate maintenance of the new infrastructure.

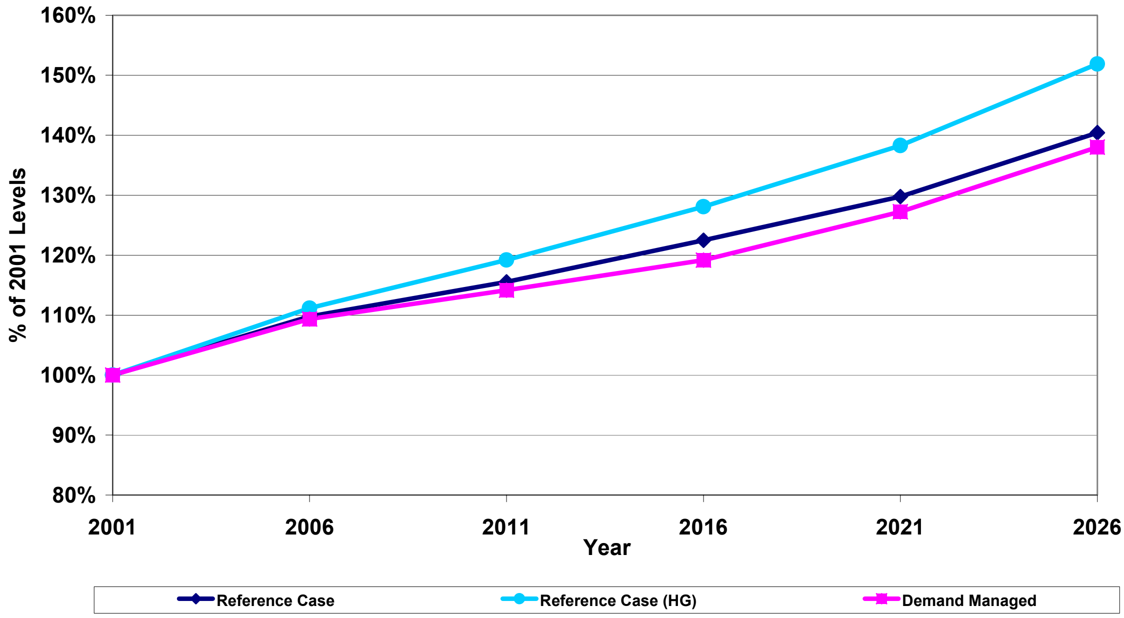
3.7.11 A similar situation will apply in the case of the Balanced Strategy, with an increase of around 50% in vehicle flows by 2026, in this case with no additional capacity for Single Occupancy Vehicles, but two additional Cross Forth High Occupancy Vehicle Lanes.

3.7.12 If no additional road crossing is provided then the Demand Managed Strategy is anticipated to contain Cross Forth traffic below the reference Case level. This will minimise additional strains on the existing infrastructure, but will not allow any greater flexibility to accommodate maintenance. This will, inevitably, result in an

[28] For further information, see Corridor Report

increasing number of incidents requiring closure of the Road Bridge or the introduction of restrictions, with a knock-on impact on reliability.

Figure 3.18 Cross Forth Person Trips by Car (0700-1900)



3.7.13 However, looking at a wider time period the above figure shows that Cross Forth person trips by car increase under all strategies that do not include a new road crossing, but that the Demand Managed Strategy contains growth at lower levels than under the Reference Case.

Conclusion on Maintenance of Existing Infrastructure

3.7.14 On this basis it would appear best to proceed with a strategy that promotes the long-term construction of an additional road crossing of the Forth, as this will increase the flexibility available for maintenance of the existing Road Bridge, and Cross Forth vehicle movements will not grow sufficiently to absorb the new capacity created (at least by 2026). All of the long term strategies impact adversely on the ability of the Rail Bridge to accommodate future maintenance.

Freight Movements

3.7.15 There are no obvious impacts, positive or negative, on the **existing** movement of freight by rail, although the proposals to increase passenger train frequencies across the Forth (Theme E) depend on the switching of freight onto the reopened Stirling – Alloa – Kincardine line and will mean that freight “paths” across the rail bridge are considerably reduced in availability.

3.7.16 Turning to road-based freight movements, the proposed HOV Lane between Halbeath and the northern bridgehead (part of Theme B) could be available to HGVs, offering a faster and more reliable journey time for them in the AM peak - examination of predicted traffic flows in 2026 shows that HGVs could be accommodated within the proposed HOV Lanes north of the Forth[29]. However it is acknowledged that driver perceptions of the attractiveness of HOV Lanes might be undermined if they were available to HGVs, and further consideration of the use of HOV Lanes by HGVs is suggested. There is no suggestion of allowing HGVs to use designated bus priority lanes.

3.7.17 Theme F (demand management) is based on an assumed tolling structure that penalises SOVs, but not HGVs. This will have indirect benefits for HGVs by reducing traffic flows across the Forth Road Bridge, as illustrated in Figure 3.x above.

3.7.18 The provision of a new crossing under either the Roads-Based Strategy or the Balanced Strategy would provide additional road space allocation to HGVs, significantly improving the ease and reliability of Cross Forth freight movements. This will be particularly the case under the Balanced Strategy, where the Multi-Modal Crossing and the HOV/HGV Lanes will result in a doubling of available road space to HGVs, but with only a modest initial impact on Cross Forth traffic.

Transport Economic Efficiency (TEE)

3.7.19 The costs and benefits from each of the following Strategies were assessed over a 60-year appraisal period using TUBA:

- Short Term Strategy (Themes A, B, C and D);
- Medium Term Strategy (completion of Theme B plus implementation of Theme E);
- Demand Managed Strategy (enhancing the Medium Term Strategy by the implementation of Theme F);
- Roads-based Strategy (supplementing the Short and Medium Term Strategies with a new road crossing); and
- Forth Multi-Modal Crossing (supplementing the Short and Medium Term Strategies with demand management and, in the long-term, a new crossing with road space reallocation in favour of HOVs).

3.7.20 TUBA provides standard output TEE tables reporting the results of this appraisal – these are reproduced in Appendix D for the five strategies listed above, and are summarised into Table 3.17 below. TUBA output, and hence Table 3.17, includes Optimism Bias unless stated otherwise. The appraisal period was 60-years, 2006 – 2066. In keeping with the STAG recommended approach, the Cost to Government is reported separately in greater detail in section 3.10.

[29] Modelling results for the M90 southbound HOV Lane in 2026 suggest 850 car pcu's + 267 HGV pcu's = 1117 total pcu's - i.e. 56% of a 2000 pcu capacity HOV lane.

Table 3.18: Summary of Transport Economic Efficiency for the Strategies

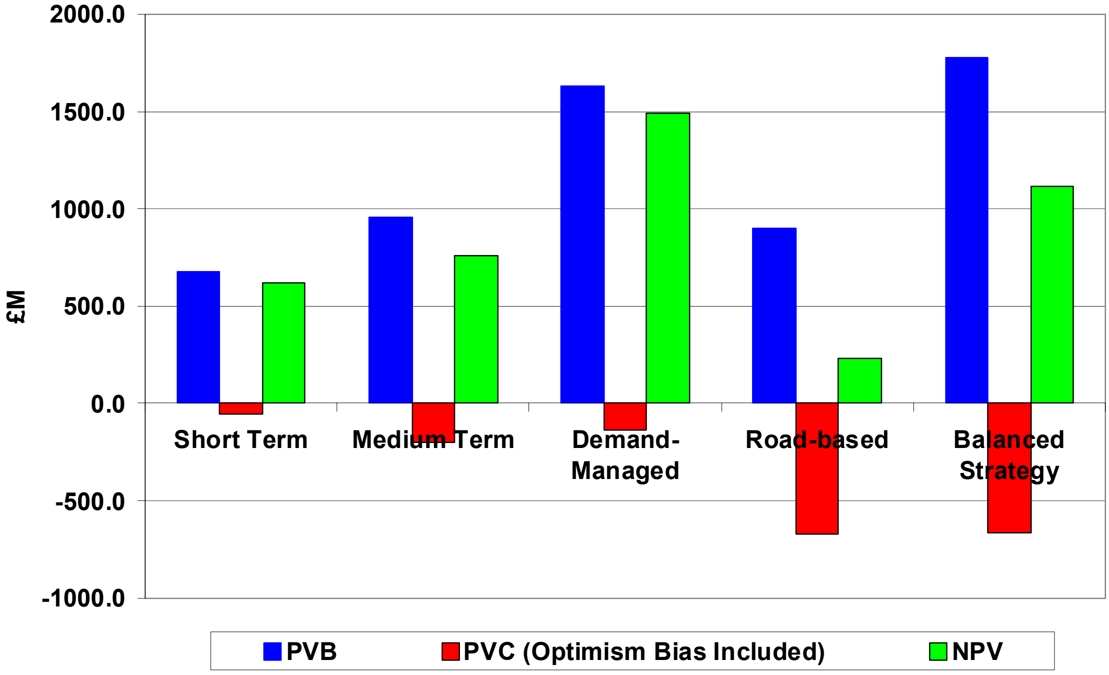
	Short Term Strategy	Medium Term Strategy	Demand Managed Strategy	Roads-based Strategy	Balanced Strategy
Consumer User Benefits					
Travel Time	438.1	577.5	816.0	556.2	906.3
Vehicle operating costs	16.7	36.6	113.0	8.5	103.6
User charges	12.2	27.6	-79.8	17.6	-97.9
NET CONSUMER BENEFITS	467.2	641.7	849.1	582.2	912.1
Business User Benefits					
Travel Time	176.6	298.5	578.9	307.2	653.5
Vehicle operating costs	9.9	18.0	34.9	14.8	39.4
User charges	0	0.2	-23.2	-2.2	-29.3
Sub Total	186.4	316.6	590.6	319.8	663.6
Private Sector Provider Impacts					
Revenue	35.1	127.9	382.4	120.4	418.0
Operating costs	-13.9	-191.6	-194.6	-217.3	-217.3
Investment costs	0	0	0	0	0
Grant/subsidy	0	63.8	0	96.9	0
Sub Total	21.2	0	187.8	0	200.7
Other Business Impacts					
Developer Contributions	0	0	0	0	0
NET BUSINESS IMPACT	207.6	316.6	778.3	319.8	864.3
Present Value of TEE Benefits (PVB)	**674.8**	**958.3**	**1627.5**	**902.0**	**1776.3**
Public Accounts					
Local Government Funding					
Net Local Government Impact	-2.1	5.1	-121.4	-16.9	-146.5
Central Government Funding					
Net Central Government Impact	59.1	193.5	255.9	685.8	809.8
Present Value of Costs (PVC) – with 44% Optimism Bias	**57.1**	**198.6**	**134.6**	**668.9**	**663.3**
Net Present Value (NPV)	**617.7**	**759.7**	**1492.9**	**233.1**	**1113.0**
Benefit to Cost Ratio (BCR)	***11.8***	***4.8***	***12.1***	***1.3***	***2.7***

All figures are in 2002 prices expressed in the form £000 000's

3.7.22 This summary of the TEE for the various strategies is illustrated graphically in Figure 3.19 below[30]. This shows that all of the Packages investigated offer a substantially positive Net Present Value (i.e. excess of benefits over costs), except a long-term strategy based on an additional road-only crossing which has a modest NPV. The Demand Managed Package offers greater NPV than the Balanced Strategy which in turn offers better value-for-money than a long-term roads-based strategy. Nevertheless both long-term strategies have good rates of return with BCRs of 2.7 and 1.3 for the Balanced Strategy and Roads-based Strategy respectively.

[30] Costs and Benefits are cumulative. The Medium Term package includes all the costs and benefits associated with the Short Term package. Each of the other packages incorporates all the costs and benefits associated with the Short and Medium Term packages.

Figure 3.19: Transport Economic Efficiency (TEE)



3.7.23 It is likely that the TEE analysis is not fully reflecting all the potential disbenefits of the Demand Managed strategy, for example the long-term constraints this might place on economic development in Fife. Such disbenefits are not fully reflected in the TEE approach, and should be borne carefully in mind when comparing the long-term strategies set out above.

3.7.24 If proceeding to a recommendation on the basis of TEE alone, it is clear that the choice would be between the Balanced Strategy and a Demand Managed Strategy. The Demand Managed Strategy offers greater TEE benefits than the Balanced Strategy, however the Balanced Strategy will have wider benefits, including the impact on Economic Activity and Location, considered next. There are other benefits from the Balanced Strategy, not least its long-term planning horizon, which will be discussed later.

Economic Activity and Location Impacts (EALIs)

3.7.25 Volume 1 of this Technical Annex set out EALI scoping of the four Packages considered in the Part 1 appraisal[31]. This determined that it was likely that there would be local impacts on employment at various geographical scales, and that it was even possible that there would be net positive impacts at the Scottish level in the event of building a new crossing.

Economic Impacts of New Crossings

3.7.26 By their very nature, there are few new river crossings constructed in any given period of time. "Before and After" studies may not have been undertaken, and in any

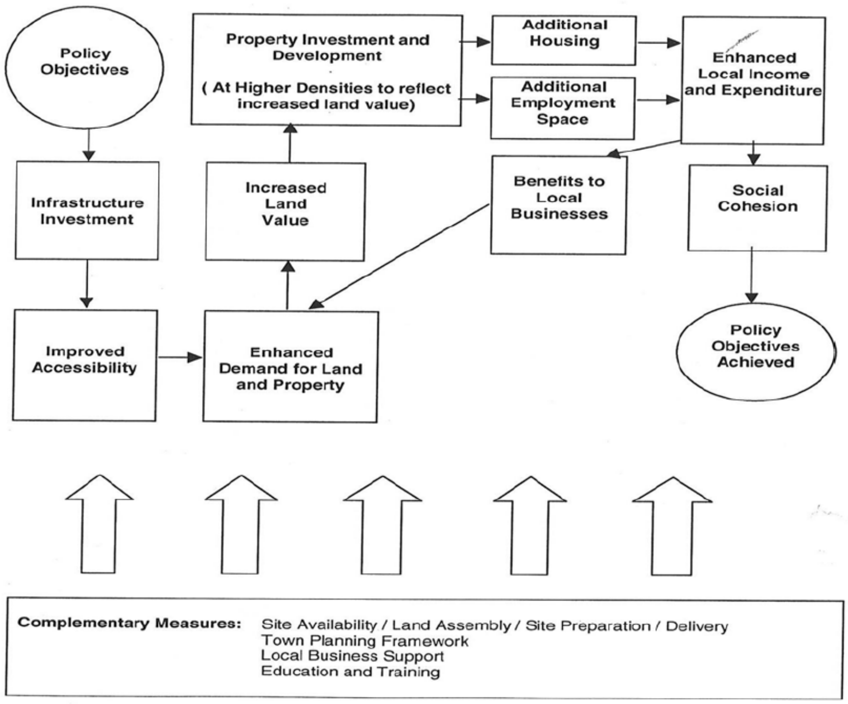
[31] See Table 6.2 in Technical Annex, Volume 1

case each new crossing could have such uniquely localised impacts that the impact of one crossing cannot serve as indicator of possible impacts elsewhere.

3.7.27 Nonetheless it is simply commonsense to expect that providing a new crossing will have some sort of impact on the surrounding economy, and that in the event of a major crossing these impacts may be at the regional or even national scale. Similarly it is seems logical to conclude that provision of a second crossing parallel to an existing crossing will have a less marked impact that the original crossing.

3.7.28 In work carried out for a possible new river crossing of the Thames ("The Thames Gateway Bridge") consultants for the Greater London Authority developed an explanatory model of the relationship between transport infrastructure and economic impacts such as regeneration. The diagram in Figure 3.20 provides a summary of this model – for more information refer to the source reports[32].

Figure 3.20: Economic Impacts of Transport Infrastructure



3.7.29 This flowchart suggests that improved accessibility will (indirectly) lead to property development and additional housing and employment space, enhancing local income and expenditure.

3.7.30 There is an assumption that "*physical access is required to open up sites for development – for sites to be attractive for employment uses they must be accessible for employees, customers and suppliers and for residential uses they need to have access to a range of employment, retail, leisure and social opportunities, including public and community services*"[33].

[32] Thames Gateway Bridge Regeneration Statement (*Greater London Authority*, July 2004), Figure 4.5
[33] ibid., paragraph 114

3.7.31 The report goes on *"the scale of the economic impacts of infrastructure investment depends on a number of factors related to the current economic situation and transport provision in the area around the proposed infrastructure. Previous studies … have identified significant potential for [economic] impacts from major transport infrastructure schemes, subject to a number of conditions*

- *The infrastructure provides genuine additionality in transport access – the area is not currently easily accessible anyway;*
- *The area contains a mix of uses for which transport provides a significant stimulus – certain employment uses and tourism and the potential for higher residential density;*
- *It is undertaken with the grain of the market and preferably in a location which already has some regeneration activity and market interest; and*
- *It is co-ordinated with other public investment and has a favourable public policy, including planning, framework.*[34]*"*

3.7.32 Applying this "test" to a third Forth Crossing:

- It is arguable that Cross Forth movements are increasingly constrained and that the situation will deteriorate in the future;
- The bridgehead area contains a mix of uses and the potential for higher residential density;
- The bridgehead area has some regeneration activity; and
- The new crossing should be integrated with other public policies, as discussed previously in this report.

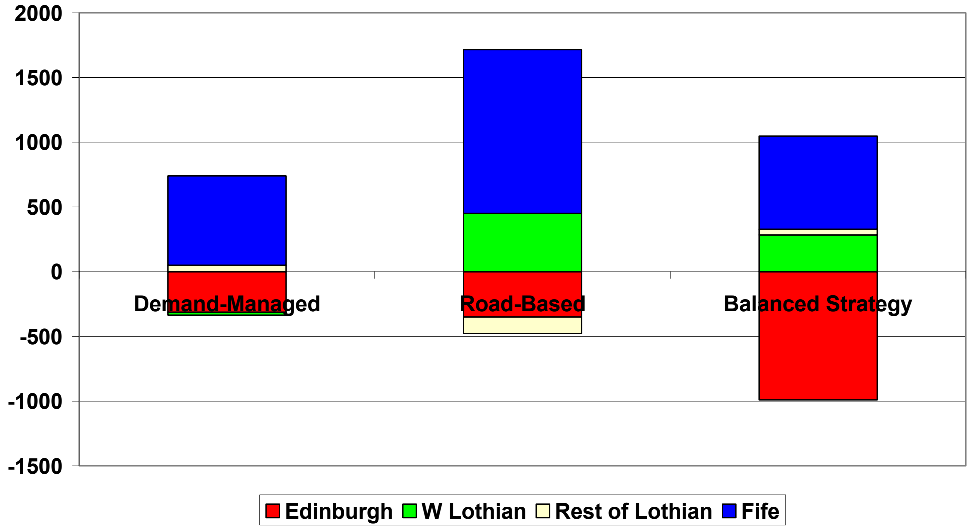
3.7.33 It therefore seems reasonable to conclude that a third Forth crossing may have economic impact on the bridgehead area, particularly south Fife.

Impact on Employment

3.7.34 The anticipated impact on jobs in the study area is illustrated in Figure 3.21 below based on output from the DELTA sub-model in CEC LUTI. From this it will be seen that persevering with the Medium Term Strategy may create a small number of additional jobs in Scotland as a whole, but will reduce employment in the SESTRAN area. The Roads-Based long-term strategy has positive employment benefits for the SESTRAN area, primarily in Fife and West Lothian.

[34] ibid., paragraph 120

Figure 3.21: Impact of Measures on Jobs in the Study Area (2026)



3.7.35 Both the Demand-Managed and Balanced Strategies offer positive impacts on employment at both SESTRAN and Scottish levels, the Balanced Strategy offering benefits for West Lothian as well as Fife. Total impact on jobs is generally similar under both strategies, with the Demand-Managed Strategy particularly favouring the SESTRAN area and the Balanced Strategy favouring the economy outwith SESTRAN, because of the impact of the third crossing.

3.7.36 Looking in more detail at the Demand-Managed Strategy in the DELTA sub-model, the increase in public transport trips resulting from the capping of Fife rail fares at the Inverkeithing level is sufficient to more than compensate for the negative impact of demand management on car trips.

Overall Appraisal against Government Objective

3.7.37 Based on the above analysis of TEE and EALIs, the following appraisal of sub-objectives has been derived.

Table 3.19: Summary of Sub-objective Assessment

<table>
<tr><th rowspan="2">Themes</th><th rowspan="2">TEE</th><th colspan="2">EALI</th></tr>
<tr><th>Within SESTRAN</th><th>Whole Scotland</th></tr>
<tr><td>Making Public Transport More Attractive</td><td>✓✓</td><td rowspan="5">✗✗</td><td rowspan="5">✓</td></tr>
<tr><td>Comprehensive Bus “Right-of-Way”
& Priority Vehicle Lanes</td><td>✓✓</td></tr>
<tr><td>Feeder Bus Services</td><td>✓✓</td></tr>
<tr><td>Park & Choose</td><td>✓✓</td></tr>
<tr><td>Optimisation of Rail Services</td><td>✓✓</td></tr>
<tr><td>Demand Management</td><td>✓✓✓</td><td>✓✓</td><td>✓✓</td></tr>
<tr><td>Roads-Based Strategy</td><td>✗</td><td>✓✓</td><td>✓✓</td></tr>
<tr><td>Balanced Strategy with
Road Space Reallocation</td><td>✓✓✓</td><td>✓</td><td>✓✓</td></tr>
</table>

3.7.38 Taking into account these sub-objective appraisals, the following overall appraisal has been reached.

Making Public Transport More Attractive	Minor Benefit for Economy
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Minor Benefit for Economy
Feeder Bus Services	Minor Benefit for Economy
Park & Choose	Minor Benefit for Economy
Optimisation of Rail Services	Minor Benefit for Economy
Demand Management	Moderate Benefit for Economy
Forth Multi-modal Crossing & Road Space Reallocation	Moderate Benefit for Economy

3.9 Integration

Government Objective: To improve integration by making journey planning and ticketing easier and working to ensure smooth connection between different forms of transport.

Planning Objectives: Maximise public transport provision and achieve public transport integration and intermodality.

Ensure land-use planning is integrated with transportation plans.

3.9.1 The Planning Objectives have three facets:

- Maximise public transport provision;
- Achieve public transport integration and intermodality; and.
- Integrating transport and land-use planning.

3.9.2 Maximising public transport provision is a fundamental measuring rod for accessibility, and will be considered later. Integration/intermodality is analogous to the Government Objective of Integration, and will be considered as part of the appraisal set out below. Transport land-use integration is a specific Government sub-objective and will also be reviewed below. Consequently appraisal of the Planning Objectives can be completely subsumed within that of the Government Objectives.

3.9.3 In appraising the Government Objective STAG requires the consideration of:

- Transport integration;
- Transport land-use integration; and
- Policy integration.

Transport Integration

3.9.4 STAG makes clear that most assessment of this sub-objective will be captured by the TEE. Transport Integration needs only to be appraised if **both** of the following justifications apply:

- There is an identifiable impact on transport interchange; **and**
- Aspects of this impact are not captured elsewhere in the appraisal (e.g. TEE).[35]

3.9.5 Given the nature of most of the schemes being considered in the Part 2 appraisal, it is clear that the objective of promoting modal shift away from single occupancy car travel will embody a shift to a wide range of public transport modes, including at one extreme the High Occupancy Vehicle (HOV). From this it can be seen that interchange will be a fundamental component of most schemes. It is acknowledged that the simple ability to make "easier" interchange between modes will generally be captured by the TEE appraisal, in terms of its impact on journey times for example. However some of the schemes envisage a much more fundamental approach to promoting public transport, and hence it is felt right to consider the issue of transport integration in greater depth.

3.9.6 Transport Interchange as it affects people is subdivided by STAG into:

- Services and ticketing; and
- Infrastructure and information.

Services & Ticketing

3.9.7 The only concepts that STAG accepts may have an impact under this heading relate to "seamlessness" of movement or of ticketing. This must confer benefits additional to those of simple savings of time or money, such as greater convenience.

Infrastructure & Information

3.9.8 This relates to the physical attributes of an interchange site, and must be additional to those reflected in other parts of the appraisal. STAG accepts that Park & Ride benefits will need to be appraised in this sub-objective[36].

Appraisal of Transport Integration

3.9.9 The appraisal must be as objective as possible, with quantification of benefits if available. However it seems likely that quantifiable benefits will have been reflected in the TEE appraisal. The methodology therefore adopted here is that set out in GOMMMS[37], with the following table based on an extension of GOMMMS Worksheet 8.1 to incorporate services and ticketing.

3.9.10 The standards of infrastructure and information are based on those set out in GOMMMS Table 8.1, but extended to include a poor/moderate/high scoring for services and ticketing based on the following standards:

[35] STAG, section 9.2.1
[36] STAG, section 9.2.8
[37] GOMMMS Volume 2, section 8.2

Table 3.20: Definition of Standards for Seamless Travel

Indicator	Poor standard	Moderate standard	High standard
Seamless Public Transport Network	Interchanges served by less than 50% of passing services, no attempts made to offer timetabled connections, no shared branding	Designated interchanges served by at least 50% of passing services, timetabled connections but not guaranteed, no shared branding	Designated interchanges served by all passing services, guaranteed connections, shared branding, Quality Partnership in place
Seamless Ticketing	Principal modes co-operating in a ticketing arrangement, may include a brand for the ticketing arrangement	Principal modes covered by a single ticketing scheme offering selected point-to-point travel within the study area, branding of ticketing	All modes covered by a single ticketing scheme allowing comprehensive point-to-point travel within the study area, branding shared with whole PT network

Table 3.21: Transport Integration Appraisal

Transport Interchange Indicator	Do Minimum Situation	Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Optimisation of Rail Services	Demand Management	Forth Multi-modal Crossing & Road Space Reallocation
Services & Ticketing								
Seamless Public Transport Network	Poor	High	Moderate	Moderate	Moderate	Moderate	Poor	Poor
Seamless Ticketing	Poor	High	Moderate	Moderate	High	Poor	Poor	Poor
Infrastructure & Information								
Waiting Environment	Moderate	High	Moderate	Moderate	High	Moderate	Moderate	Moderate
Level of Facilities	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Level of Information	Poor	High	High	High	High	Poor	Poor	Poor
Visible Staff Presence	Poor	Moderate	Poor	Poor	Poor	Poor	Poor	Poor
Physical Linkage for Next Journey	Poor	Moderate	Poor	Poor	Moderate	Poor	Poor	Poor
Connection time and risk of Missing a Connection	Covered by assessment within Services & Ticketing							
Assessment								
Overall Assessment of Impact		✓✓✓	✓✓	✓✓	✓✓✓	O	O	O
Approx. number of users affected[38]	25% by 2026	2% by 2006				3% by 2011	24% by 2026	45% by 2026[39]

✓✓✓ ✓✓ ✓	Major Benefit Moderate Benefit Minor Benefit	O	No Benefit or Impact	✗ ✗✗ ✗✗✗	Small Minor Cost or Negative Impact Moderate Cost or Negative Impact Major Cost or Negative Impact

[38] Expressed as % increase in Cross Forth Person Trips
[39] Equivalent figure for a road-only crossing is 54%

Transport Land-Use Integration

3.9.11 Although a scoping study was carried out regarding the integration between land-use planning and the transport schemes within the Part 1 appraisal, considerable further development of detailed plans has taken place, and it is appropriate to review each of the schemes/scheme groups to confirm that they continue to fit appropriate plans and guidance.

3.9.12 Reference was made to the following documents:

- Fife Structure Plan;
- Edinburgh & The Lothians Structure Plan;
- Dunfermline & The Coast Local Plan;
- Rural West Edinburgh Local Plan;
- West Edinburgh Local Plan;
- SESTRAN Regional Transport Strategy;
- Fife Local Transport Strategy;
- City of Edinburgh Local Transport Strategy;
- FETA Local Transport Strategy;
- NPPG17, SPP17 & PAN57;
- SPP2 & SPP3; and
- West Edinburgh Planning Framework.

3.9.13 A review of the recently published White Paper (Scotland's Transport Future, *Scottish Executive*, June 2004) was also undertaken.

3.9.14 Assessment against these documents is set out in Appendix C, and in summary is as follows:

Table 3.22: Transport Land-Use Integration Appraisal

Themes	Appraisal
Making Public Transport More Attractive	✓✓✓
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	✓✓
Feeder Bus Services	✓✓
Park & Choose	✓✓
Demand Management	O
Optimisation of Rail Services	✓
Forth Multi-modal Crossing & Road Space Reallocation	O

Policy Integration

3.9.15 Following the brief review during the Part 1 appraisal process, a more detailed assessment of the schemes against these non-transport policies took place.

- Disability;
- Health;
- Rural Affairs;
- Social Exclusion; and
- Transport targets.

3.9.16 The Disability and Social Exclusion issues will be dealt with in section 3.9. Rural affairs, whilst arguably affecting parts of the study area are not fundamental to assessment of the schemes in this corridor study, which is predominantly focused on interurban travel. This leaves Health and Transport Targets to be considered.

Health

3.9.17 The recent transport White Paper acknowledges:

> *"How we choose to travel has an impact on our health … Good travel habits can contribute to a healthier lifestyle … The health improvement challenge sets out a framework for action and emphasises the importance of physical activity."*[40]

3.9.18 The Scottish Executive has set out its aspirations for improving Scotland's health[41] and it is clear that measures which promote physical activity over inactivity will contribute to furthering these aims. In this regard modal shift to public transport will be favoured, particularly where access to/from the public transport network is either by walking or cycling.

Transport Targets

3.9.19 The following targets have been identified[42].

Building a Better Scotland

- Increase rail passenger journeys on the ScotRail network by a further 5% by 2006 on 2002-03 levels.
- Increase local bus passenger journeys by 5% by 2006 on 2000-01 levels.
- Increase passenger numbers passing through HIAL airports by 5% by 2006 on 2001-02 levels.
- Increase the quality and quantity of lifeline ferry services and ensure 98% of planned sailings actually sail and 98% arrive on time, by 2006.
- Reduce the time taken to undertake trunk road journeys on congested/heavily trafficked sections of the road network by 2006.
- Achieve best value for money by reducing the proportion of the trunk road network that requires close monitoring to 6% for motorways and 8% for dual carriageways by 2006.
- Reduce the number of serious and fatal road accident casualties by 40% by 2010 and by 50% for children over the same period, compared with 1994-98 annual averages.
- Traveline Scotland Ltd to answer at least 1 million enquiries per year by 2006 and for performance and output standards to be met.
- Transport Direct portal to achieve at least 1.5 million visits per annum by 2006 and for performance and output standards to be met.

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40 Scotland's Transport Future (*Scottish Executive*, June 2004) paragraphs 4.59, 4.60 & 4.61

41 Improving Health in Scotland (*Scottish Executive*, March 2003)

42 Scotland's Transport: Delivering Improvements: Transport Indicators for Scotland (*Scottish Executive*, 2002) Annex A

Scottish Climate Change Programme

- Make an equitable contribution to the UK Kyoto target of a 12.5% reduction in 1990 levels of greenhouse gas emissions.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

- To work in partnership with local authorities with the aim of meeting the annual nitrogen dioxide objective by 2005 and the objective for PM10 by 2010 in all areas.

3.9.20 It is clear that improving bus and rail services in support of modal shift towards public transport will help to increase bus and rail patronage, contributing to the first two targets set out above. Reducing demand to travel by road or improving the efficiency with which road-space is utilised will contribute to the target of reducing trunk road congestion. Road accident casualties will be improved by reducing road traffic through modal shift towards public transport. Finally modal shift to more sustainable transport modes will support the Scottish Climate Change Programme and the Air Quality Strategy.

Overall Appraisal against Government Objective

3.9.21 Taking into account the sub-objective appraisals provided above, the following overall appraisal has been reached.

Making Public Transport More Attractive	Major Benefit for Integration
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Moderate Benefit for Integration
Feeder Bus Services	Moderate Benefit for Integration
Park & Choose	Moderate Benefit for Integration
Optimisation of Rail Services	Minor benefit for Integration
Demand Management	No benefit/disbenefit for Integration
Forth Multi-modal Crossing & Road Space Reallocation	No benefit/disbenefit for Integration

3.10 Accessibility and Social Inclusion

Government Objective:	To promote social inclusion by connecting remote and disadvantaged communities and increasing the accessibility of the transport network.
Planning Objectives:	Enhance community life and social inclusion.
	To stabilise (in the short term) and improve (in the long term) accessiblity to cross-Forth movement for people and goods.

3.10.1 STAG requires the consideration of two aspects as part of the Accessibility and Social Integration Government Objective, viz.:

- Community accessibility; and
- Comparative accessibility.

3.10.2 STAG advises that "*the scope and detail required in the accessibility analysis needs to be commensurate with the planning objectives*"[43].

3.10.3 The first Planning Objective, which relates to community life and social inclusion, is analogous with the Government Objective and these two Objectives can therefore be assessed together. The second Planning Objective is similar to the Government Objective, but introduces a temporal dimension (short and long terms). The assessment therefore proceeds as follows:

- Community Accessibility (split into Public Transport provision and Local Accessibility, per STAG Chapter 10);
- Comparative Accessibility (split into Impacts by People Group and Impacts by Location, per STAG Chapter 10);
- Short term stabilisation of Accessibility;
- Long term improvements in Accessibility.

3.10.4 Given the scale of the Corridor and the STAG advice regarding scope, a generally qualitative approach has been taken, although the opportunity to introduce quantification has been taken where possible, and this is illustrated graphically.

Community Accessibility

Public Transport Provision

3.10.5 This element of appraisal allows a focus on minority groups in society, and allows "*Social Inclusion policy [to] be informed by accessibility measures to ensure that all relevant people groups and trip purposes are considered*"[44].

3.10.6 Most of the themes place an emphasis upon public transport, and clearly this emphasis will convert into positive benefits for minority groups who currently rely on public transport. In particular Theme B, with its expansion of Cross Forth bus services into many areas not currently served by direct bus services, and Theme C with its expansion of local bus feeders to the rail network will have significant benefits for the range of the local transport network.

3.10.7 Although not expanding the network coverage, the planned improvements to rail frequencies (in Theme E) will also have positive benefits for public transport provision, and the overall support for more attractive public transport envisaged in Theme A will also be beneficial.

[43] STAG, paragraph 10.1.4
[44] STAG, paragraph 10.5.1

3.10.8 Park & Choose (Theme D) does not act directly on public transport provision, but will certainly serve to improve accessibility to the enhanced public transport network proposed through easier local travel to/from Park & Choose interchanges and through the ability to "mix-and-match" public transport modes.

3.10.9 The other Themes (F – Demand Management and G – Multi-Modal Crossing/Road Space Reallocation) incorporate all the short and medium-term Themes discussed above, but do not otherwise have any direct impacts on the public transport network other than to enhance road traffic flows across the Forth.

3.10.10 For the Balanced Strategy, cherry-picking the best aspects of all seven Themes, the impact on accessibility to the Cross Forth public transport network can be illustrated by Figure 3.22. As an example this shows improvements to Public Transport journey times from Dunfermline to the study area. As can be seen there are particular improvements to travel times from the area west of Dunfermline, and from West Lothian and West Edinburgh (as a result of the significantly enhanced bus services and the rail improvements offered by EARL), but most of the Edinburgh and Lothians' area achieves improved journey times, of up to 20-minutes.

Local Accessibility

3.10.11 The emphasis of this element of STAG is on the impact of proposals on local accessibility through cycling and walking.

3.10.12 It is not anticipated that many of the Themes considered will have significant impacts on local accessibility, with the exception of the Multi-Modal Crossing. In this case (Theme G) there will be localised impacts resulting from the building of the new bridge and its associated infrastructure, particularly new access roads although these will generally be introduced into areas already adversely affected by highway provision, and it is assumed that attempts will be made to include suitable mitigation at the detailed design stages.

3.10.13 Theme A (Making Public Transport More Attractive) also includes measures aimed at improving local access to transport services, including provision for cyclists and the disabled, although the overall impact is likely to be minor.

Comparative Accessibility

Impacts by People Group

3.10.14 STAG recommends that particular attention is paid to determining whether proposals have greater benefits for non-car available households than for car-available households. Figure 3.x has already illustrated the improved public transport travel times achieved under the Balanced Strategy. For comparison Figure 3.23 illustrates the changes in highway (i.e. car) travel times under the same strategy. Comparing the two graphically demonstrates that the Balanced Strategy has greater impacts on public transport travel times than on highway travel times – in other words, the Balanced Strategy is more effective at improving public transport journey times, and hence has a proportionately greater benefit for non-car available households than for car-available households.

3.10.15 The reasons for this positive impact have already been discussed under the Community Accessibility sub-heading, where the particularly positive influence of Themes B (Bus Right-of-Way) and C (Feeder Buses) was noted.

Impacts by Location

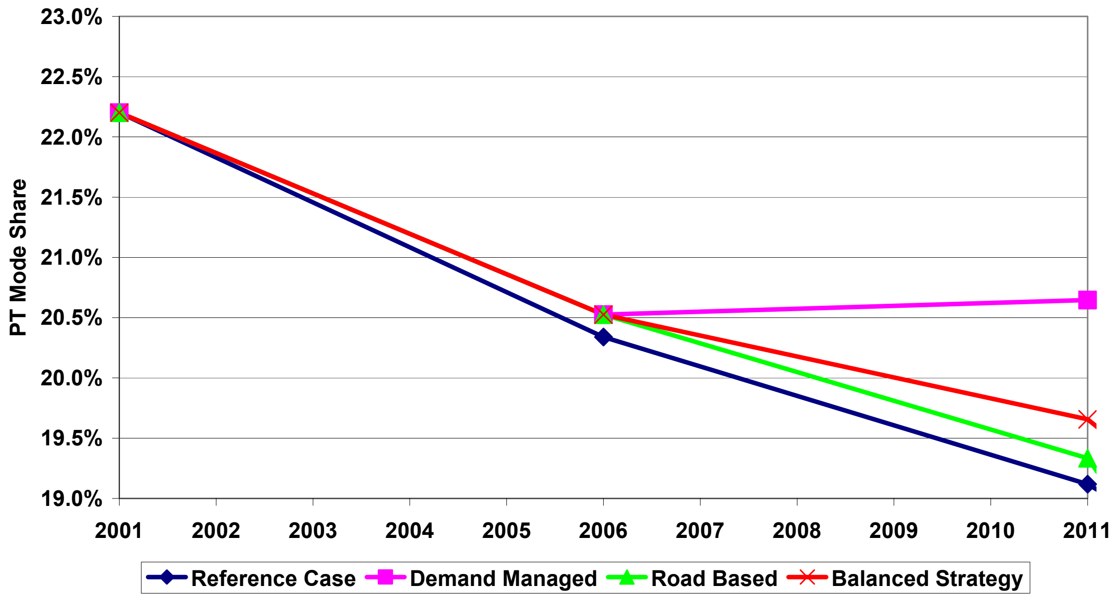
3.10.16 Again reference to Figures 3.22 and 3.23 shows the concentration of positive impacts in West Edinburgh and West Lothian. These were precisely the areas identified at the outset of the study as being poorly served by existing transport links (particularly public transport), with a consequent negative impact on Cross Forth road traffic to/from those areas.

3.10.17 The positive impact of the improved rail services (Theme E) on accessibility within south Fife and to/from Markinch is also notable in Figure 3.22.

Short term Stabilisation of Accessibility

3.10.18 This can be considered by reference to Cross Forth modal share, the target being to stabilise public transport mode share at the 2001 level (as a proxy for the current situation).

Figure 3.24: Short Term Public Transport Cross Forth Mode Share (Southbound 0700-1000)



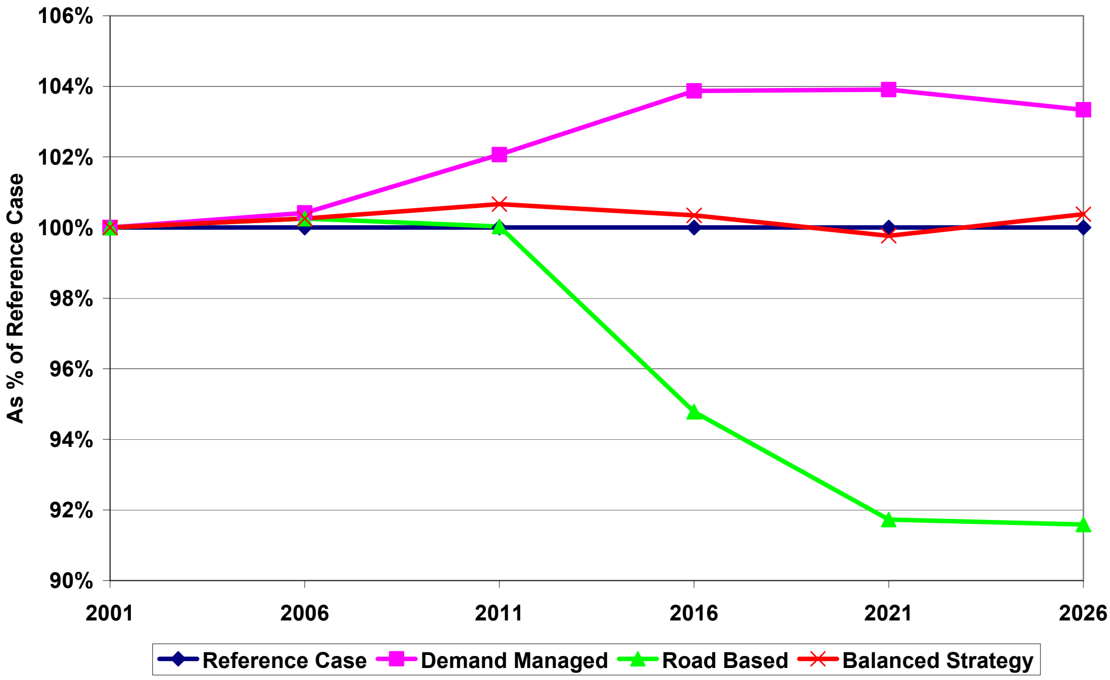
3.10.19 The Reference Case situation (without any measures impacting on Cross Forth travel) shows a decline in mode share from around 22% at present to about 19% by 2011, when the short and medium-term measures are assumed to have been implemented. The effect of the proposed measures in the short to medium term is to offer a slower decline in public transport mode share, and in the case of the Demand Management Strategy this appears to stabilise the medium term situation at the 2006 level, albeit at a lower level than the 2001 level. This is because the demand management measures encourage a shift from private car to public transport.

3.10.20 The other strategies do not arrest the decline in public transport mode share, but they do achieve better public transport mode share than under the Reference Case.

Long Term Improvements in Accessibility

3.10.21 In a similar manner to assessing the short term impacts on accessibility, Figure 3.25 below shows the impact of long-term strategies on public transport mode shares through to 2026.

Figure 3.25: Long-Term Public Transport Cross Forth Mode Share (Southbound 0700-1000)



Overall Appraisal against Government Objective

3.10.22 The individual assessment of sub-objectives is summarised in Table 3.xx below.

Table 3.23: Summary of Sub-objective Assessment

Themes	**Community Accessibility**	**Comparative Accessibility**
Making Public Transport More Attractive	✓✓	✓
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	✓✓	✓✓
Feeder Bus Services	✓✓	✓✓
Park & Choose	✓	✓
Demand Management	✓	✓✓
Optimisation of Rail Services	✓	✓
Forth Multi-modal Crossing & Road Space Reallocation	O	✓

3.10.23 Taking into account the sub-objective appraisals provided above, the following overall appraisal has been reached.

Making Public Transport More Attractive	Minor Benefit for Accessibility
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Moderate Benefit for Accessibility
Feeder Bus Services	Moderate Benefit for Accessibility
Park & Choose	Minor Benefit for Accessibility
Optimisation of Rail Services	Minor benefit for Accessibility
Demand Management	Minor benefit for Accessibility
Forth Multi-modal Crossing & Road Space Reallocation	Neutral benefit/disbenefit for Accessibility

3.11 Cost to Government

3.11.1 In accordance with STAG philosophy a distinction is made between Public and Private Sector costs. The non-public sector costs and benefits have already been reported in Table 3.18 and Appendix D.

3.11.2 The Present Value Cost to Government for each Strategy is provided in Table 3.23 on the basis of the TUBA results provided in Appendix D.

Table 3.24: Present Value Cost to Government for each Strategy

	Short Term Strategy	Medium Term Strategy	Demand Managed Strategy	Roads-based Strategy	Balanced Strategy
Local Government Funding					
Revenue	-2.1	5.1	-121.4	-16.9	-146.5
Operating costs	0	0	0	0	0
Investment costs	0	0	0	0	0
Developer contributions	0	0	0	0	0
Grant/subsidy payments	0	0	0	0	0
Net Local Government Impact	-2.1	5.1	-121.4	-16.9	-146.5
Central Government Funding					
Revenue	0	0	0	0	0
Operating costs	0	0	0	45.9	45.9
Investment costs	36.3	74.6	74.6	511.0	580.7
Developer contributions	0	0	0	0	0
Grant/subsidy payments	0	63.8	0	96.9	0
Indirect Tax Revenues	22.9	55.1	181.3	32.1	183.2
Net Central Government Impact	59.1	193.5	255.9	685.8	809.8
Present Value of Cost to Government (PVC) – with 44% Optimism Bias	**57.1**	**198.6**	**134.6**	**668.9**	**663.3**

All figures are in 2002 prices expressed in the form £000 000's

3.11.3 Comparing the two long-term strategies the Balanced Strategy generates a larger flow of revenue to FETA, as a result of the demand management regime through tolling on the bridges, and requires no subsidies to private sector transport operators. These benefits to the public sector help to offset the additional investment costs required for a Balanced Strategy.

Chapter 4

RISK & UNCERTAINTY

4. RISK & UNCERTAINTY

4.1 Introduction

4.1.1 STAG recognises that *"in appraisals there is always likely to be some difference between what is expected, and what eventually happens, because of biases unwittingly inherent in the appraisal, and risks and uncertainties that materialise."*[45]

4.1.2 In order to take account of these risks and uncertainties transport appraisals incorporate Optimism Bias and risk-adjusted "expected values" along with an allowance for contingencies. Generally in the earliest stages of appraisal very broad-brush factors for Optimism Bias will be applied. As schemes progress through the appraisal process their detail becomes more defined with appropriate contingencies identified and uncertainties clarified, and accordingly the application of broad-brush uplift factors becomes unnecessary.

4.1.3 The schemes identified as part of this study vary widely in scale and complexity, from non-infrastructure measures (such as improved travel plans and public transport marketing) through modest infrastructure improvements (e.g. bus priority lanes) up to major new structures (e.g. the new Forth MMC). Scheme definition for STAG Part 1 was necessarily low, and accordingly the default levels for Optimism Bias were applied, viz.:

- Capital and Operating Costs – 44%

4.2 Optimism Bias for STAG Part 2

4.2.1 STAG sets out some simple factors to be taken into account when considering risk and uncertainty for projects[46]. Given the variability of likely risk applying to the measures set out in this study, a summary assessment against these factors is presented in Table 4.1 below for each of the seven Themes described in Chapter 3.

[45] STAG, section 12.1.1
[46] STAG, Table 12.1

Table 4.1: Review of Optimism Bias Factors

	Contributing Factors			
Schemes	**Procurement**	**Project Specific**	**Client Specific**	**Environment, External Influences**
Making Public Transport More Attractive	Straightforward procurement for most measures, but may be wide variety of "deliverers" (e.g. local authority, public transport operators, employers).	Limited infrastructure required, and where necessary it is "tried and tested" (e.g. improved bus stops). Some measures innovative, and delivery methods will need to be developed (e.g. travel planning, improved public transport travel environments).	Large number of potential stakeholders, and potentially the need to develop new working relationships (e.g. local authority in partnership with bus operator). Will require identification of local authority project management team to ensure deliverability, and team must be safeguarded into medium term. Requires ring-fenced annual funding not capital.	Innovative approaches will require "hearts & minds" before the public and employers are won over. Political support for a sustained programme is essential – political consensus was identified as vital in the best practice review. Appropriate legislation and regulations exist, but may require new approach to partnership working with stakeholders.
Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Delivery of new-build HOV lanes and redesignation of existing highway capacity straightforward.	Infrastructure requirements are proven and straightforward. Some environmental issues may arise and need to be addressed.	Stakeholders readily identifiable, and for each component will be limited in number. Delivery will be via local authorities, who are experienced with these types of projects,	Generally based around bus lanes/greenway concepts, which are already tried and tested, and unlikely to face particular resistance (especially when reductions to existing highway capacity are generally being avoided). HOV Lane concept is more innovative, but again does not result in a loss of existing capacity.

	Contributing Factors			
Schemes	**Procurement**	**Project Specific**	**Client Specific**	**Environment, External Influences**
Feeder Bus Services	Straightforward – definition of requirements by local authority, and procured through established tendering system.	Simple and straightforward.	Based on simple subsidy arrangements. Will require identification (and commitment) of medium term funding to ensure projects persevere beyond initial start-up period.	Unlikely to face any significant external influences, although availability of resources (particularly drivers) to provide additional bus services needs to be considered.
Park & Choose	Delivery of necessary infrastructure (transport interchanges) simple and straightforward.	Infrastructure simple and straightforward. Development of supporting measures (e.g. car-sharing) depends on more innovative approaches.	Depends heavily on measures set out under "Making Public Transport More Attractive" theme (q.v.).	Depends heavily on measures set out under "Making Public Transport More Attractive" theme (q.v.).
Optimisation of Rail Services	ScotRail contract provides for negotiation of changes to specification. Provision of rolling stock and infrastructure subject to well-established and proven techniques.	Likely to be simple and straightforward.	Complex array of stakeholders may result in prolonged negotiations and difficulty in identifying funders. No specific project management difficulties.	Unlikely to face any significant external influences, although availability of resources to provide additional train services needs to be considered.
Demand Management	Differential tolling will be supported when FETA moves to Road User Charging regime for tolls. Provision of supporting infrastructure generally simple and straightforward.	Not particularly difficult or innovative (unless it incorporates new technology for automated differential "free-flow" tolling).	Delivered in each case by a single local authority.	Stick not carrot, therefore not likely to be universally welcomed.

	Contributing Factors			
Schemes	**Procurement**	**Project Specific**	**Client Specific**	**Environment, External Influences**
Forth Multi-modal Crossing & Road Space Reallocation	One-off project, but likely to adopt proven methods of procurement.	All bridge projects are unique and site specific. This would be a particularly complex undertaking, despite employing tried and tested construction techniques. Has advantage of a long history of design development since a third crossing was originally raised as a future option. Likely to encounter risks which are unforeseeable even at the latest stages of design development.	Would be delivered by a single authority (FETA). Could not be commenced without assurances of long term finance being in place.	Likely to be controversial. High public profile means a high risk of ongoing design changes even during detailed design. Given long-term timescale for delivery changes to regulations and legislation are likely, and may impact adversely on delivery of the project.

4.3 Applying Optimism Bias for STAG Part 2

4.3.1 Taking account of the factors set out in Table 4.1, it has been considered prudent to adopt the same levels of optimism bias for the purposes of STAG Part 2 appraisal, as were used in the Part 1 appraisal, viz.:

- Capital and Operating Costs – 44%

4.3.2 Although more detailed designs have been prepared for each of the schemes considered, in no case are these designs sufficiently far advanced as to include the calculation of contingencies and hence expected values. Accordingly the Optimism Biases described above have not been netted off against any other risk related values and hence there is no double-counting of risk.

4.4 Sensitivity Analysis

4.4.1 *"The future is inherently uncertain. Therefore it is also essential to consider how future uncertainties could affect the choice between options."*[47]

4.4.2 Sensitivity analysis is used to explore these future uncertainties, of which there are generally two types:

- Changes to underlying cost assumptions; and
- The impact of omitting certain assumed projects from the "Do Minimum" scenario.

4.4.3 For the purposes of this study the following sensitivity tests were carried out:

- Introduction of Congestion Charging in Edinburgh; and
- Failure to provide Edinburgh Airport Rail Link.

4.4.4 These sensitivity tests were applied at the SESTRAN level, that is globally to all five corridors in the study area, rather than on an individual corridor-by-corridor basis. The results are therefore reported in the overall SITCoS Study Report.

[47] STAG, section 12.7.1

Chapter 5

MONITORING & EVALUATION

5. MONITORING & EVALUATION

5.1 Explanation

5.1.1 STAG requires consideration to be given to the monitoring and evaluation of the option or options recommended as an outcome of the study process[48]. This is because a process of monitoring and evaluation will be required for projects receiving financial support, in whole or in part, from the Scottish Executive.

5.1.2 The two processes can be distinguished as follows:

Monitoring An on-going process to measure progress towards a set of agreed targets.

Evaluation A specific one-off activity to investigate project performance in depth.

5.2 Monitoring

5.2.1 *"Monitoring is the process of gathering and interpreting information on the performance of a project. This process should be an on-going one and may take place in conjunction with other information gathering exercises..."*[49]

5.2.2 The focus of monitoring will be on outcomes and to assist in this it is necessary to establish key performance indicators (KPIs) to assist with measuring the impact of the options implemented. These KPIs should build on the study's Planning Objectives, and be demonstrably SMART. Appropriate monitoring yardsticks are set out below in Table 5.1.

5.2.3 The scale of monitoring required is considerable as it will need to reflect the wide diversity of the study area (e.g. central versus west Edinburgh, Dunfermline versus Dalgety Bay) as well as the background for decisions surrounding Cross Forth travel (e.g. commuting versus leisure activities, trip routings, transport options available).

5.2.4 The wide variety of measures recommended for consideration also poses difficulties for the collection of appropriate data. For example whilst collecting numbers of passengers on conventional bus and rail services is straightforward, it will also be necessary to maintain a reliable database of vehicle occupancy levels and to measure the outcome of schemes to encourage car-sharing.

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[48] STAG, section 14.2.46
[49] STAG, section 15.3.1

Table 5.1: Monitoring Yardsticks for STAG Part 2 Planning Objectives

Planning Objective for STAG Part 1	Monitoring Yardstick 2006	Monitoring Yardstick 2011	Monitoring Yardstick 2016
1. Reduce the number of people commuting in single occupancy vehicles within South East Scotland – especially for journeys to and from Edinburgh; but also for journeys to destinations outwith the SESTRAN area;	Reduce the "driver only" car trips across the Forth Road Bridge to 85% of peak period flows	Reduce the "driver only" car trips across the Forth Road Bridge to 75% of peak period flows	Reduce the "driver only" car trips across the Forth Road Bridge to 70% of peak period flows
2. Minimise the overall need for travel, especially by car;	Road traffic increases by less than 10% in study area	Road traffic increases by less than 15% in study area	Road traffic increases by less than 20% in study area
3. Maximise public transport provision and achieve public transport integration and intermodality;	Increase passenger transport use for Cross Forth movements by 25%	Increase passenger transport use for Cross Forth movements by 50%	Increase passenger transport use for Cross Forth movements by 65%
4. Improve safety for all road and transport users;	Reduce Killed & Seriously Injured (KSI) accidents by 20%	Reduce Killed & Seriously Injured (KSI) accidents by 40%	Reduce Killed & Seriously Injured (KSI) accidents by 50%
5. Enhance community life and social inclusion;	Increase population within 6 minutes walking time of a PT service running at least every 30 minutes to 45%[50]	Increase population within 6 minutes walking time of a PT service running at least every 30 minutes to 50%	Increase population within 6 minutes walking time of a PT service running at least every 30 minutes to 60%
6. Maintain existing infrastructure properly in order that it can be fully utilised;	No quantifiable measure identified		
7. Enhance movements of freight, especially by rail and other non-road modes; and	Increase rail freight tonnes by 50%	Increase rail freight tonnes by 75%	Increase rail freight tonnes by 85%
8. Sustain the economic health of the SESTRAN region.	No quantifiable measure identified		
9. To stabilise (in the short term) and improve (in the long term) accessiblity to cross-Forth movement for people and goods.	Morning peak travel time by road to be same as 2001. "PIXC" on rail to be same as 2004.	Morning peak travel time by road to be reduced by 5% compared to 2001. No "PIXC" on rail.	Morning peak travel time by road to be reduced by 10% compared to 2001. No "PIXC" on rail.
10. Ensure land-use planning is integrated with transportation plans.	No short term measure appropriate	50% of major new developments located in line with principles of SPP2, SPP3 and SPP17	All major new developments located in line with principles of SPP2, SPP3 and SPP17

Sources: Green text from Fife LTS; Maroon text from CEC LTS; other text new for this study.

[50] Scottish Household Survey 2001/2002 shows 40% for Fife compared to national average of 44% for "accessible" small towns

5.2.5 One particular advantage for this study area is that the primary focus is upon Cross Forth movements, and hence for the foreseeable future consideration need only be given to the two existing bridges. Monitoring passenger trends on rail services is long-established, ensuring both a reliable methodology and an accurate time-series database. Data for Cross Forth travel on the road bridge is more mixed, but nevertheless every effort should now be made to commence the collection of suitable data to provide a background to future trends.

5.2.6 Some of this data collection is already undertaken, albeit in an *ad hoc* manner. For example the use of Road Side Interviews (RSIs) is a well-established technique and has furnished much of the data used to calibrate modelling for this study. However the modelling process for this study has also illuminated some of the weaknesses of current data, for example the methodology for dealing with Park & Choose or car-sharing more generally.

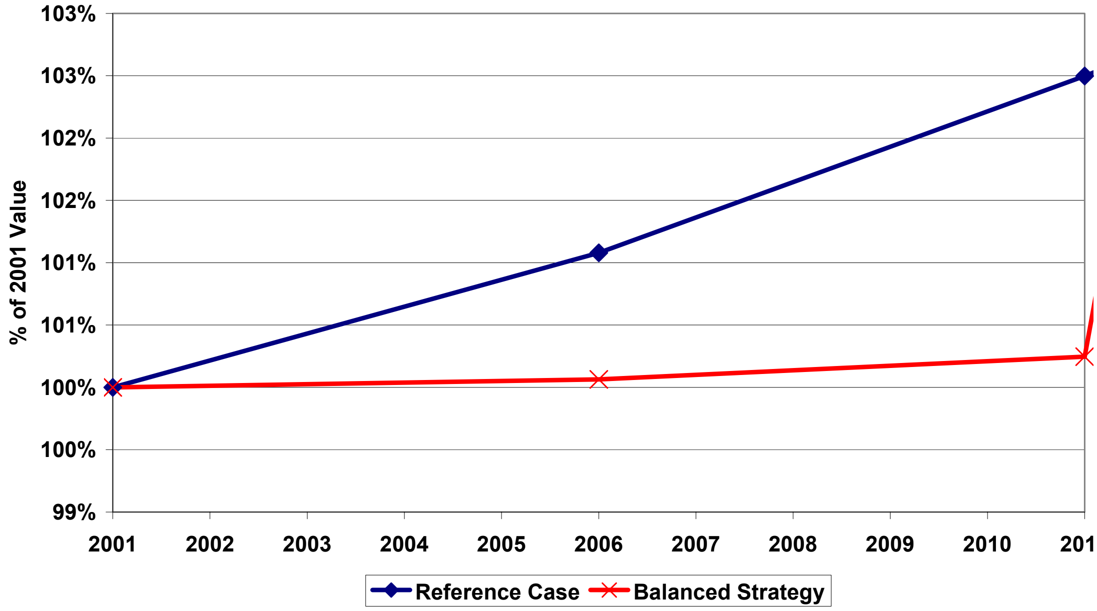
Trigger Yardsticks

5.2.7 The recommendations in Chapter 6 identify a package of transport measures that contribute towards achieving the Planning Objectives. Fundamental to achieving “success” on this corridor is the objective to stabilise (short term) and improve (long term) access to Cross Forth movement for people and goods. This Planning Objective could be simply paraphrased “stabilise and then reduce congestion”, whether measured as queuing to cross the road bridge or standing on trains crossing the rail bridge.

5.2.8 A range of short term measures are identified later, the aim of these measures being to either eliminate the need for more expensive solutions (which may have significant disbenefits), or to at least delay the need for their introduction. The difficulty here is that the lead-times for long term projects (such as the Forth Multi-modal Crossing) are considerable, and therefore there is a need to ensure that progress towards their implementation needs to be “triggered” suitably far in advance.

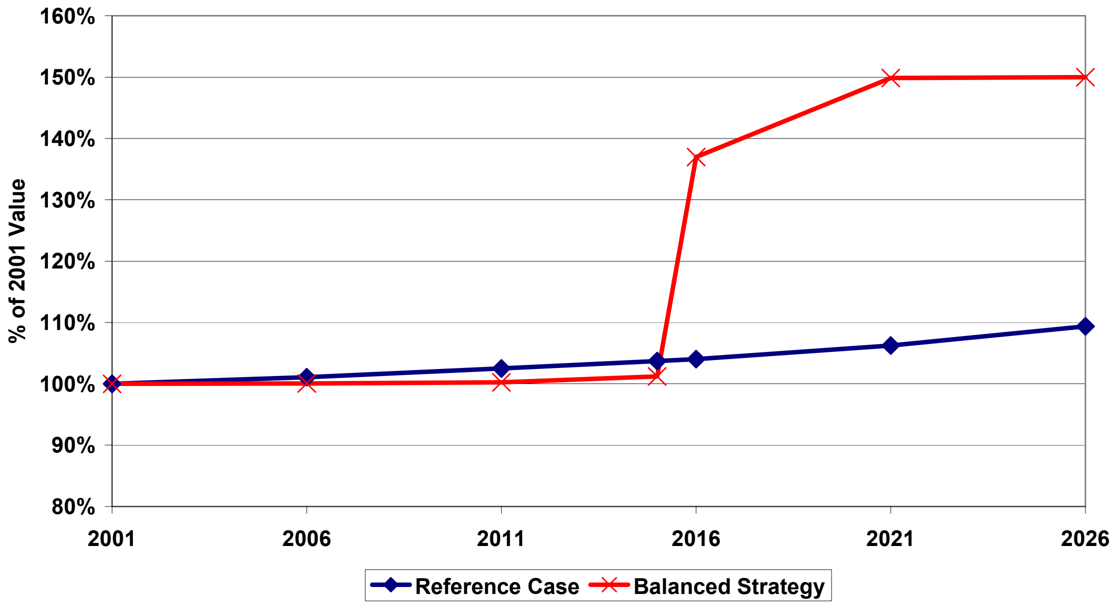
5.2.9 The impact of some of these short-term measures can be illustrated graphically below in Figure 5.1, which shows that although each individual measure may not be able to stabilise or reduce congestion by itself, the cumulative impact of all short and medium term schemes in a balanced strategy will contribute towards achieving this aim.

Figure 5.1: Cross Forth Car Flows (Southbound 0700-1000) 2001 - 2011



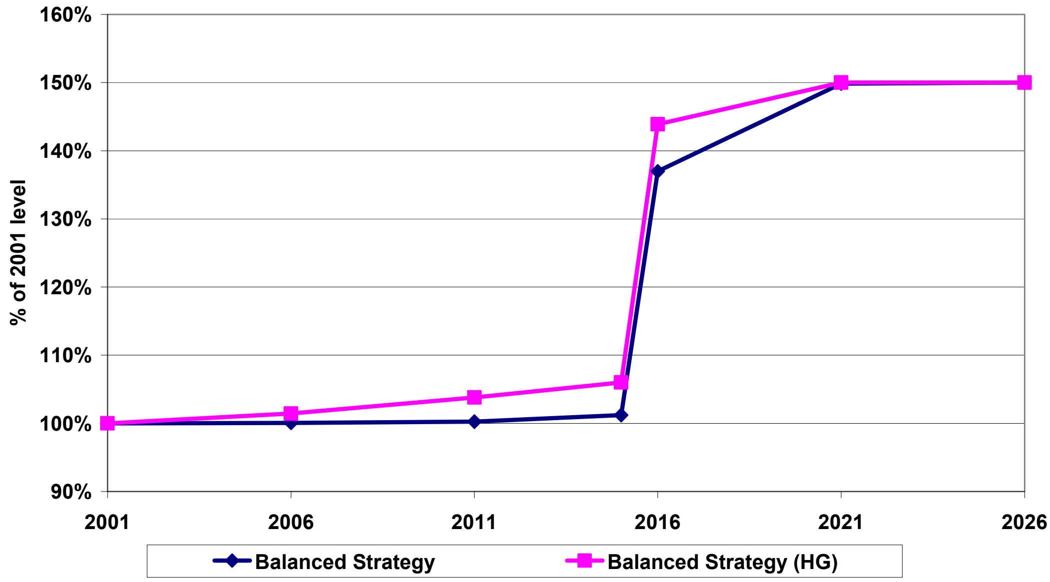
5.2.10 However there may be other adverse impacts, such as the level of ongoing background growth. In Figure 5.2, with low (Reference Case) growth in demand the cumulative impact of the short and medium term schemes is to restrict peak hour traffic to below the existing flows even in 2021, although an upward trend in traffic is evident from 2011.

Figure 5.2: Cross Forth Car Flows under Reference Case Land Use Scenario (Southbound 0700-1000)



5.2.11 With High Growth as shown in Figure 5.3 the benefits of the schemes are more rapidly eroded, and longer-term mitigation measures will need to be identified.

Figure 5.3: Cross Forth Car Flows under High Growth Land Use Scenario (AM Peak Hour)



5.2.12 The comparative impact of low and high growth on Cross Forth car flows and public transport demand is illustrated in Figures 5.4 and 5.5 respectively.

Figure 5.4: Impact of High Growth Land-Use on Cross Forth Car Flows (Southbound 0700-1000)

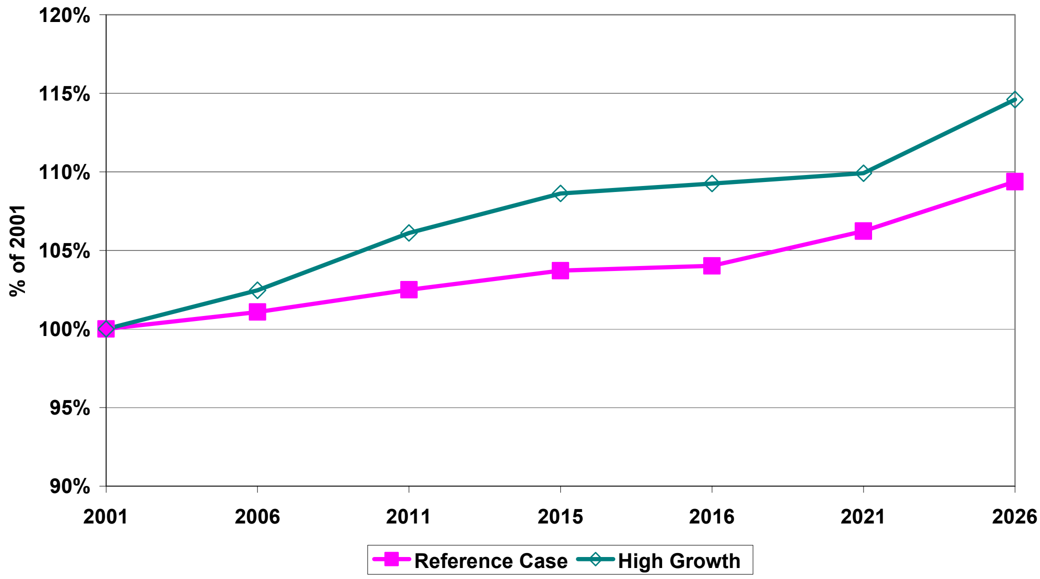
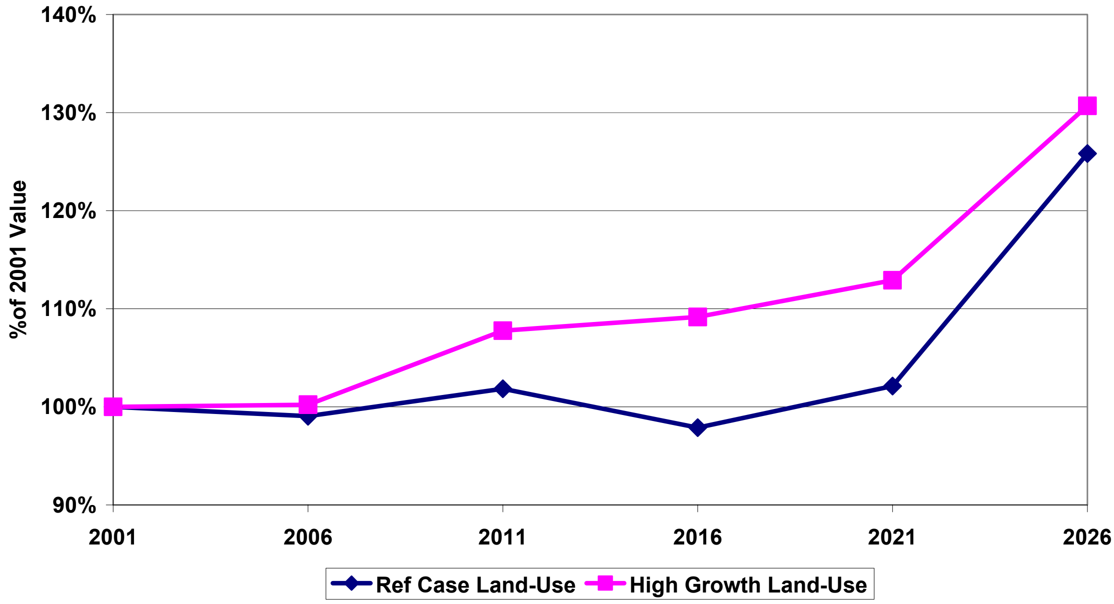


Figure 5.5: Impact of High Growth Land-Use on Cross Forth Passenger Transport Demand (AM Peak southbound)



5.2.13 On the basis of the above it is considered desirable to determine "Trigger Yardsticks" which make clear that long term corrective action has become necessary. The following Triggers are suggested:

1. Daily Peak Hour Traffic across the Forth Road Bridge exceeds:
   $(C - (3600 * g^n))$

   where C represents the maximum design capacity of the bridge (in vehicles/hour/direction)
   g represents the observed annual growth in traffic
   n represents the expected time to deliver a new crossing from inception to commissioning.

2. Train Over-crowding as measured by PIXC (Passengers in Excess of Capacity – an ongoing railway monitoring programme) demonstrates one or more trains regularly carries standing passengers across the Forth.

Conclusions on Monitoring

5.2.14 It therefore seems likely that some form of specific monitoring régime will be required in order to ensure meaningful data is both collected and reported. Although the yardsticks set out above relate to three specific years (2006, 2011 and 2016 – chosen to represent the short, medium and long terms respectively, and also used as the model years for the TEE appraisal), it is vital that monitoring takes place at much more regular intervals. Every six months would not seem inappropriate given the importance of testing success against the yardsticks and considering whether to apply the trigger as set out above.

5.2.15 Reliance on short and medium term measures will have a corresponding need to determine and monitor "trigger yardsticks" designed to indicate when the need for action on longer-term measures has become necessary.

5.2.16 It is important that regular collection and interpretation of monitoring data takes place, and any corrective action is identified (including the triggering of longer term measures). This process must not only be scheduled, but funding also needs to be ring-fenced in appropriate annual budgets for the foreseeable future.

5.3 Evaluation

5.3.1 *"It is necessary to demonstrate at the post-implementation stage of a project how effectively that project has met the established objectives."*[51]

5.3.2 Evaluation can be divided into two types:

Process Evaluation	Primarily concerned with how well the project has been implemented.
Outcome Evaluation	Examines the performance of the project after completion, and measures its "success". It therefore cannot take place until sufficiently long after implementation for success to be measurable.

5.3.3 It is unlikely that Outcome Evaluation can be undertaken for this corridor other than in the extremely long-term. For example the overall impact of the package of measures may take 30 years or more to demonstrate its effectiveness in stabilising and reducing congestion. The results of failure will, in fact, be evident for everyone and consequently formal Outcome Evaluation is not considered further in this report.

5.3.4 Process Evaluation will be more informative, focusing on the implementation of the identified projects, and should take place at regular intervals throughout the post-study period. It is recommended that the cycle of years identified in Table 5.1 is adopted, with each component of the package of measures reviewed with particular regard to:

- Budget for each measure and the profile of spending adopted;
- Initial impacts on objectives (particularly Cross Forth congestion);
- Response of commercial public transport operators (primarily local bus operators);
- Initial public support, and subsequent changes in support; and
- Administrative costs profiles (e.g. the cost in terms of "general" local authority resources such as officers' time to support the measures).

5.3.5 Given the high profile of the corridor and the proposed measures it is likely that a series of process evaluations will need to be undertaken, for example as new measures come on-stream, and as such for this corridor there will generally be a merging of evaluation and monitoring.

5.3.6 It is recommended that in addition to routine monitoring outputs, an annual report on the corridor should be produced for SESTRAN and its local authority constituents, providing useful data on the progress in achieving the Planning Objectives for this study, as well as the broader aims of the Local Transport Plans and the SESTRAN Regional Transport Strategy.

[51] STAG, section 15.8.1

Chapter 6

OTHER ISSUES TO BE CONSIDERED

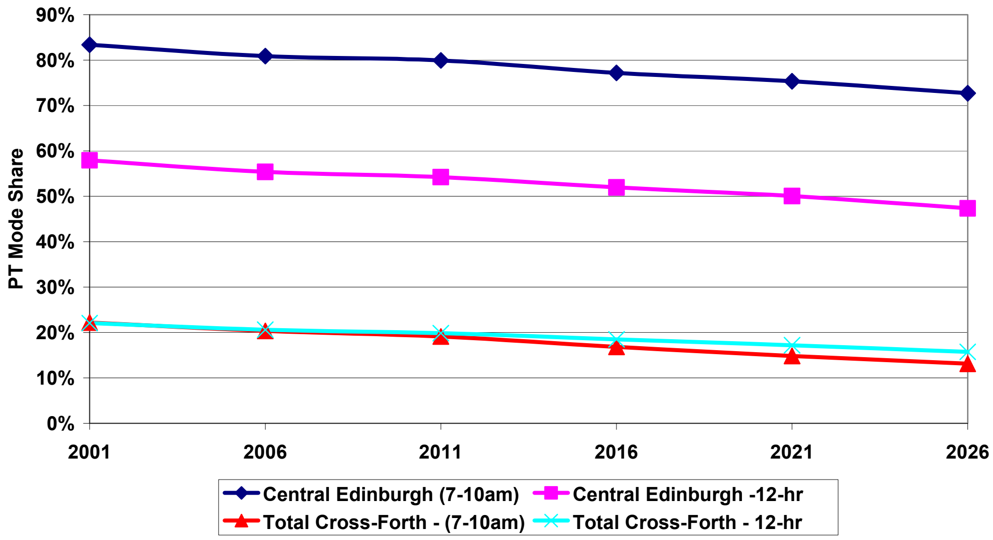
6. OTHER ISSUES TO BE CONSIDERED

6.1 Rail Overcrowding

The Challenge for Cross Forth Rail Services

6.1.1 Public transport already plays a dominant role in facilitating Cross Forth travel into central Edinburgh. This is illustrated by Figure 6.1 below, which shows that at present public transport has a mode share exceeding 80% for morning peak period journeys into central Edinburgh. The success of public transport, and particularly rail services, has resulted in problems of over-crowding and these are discussed further in later paragraphs.

Figure 6.1: Public Transport Mode Share (Reference Case)



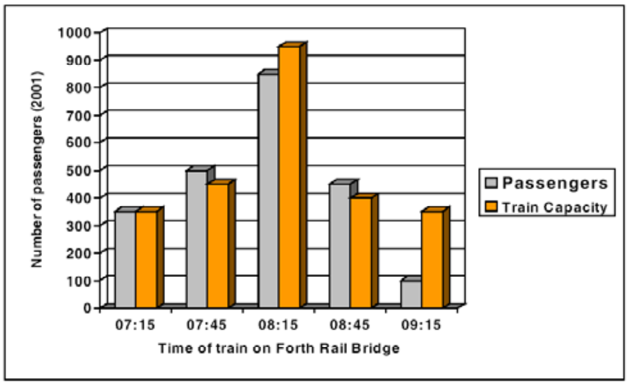
6.1.2 The considerable success of public transport in achieving such a high modal share is not reflected in total Cross Forth travel. As Figure 6.1 shows, in the morning peak period little more than 20% of **total** Cross Forth travel uses public transport and this is forecast to decline under the Reference Case scenario. The challenge for the corridor is to identify measures to increase the penetration of public transport into the total Cross Forth travel market; given the penetration of the central Edinburgh market this will mean targeting travel to other areas, particularly west and north Edinburgh. Further information on the origins and destinations of Cross Forth travel was presented in Volume 1 of the Technical Annex.

6.1.3 Rail plays a major role in serving the central Edinburgh market. It is less well placed to serve other, more dispersed destinations south of the Forth, and for this reason a range of non-rail measures has already been proposed in earlier sections, including improved bus services to west and north Edinburgh and West Lothian, and more flexible solutions such as car sharing supported by priority for HOVs. Thus whilst rail will continue to have an important role to play in serving existing Cross Forth travel, its role in achieving further modal shift away from single occupancy cars is less pivotal.

Rail Overcrowding

6.1.4 Existing rail overcrowding is required to be addressed under the terms of the renewed Scottish Rail Franchise, and is currently being facilitated by a policy of lengthening platforms to accommodate 6-car trains and providing additional rolling stock to operate longer trains where these are identified as being over-crowded. Although some peak-hour trains regularly carry passengers in excess of their seating capacity, this is not true of all Cross Forth trains, as illustrated Figure 6.2 below[52]. It is anticipated that following committed platform and train lengthening all **existing** passengers should have a seat on Cross Forth trains.

Figure 6.2: Cross Forth Train Capacity and Loadings – AM Peak Hour



6.1.5 The current plans and future potential utilising up to 6-car trains on First ScotRail services is summarised in Table 6.1 below. This demonstrates that although there is a need to tackle existing overcrowding and accommodate future growth in passenger demand, it is feasible to more than double the number of seats provided to meet these needs without further platform lengthening.

6.1.6 At present Virgin Trains provide an additional Cross Forth train southbound in the AM peak, but given the possible changes to the Cross Country franchise, this has been excluded from the analysis at present.

[52] Taken from FETA Interim Action Plan (*SIAS/WSP*, March 2003), Figure 2.7

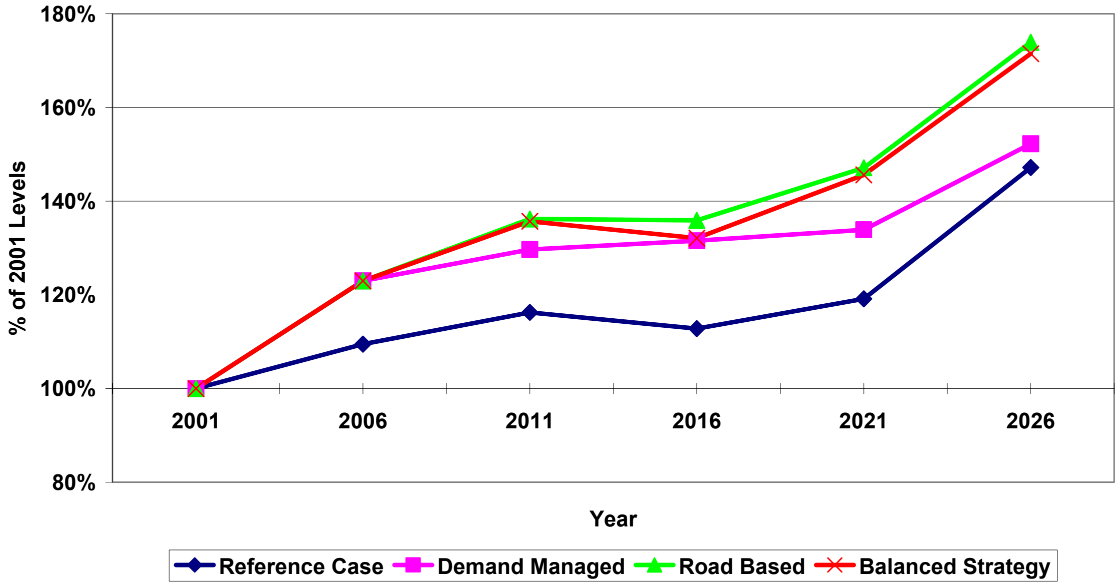
Table 6.1: Composition of Morning Peak Hour Cross Forth Trains

Morning Peak Train (or equivalent in future plans)	**Situation in May 2003**		**Situation after Platform & Train Lengthening**		**Situation after Provision of Additional Trains**		**Situation Assuming all Trains formed by 6-cars[53]**	
0614 Perth – Edinburgh (0758)	1 x 150	145	1 x 170S	212	1 x 170S	212	2 x 170	380
0622 Edinburgh – Edinburgh (0817)	2 x 150	290	1 x 158 + 1 x 170S	348	1 x 158 + 1 x 170S	348	2 x 170S	424
0705 Perth – Edinburgh (0824)	1 x 170	190	1 x 170	190	1 x 170	190	2 x 170	380
0733 Glenrothes – Edinburgh (0833)	2 x 150	290	2 x 170S	424	2 x 170S	424	2 x 170S	424
0731 Kirkcaldy - Edinburgh (0841)	2 x 150	290	1 x 158 + 1 x 170S	348	1 x 158 + 1 x 170S	348	2 x 170	380
0755 Kirkcaldy – Edinburgh (0845)	2 x 150	290	1 x 158 + 1 x 170S	348	1 x 158 + 1 x 170S	348	2 x 170	380
0643 Carnoustie – Edinburgh (0850)			1 x 170	190	1 x 170	190	2 x 170	380
0600 Aberdeen – Edinburgh (0855)	2 x 158	272	1 x 170	190	1 x 170	190	2 x 170	380
New train circa 0700 Markinch – Dunfermline – Edinburgh (0812)					1 x 158 (min)	136	2 x 170	380
New train circa 0743 Kirkcaldy – Edinburgh (0828)					1 x 158 (min)	136	2 x 170	380
TOTAL SEATS		**1767**		**2250**		**2522**		**3888**
(% increase on current situation)				+27%		+43%		+120%

6.1.7 Figure 6.3 below illustrates predicted changes in rail passenger flows across the Forth, compared to a 2001 base. Under the Balanced Strategy this shows that by 2026, when all proposed measures are assumed to be in place including the new Multi-Modal Crossing, demand for rail services in the AM peak will be around 65% higher than in 2001.

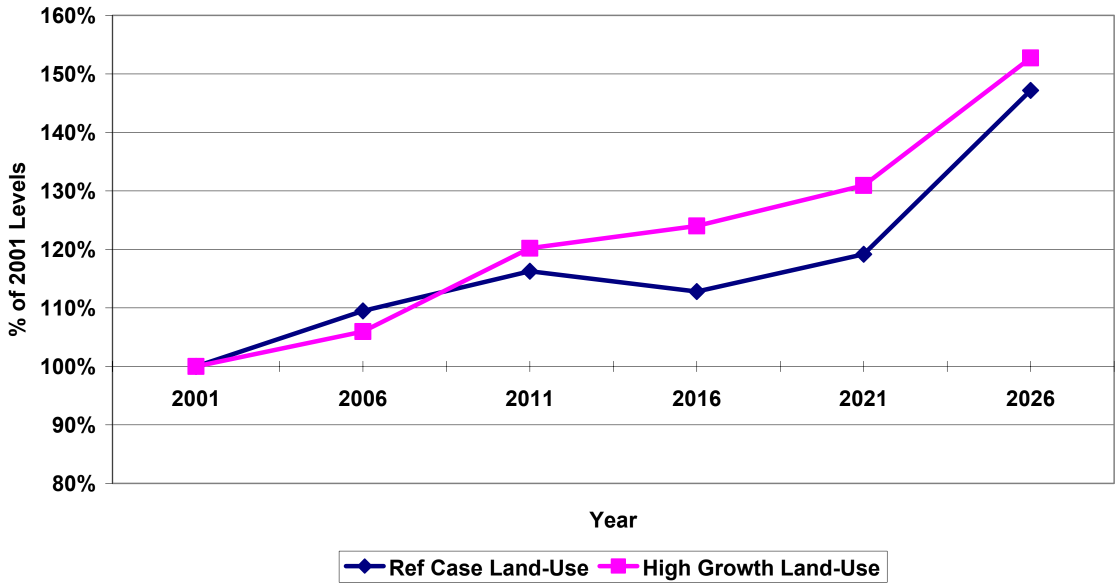
[53] Assumes all trains formed of two Class 170 units, except 2 existing formations using Class 170S – greater capacity achievable using more Class 170S units

Figure 6.3: Cross Forth Rail Passengers (AM Peak Southbound)



6.1.8 This would clearly be augmented in the case of the High Growth Land Use Scenario (see section 6.3), illustrated in Figure 6.4 below. This could boost demand by a margin of 7%, suggesting the highest likely rail demand in 2026 could be 75%-80% higher than in 2001, equivalent to a sustained annual growth rate of around 1.2% per annum for more than 20-years.

Figure 6.4: Cross Forth Rail Passengers under High Growth Scenario (AM Peak Southbound)



6.1.9 When compared to predicted demand for rail travel, once planned enhancements to Park & Choose and the other measures described above take place, it should still be possible to accommodate this demand within existing platform lengths, although at the cost of significant investments in additional rolling stock (estimated at £23 million). The costs of addressing future overcrowding have been included in the economic appraisal of rail optimisation.

6.2 Contribution of LRT in the Future

6.2.1 Although it had been considered and ruled out in the STAG Part 1 appraisal process, it was agreed to review the possible future contribution of LRT in the event of a requirement for additional Cross Forth public transport capacity. As the only bridge suitable for LRT operation would be the proposed Forth MMC it was clearly only feasible to consider LRT **after** building the Forth MMC.

6.2.2 The potential for upgradability from road-based schemes to LRT was addressed in section 3.2 and illustrated on Figure 3.4.

6.2.3 However even when an enhanced "figure-of-eight" LRT network was tested north of the Forth (see Figure 3.4), a Benefit-Cost Ratio (BCR) of only 0.4 was achieved, even when the cost of the Cross Forth Crossing was excluded. This is principally because:

- Very little "new" public transport use was generated, the LRT abstracting significantly from local buses and heavy rail;
- LRT fares were assumed to be lower than the equivalent heavy rail services;
- Although the network was conceived as an extension to Edinburgh Tramline 2 (ETL2) from the Airport, over-crowding on ETL2 means that additional journeys have to be operated between the City Centre and Edinburgh Airport, incurring significant additional operating costs; and
- Many of the benefits accruing from the LRT could be achieved more cheaply (e.g. by efficient transport interchanges to facilitate such journeys as Fife to Edinburgh Park).

6.2.4 The "Figure-of-Eight" network was re-evaluated as a guided busway, but the savings in capital and operating costs continued to be insufficient to achieve a positive Net Present Value (NPV).

6.2.5 However it is clear from the work carried out on the proposed "Bus Right-of-Way" and its associated bus services than a comprehensive Cross Forth bus network can be provided at modest overall cost and with significant benefits for users and society in general. These are set out in Chapter 3 and overall recommendations summarised in Chapter 7 below. The "Bus Right-of-Way" is dependent on the various bus priority measures outlined in Chapter 3, and would particularly benefit from positive support during the land-use planning process, for example by identifying key roads as bus routes and concentrating housing densities around bus stop nodes.

6.2.6 In the longest-term, as the rail services become closer to over-crowded (after 2026) there may well be a case to re-examine LRT and/or guided buses as an alternative to further increases to heavy rail capacity, particularly given the inflexibility of heavy rail routings and their general inability to penetrate proposed new developments.

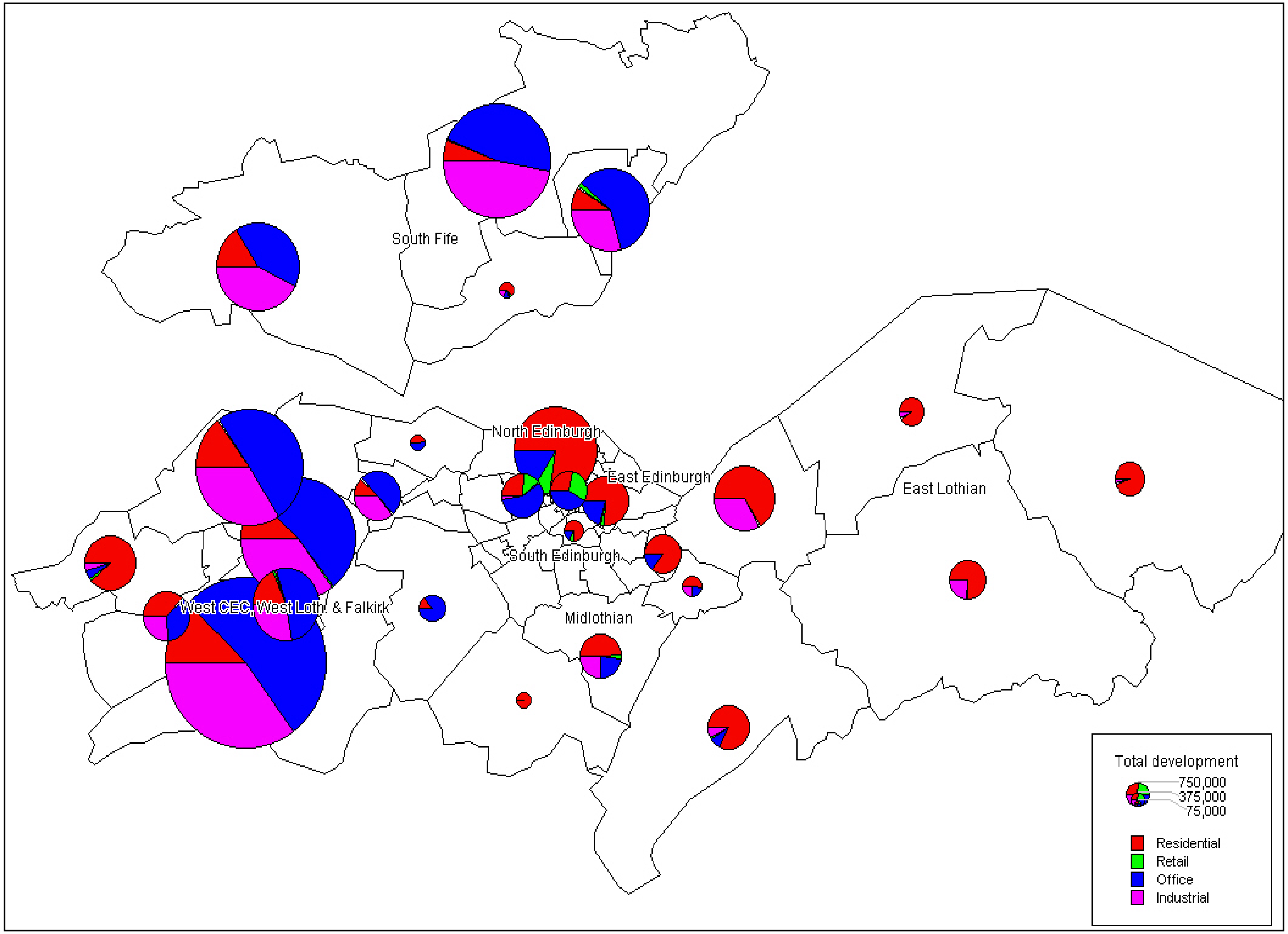
6.3 Impact of Alternative Land Use Scenarios in Fife

6.3.1 The Reference Case, against which the impacts of the various strategies have been assessed, was based on the existing Approved Structure Plans for Fife[54] and Edinburgh & The Lothians[55]. These plans were reflected in the modelling undertaken for the study, which predicted how much (if any) of the available land would be utilised for development in each year of the study period.

6.3.2 Total development inputs are shown in Figure 6.5.

[54] Fife Structure Plan (*Fife Council*, July 2002)
[55] Edinburgh & The Lothians Structure Plan, Finalised Plan (*City of Edinburgh Council & others*, March 2003)

Figure 6.5: Total Development Input to SITCoS Reference Case 2001-2026



6.3.3 This demonstrates a particular concentration on development in west Edinburgh, West Lothian, south Fife and north Edinburgh. These developments are reflected in the predicted growth in Cross Forth trips shown throughout the Corridor Report and this Technical Annex, and summarised in Figures 6.6 and 6.7 below. Note that these show the situation in the AM peak hour if the Forth Road Bridge was running below maximum capacity at this time. As discussed later, in fact this additional demand cannot be accommodated and the result is "peak-spreading".

Figure 6.6: Cross Forth Public Transport Trends (Southbound AM Peak Hour)

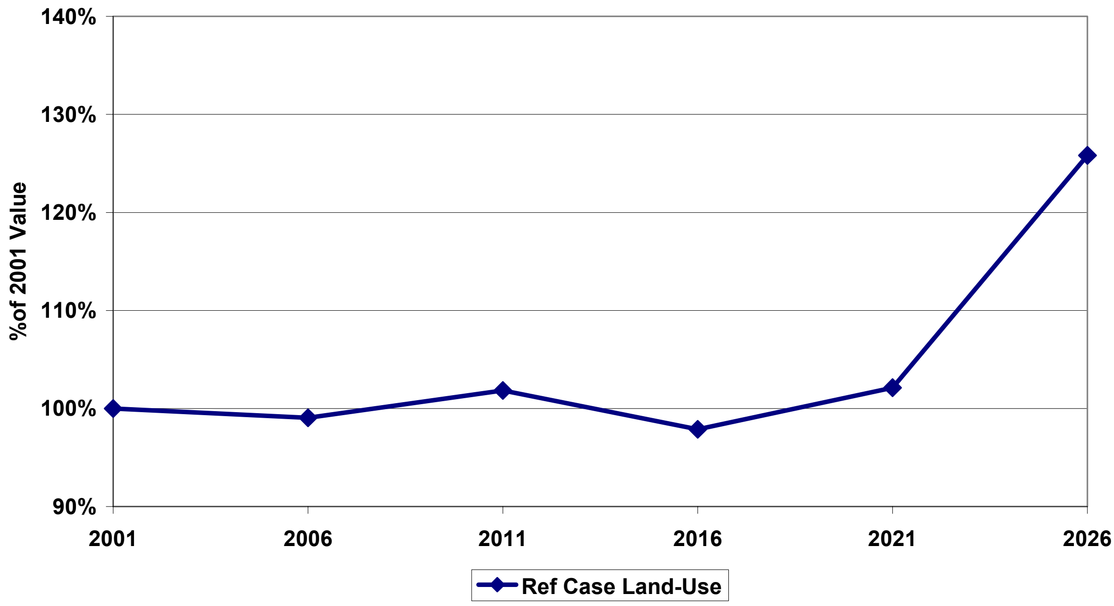
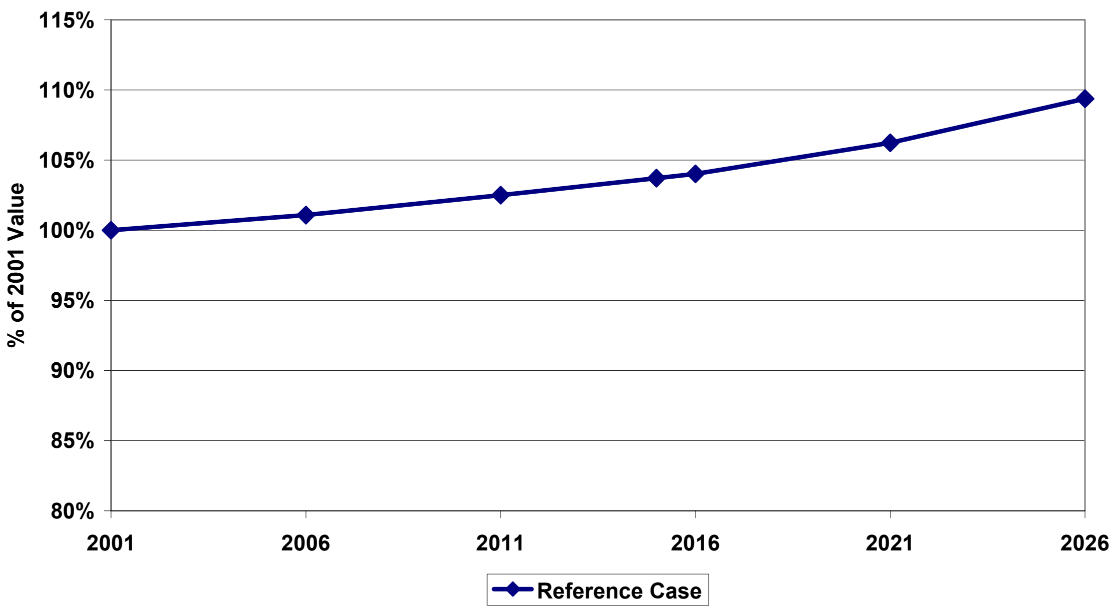


Figure 6.7: Cross Forth Car Trends (Southbound 0700-1000)



6.3.4 Fife Council have been reviewing their Structure Plan, with a series of consultations on a variety of different options. Within these options one consideration has been the possibility of releasing more development land in Fife, particularly for housing, and reviewing the geographical boundaries within which this land should be released.

6.3.5 During the course of the SITCoS study, two alternatives to the Approved Structure Plan emerged, viz:

- Option 6 – Releasing additional land beyond that envisaged in the Approved Structure Plan, principally in mid Fife (i.e. outwith the northern bridgehead area); and
- Option 8 – Also releasing additional land, but this time in south Fife around the northern bridgehead.

6.3.6 Following further discussions, it was identified that in the event of development taking place in the northern bridgehead, as envisaged by Option 8, it would be important to maximise public transport mode share in south Fife in order to avoid over-burdening the Cross Forth infrastructure. This resulted in the development of a so-called Option 8B which incorporated concentrations of housing density around transport nodes in south Fife to encourage maximisation of public transport mode share. Option 8B is illustrated in Figure 6.8.

6.3.7 The impact of these land-use scenarios on person trips is illustrated in Figure 6.9.

Figure 6.8: Fife Council Land Use Option 8B Proposed Development

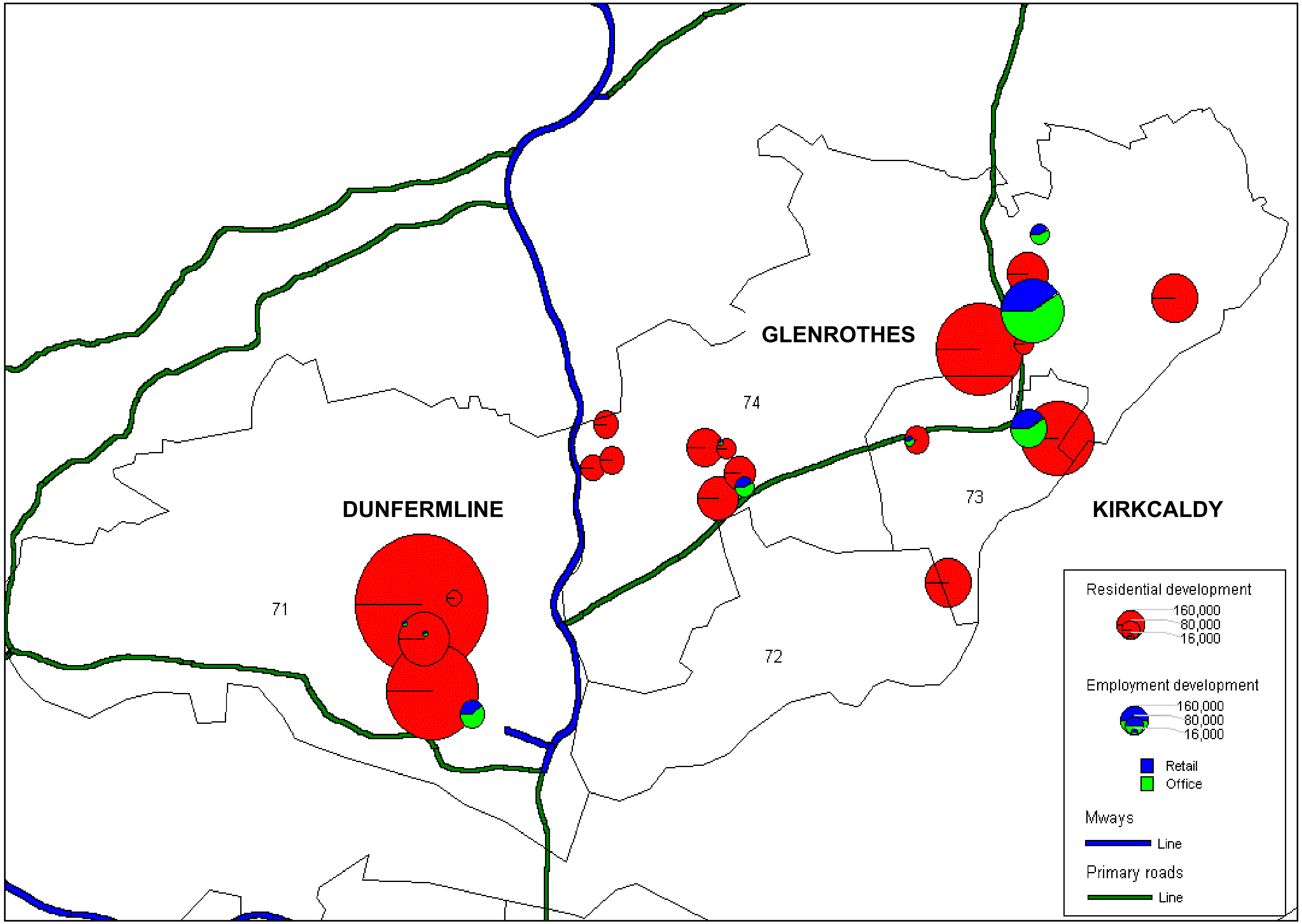
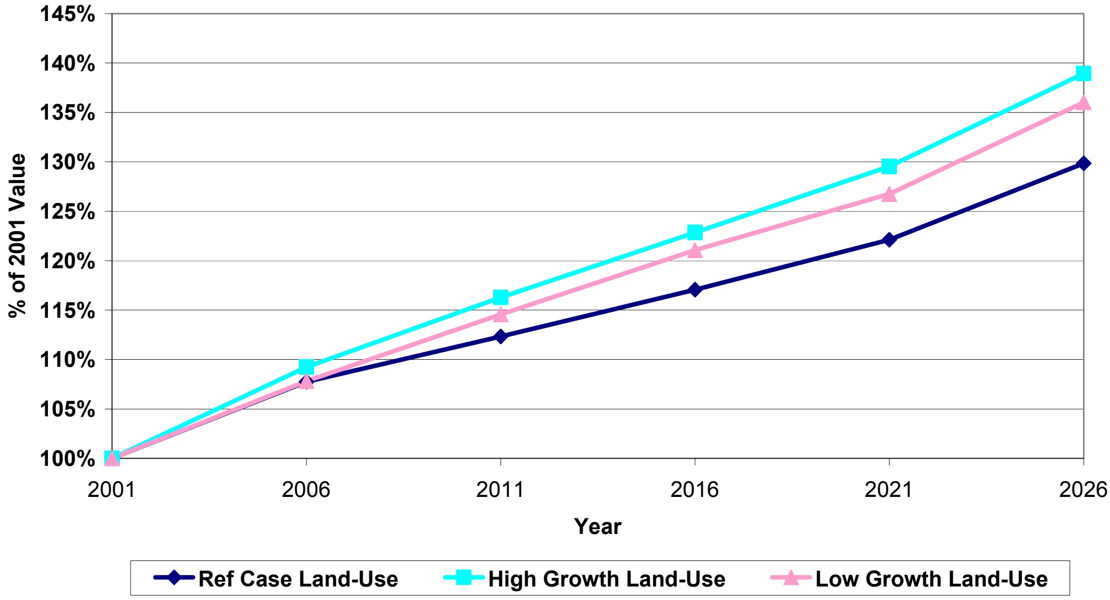


Figure 6.9: Growth in Cross Forth Person Trips (12-hour period, 0700-1900)



6.3.8 This shows that under the Reference Case (i.e. the current Approved Structure Plan) an increase in Cross Forth people movements of 30% is predicted between 2001 and 2026. In the event of the adoption of Option 6, with increased releases of land in the mid Fife area, then a "Low Growth Scenario" can be predicted, which anticipates an increase in Cross Forth movements of around 36% over the same period. Finally in the event that Option 8B is adopted, with release of additional land in south Fife, then a "High Growth Scenario" can be predicted anticipating about a 39% increase in Cross Forth movements from 2001 to 2026.

6.3.9 Unless stated otherwise the Corridor Report and Technical Annex give comparisons with the Reference Case for each Strategy. The impact of a High Growth land-use scenario is discussed where appropriate, giving an upper bound for predicted traffic, and it can be summarised by Figures 6.10 and 6.11, which compare the Reference Case predictions in Figures 6.6 and 6.7 with those applying under High Growth.

Figure 6.10: Cross Forth Public Transport Trends (Southbound AM Peak Hour)

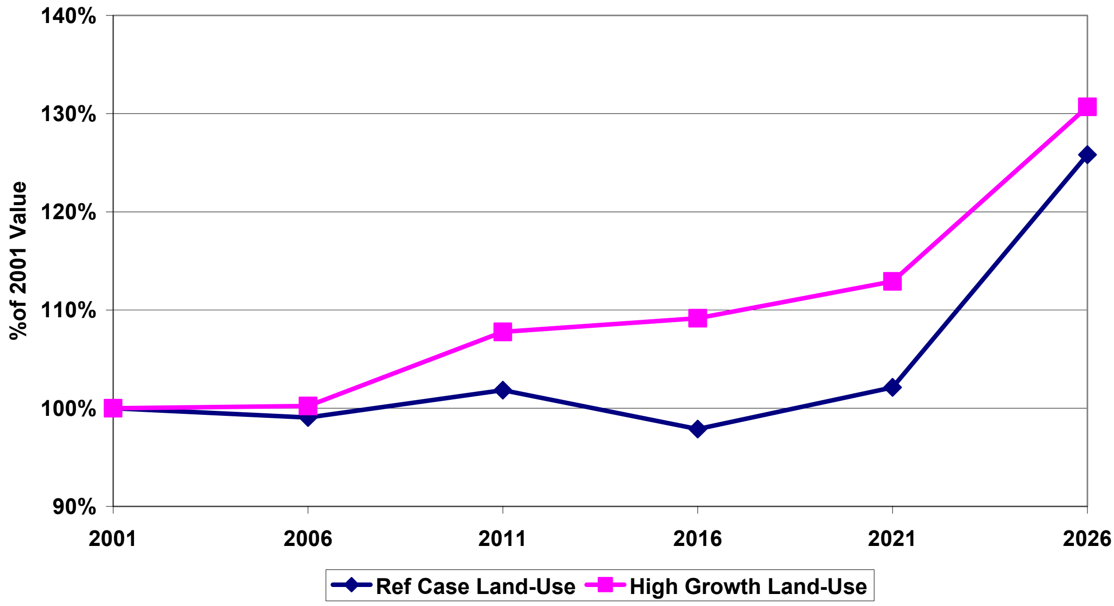
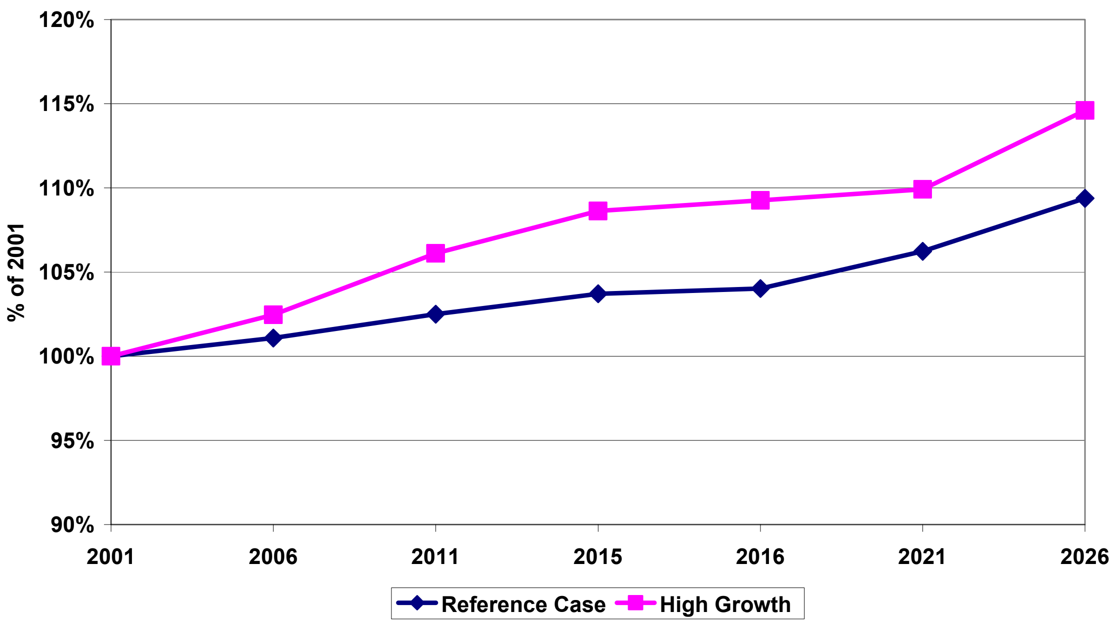


Figure 6.11: Impact of High Growth Land-Use on Cross Forth Car Flows (Southbound 0700-1000)



6.3.10 As can be seen adoption of a High Growth land use scenario impacts on Cross Forth flows, and under Reference Case conditions (without the adoption of any of the strategies outlined in this study) the High Growth Scenario would generate **additional** movements equivalent to 5% of the 2001 level by 2026 by both car and public transport over and above the Reference Case (i.e. the current Structure Plan).

6.3.11 In considering land use scenarios and their impact on demand for Cross Forth travel it would appear that by 2026 a High Growth Scenario would increase travel by:

- 3.9% for Public Transport; and
- 4.8% for Cars.

6.3.12 These factors need to be taken into account when reviewing the impact of the Strategies set out later, particularly the Long Term Strategies.

6.3.13 The degree to which schemes integrate with land-use planning in this study forms part of the assessment against the Government integration objective. However in "making public transport more attractive" it is necessary to create a virtuous circle where land-use planners incorporate suitably sustainable transport plans at the earliest possible stages of development, and (for example) ensure that development densities are such as to encourage viable public transport networks.

6.3.14 It is essential, therefore, that close integration is achieved between emerging land-use policies for south Fife and the planned transport infrastructure in the area, and in particular the infrastructure to support Cross Forth people movements. Failure to do so could result in significantly worsened congestion in the northern bridgehead, and actually damage prospects of fulfilling future Structure Plan aspirations for housing growth in south Fife.

6.4 Peak-Spreading

6.4.1 The outputs from the modelling process do not directly simulate "peak-spreading", where traffic which is unable to cross the Forth Road Bridge at the peak periods when the bridge is running at maximum capacity "spreads" progressively into the peak shoulders. This results in the bridge running at maximum capacity for longer periods each year.

6.4.2 To provide a very simple simulation of the impact of peak-spreading, graphs were prepared on the following basis:

- Based on sample day from FETA "Weigh-in-Motion" data (24th March 2004);
- Apply growth factors derived from model predictions for each category of hour (AM peak, 0700-1000, rest of day, etc.);
- Cap maximum flow in any one 10-minute period to the maximum observed in 2004 (700);
- From 2011 a 50% increase in lane capacity (dedicated to HOVs) was assumed southbound on the M90, but no additional Cross Forth capacity in this year;
- Any excess above this capacity constraint is forced earlier or later in the peak period (with the "pivot" being at 0700), until all predicted traffic under any Strategy can be contained within the overall lane capacity;
- An assumed 15% of predicted total traffic was allocated to the HOV Lane from 2011(based on modelling results referred to in footnote 58);
- For an additional Forth Crossing without HOV restrictions an additional general traffic lane was assumed on the M90 in both directions from 2015;
- In the case of either a Multi-Modal Crossing or a third Forth Crossing with all additional capacity available to all traffic, maximum flow was capped at the

capacity constraint of the southbound M90 (including the HOV Lane from 2011, and additional general lane from 2015 where appropriate);

- Although a demand management strategy would still benefit from the HOV Lanes, without an additional crossing of the Forth the constraint would remain the capacity of the existing road bridge; and
- If the maximum capacity of the HOV lane was exceeded, the excess traffic had to be accommodated in the remaining general traffic lanes.

6.4.3 The resulting profiles of traffic for a variety of situations are shown below but it should be noted that these Figures are broadly indicative only, and not prepared to the same degree of accuracy as the other modelling outputs.

Figure 6.12: Peak Spreading in Reference Case

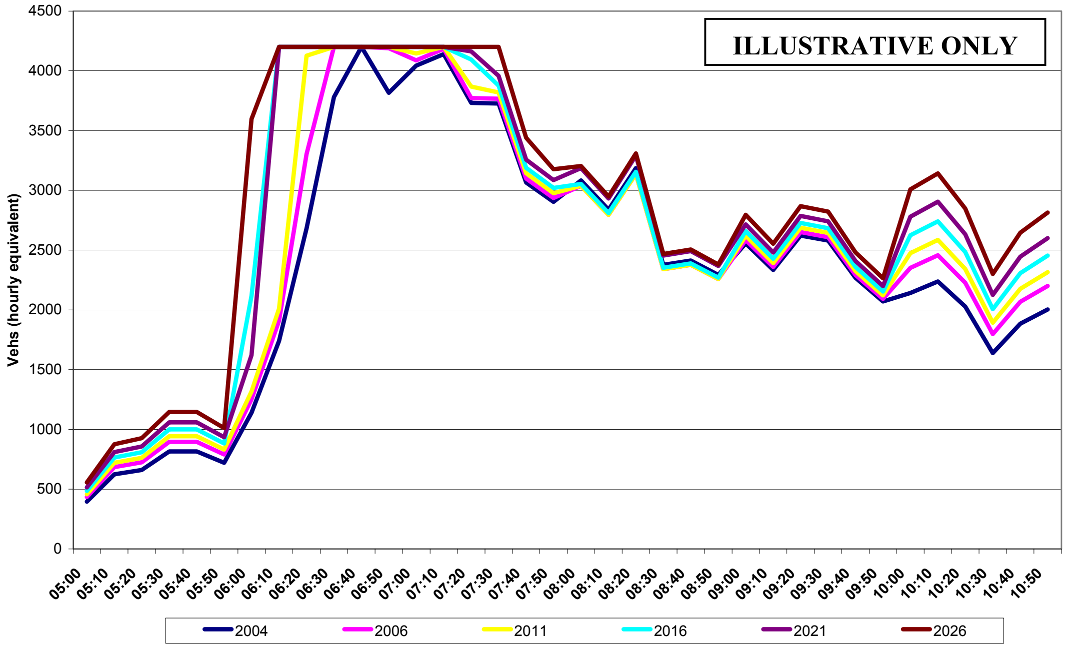


Figure 6.13: Peak Spreading in High Growth Land-Use Scenario

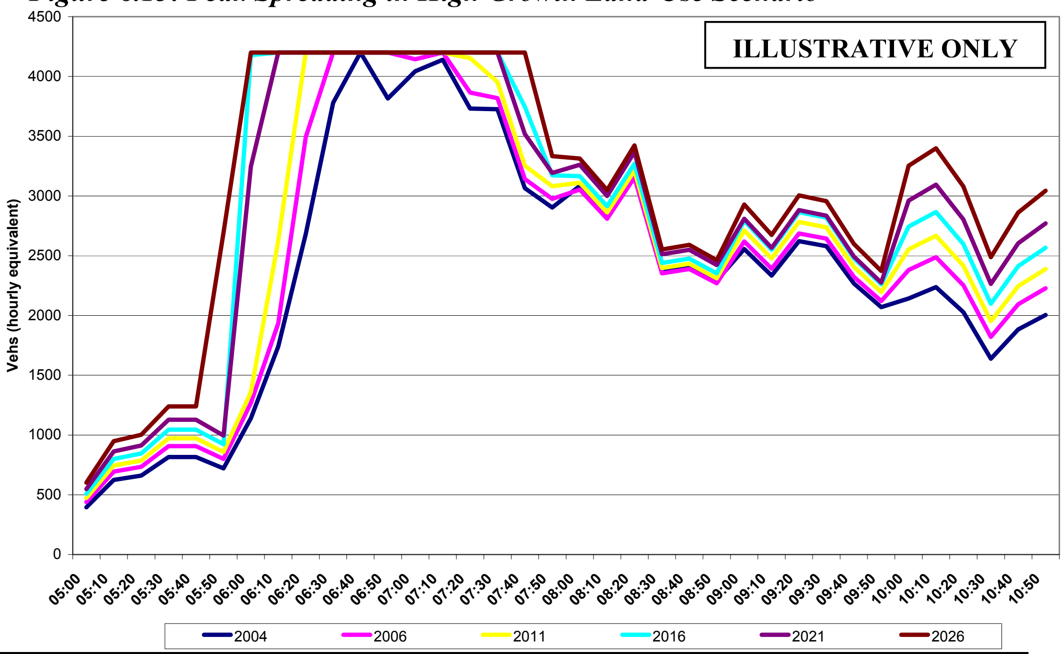


Figure 6.14: Peak Spreading under Demand Managed Strategy

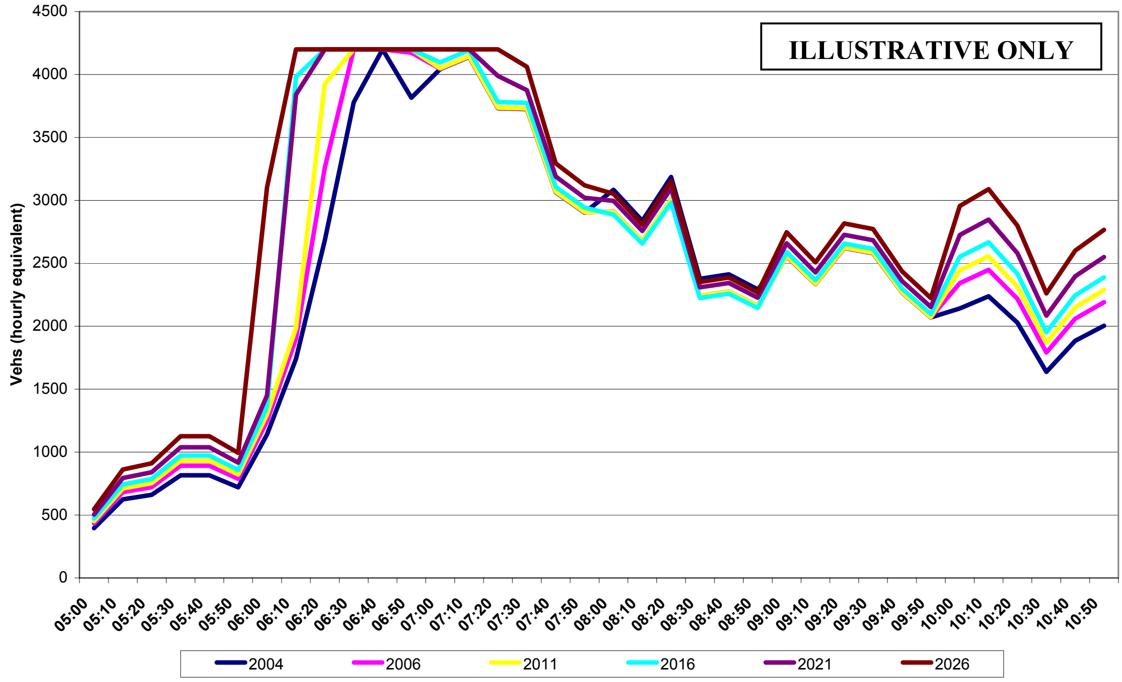


Figure 6.15: Peak Spreading under Roads-based Strategy

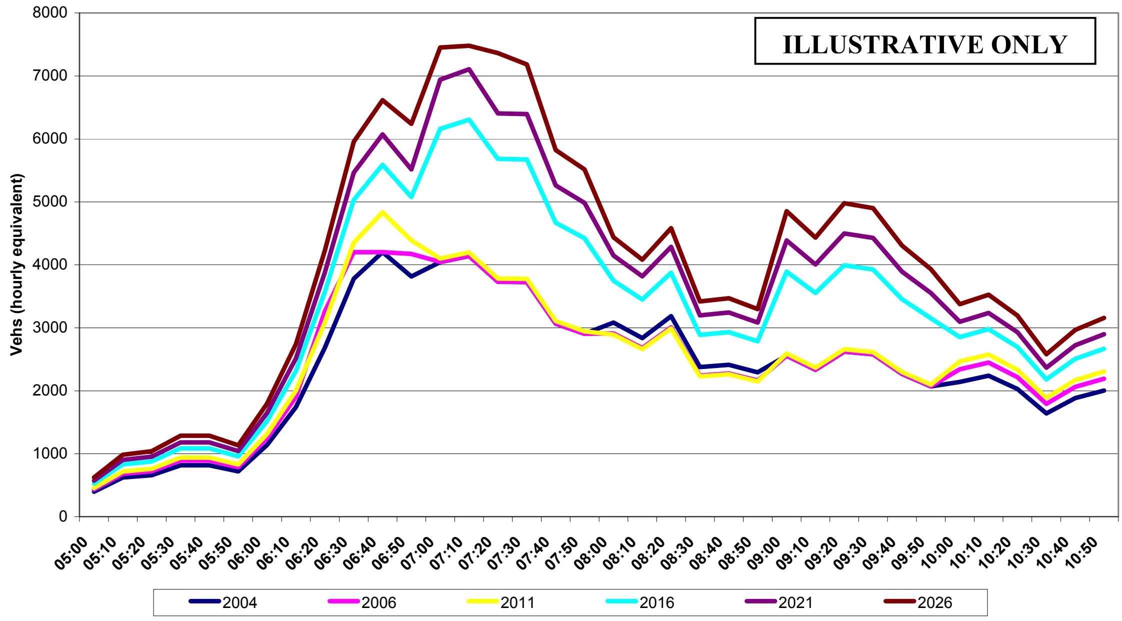


Figure 6.16: SOV Peak Spreading under Balanced Strategy

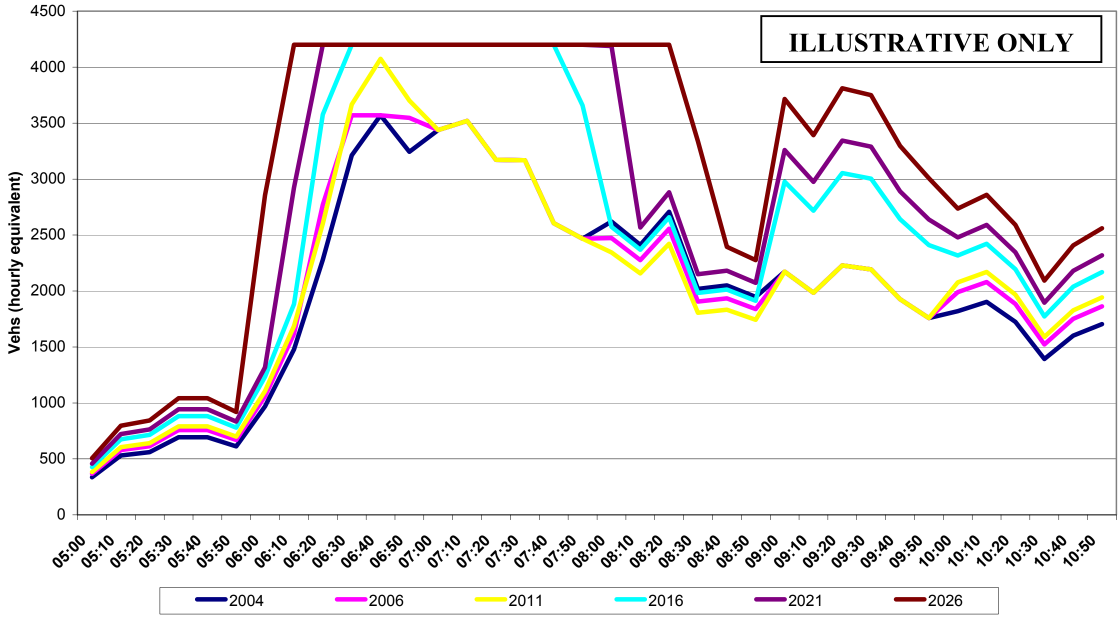


Figure 6.17: Peak Spreading for All Vehicles under Balanced Strategy

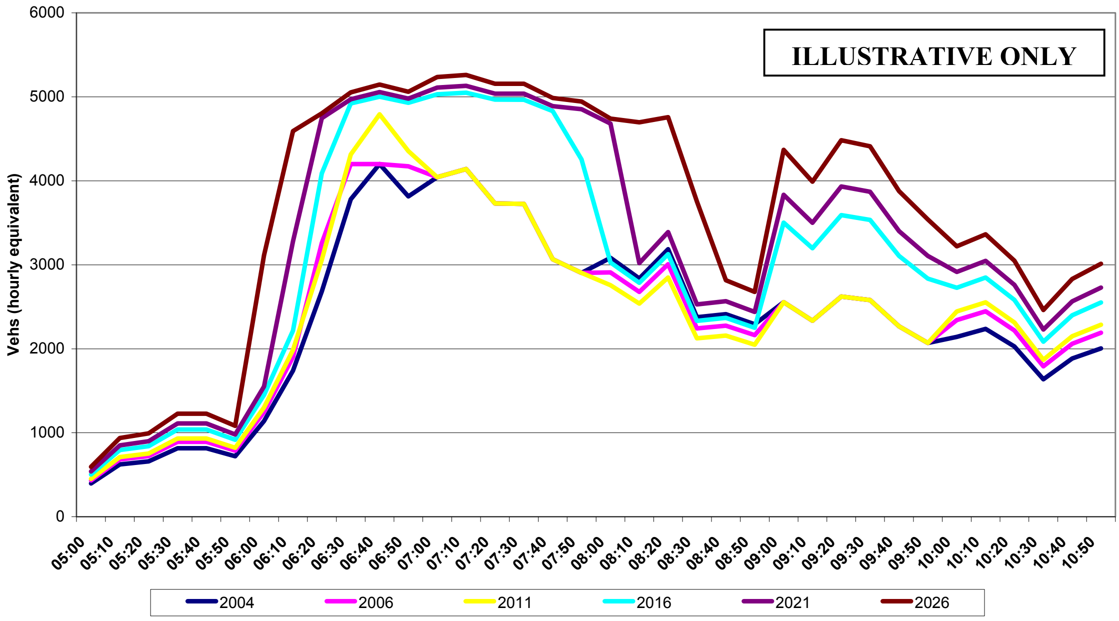
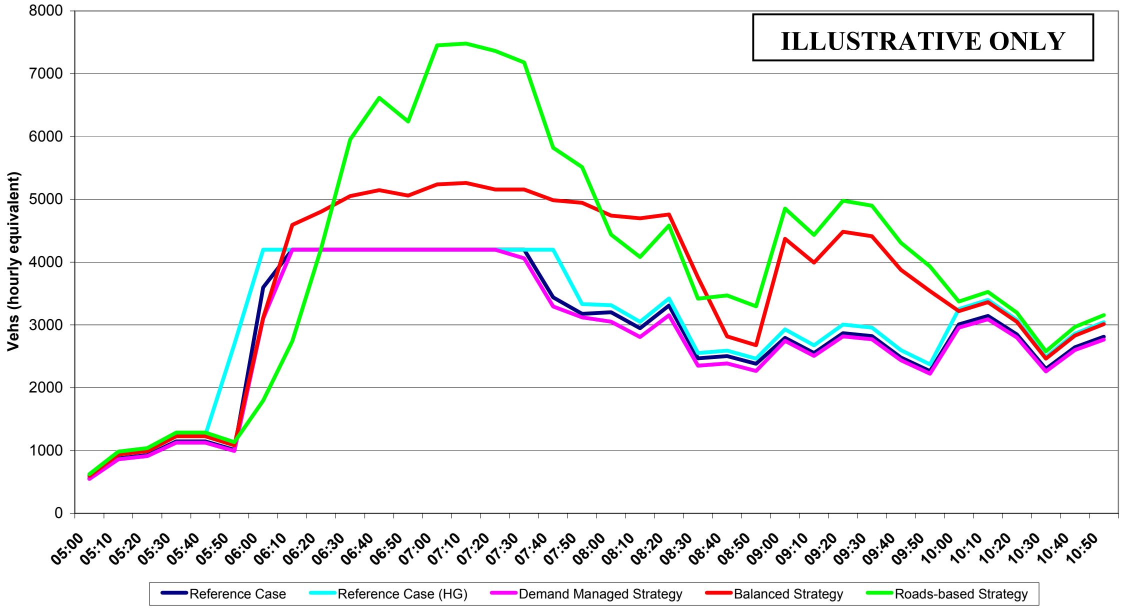


Figure 6.18: Peak Spreading under various Long Term Strategies – 2026



6.4.4 Figure 6.18 suggests that under the Reference Case situation in 2026 the Road Bridge will be running at equivalent hourly flows in excess of 3500 vehicles/hour from about 0600 to 0740; under the High Growth land-use scenario this period extends to about 0600-0750. Under a medium-term demand managed strategy, without additional road capacity of any kind, this period is about 0600-0740, similar to the Reference Case.

6.4.5 For a roads-based long-term strategy it should be noted that traffic would flow at volumes in excess of the current maximum (4200 vehicles/hour) from about 0620 until 0950 (with a short respite between 0830 and 0900). Traffic on surrounding roads would therefore be flowing at levels around the very height of the current AM peak for more than 3½ hours in 2026.

6.4.6 Under a balanced long-term strategy, with an additional crossing but extra lanes provided solely for HOVs, traffic flows in excess of 4200 vehicles/hour are reached around 0600 (about the same as under the Reference Case) and are sustained until about 0830, with a short secondary peak between 0900 and 0940. The peak flows are lower than under a roads-based strategy, but the peak is more spread out. Nevertheless it is clear that adopting a strategy based on an additional crossing of the Forth will place further stress on the surrounding road network (e.g. the M90).

6.5 Problems Facing the Strategic Road Network

6.5.1 The growth of traffic on the trunk road network was highlighted in Volume 1.

6.5.2 There is a division in responsibility for roads within Scotland between the Scottish Executive, which controls the Strategic Road Network (i.e. the Trunk Roads), and local authorities, which control the remainder of the roads. This can create a "tension" particularly at the transition between Trunk and non-Trunk Roads, with local authorities needing to adopt road traffic reduction strategies on their own networks but unable to take action to reduce the traffic "decanting" onto local authority roads from the Trunk Roads. There is no obligation placed on the Scottish

Executive to pursue road traffic reduction, although local roads authorities do have such obligations, and there is no formal National Transport Strategy.

6.5.3 There is a symbiotic relationship between traffic on local authority roads and the Trunk Road Network. Most traffic on the latter originates on the former, but traffic from Trunk Roads then usual decants onto local authority roads that act as local distributors. The Roads Authority involved at origin may, or may not, be the same one as that involved at the destination.

6.5.4 Local authorities must therefore take measures to react to increasing traffic on roads within their control, and to do so in a sustainable manner, but without the ability to directly influence traffic on the Strategic Roads Network. This is a significant challenge for such authorities, such as Fife Council, West Lothian and SESTRAN in the study area.

6.5.5 There are considerable mutual benefits to be gained through a constructive relationship between local Roads Authorities, Regional Transport Partnerships, FETA and the Scottish Executive that places overall traffic reduction at the core of all policies.

6.6 Cross Forth Ferry

6.6.1 In 2004 consideration was given to the viability of operating Cross Forth Ferry Services, linking south Fife with north Edinburgh[56]. This concluded that a route from Kirkcaldy to Leith offered the greatest potential for subsidy-free day-to-day operation and might, in part, be able to cover the capital costs of vessel acquisition. Subsequently the Stagecoach Group announced a willingness to consider the commercial operation of a Cross Forth Ferry.

6.6.2 A sensitivity test was undertaken to assess the likely impact of such services on Cross Forth flows, the results being as set out below.

Table 6.2: Impact of Cross Forth Ferry on Southbound Traffic Flows (0700-1000)

	Reduction in Cars	Reduction in Rail Passengers
2011	Circa 1%	Up to 7%
2026	Less than 0.5%	Up to 13%

6.6.3 As with other public transport schemes it appears that a Cross Forth Ferry will appeal more to existing public transport users rather than contributing to modal shift from cars, but nevertheless it might have some benefits in addressing future crowding on Cross Forth rail services after 2026, as discussed in section 6.1.

[56] Options for a Cross Forth Passenger Service (*Halcrow*, May 2004).

Chapter 7

CONCLUSIONS & RECOMMENDATIONS

7. CONCLUSIONS & RECOMMENDATIONS

7.1 Conclusions

7.1.1 In summarising the recommendations the Schemes have been grouped into three timescales as follows:

Short Term (1 – 5 years)	Schemes that help deliver the study objectives, can be delivered relatively quickly and should be brought forward for earliest possible implementation.
Medium Term (5 –10 years)	More substantial cost-effective measures that it is recommended should be pursued to deliver their benefits over the next 5 – 10 years.
Long Term Vision (10+ years)	Considering future aspirations and likely requirements for Cross Forth travel.

7.2 Short Term Recommendations

7.2.1 Section 3.2 set out a wide range of short-term measures to improve the attractiveness of public transport, and to widen its definition to include such activities as organised Car Sharing and the use of High Occupancy Vehicle lanes. Land use planning also needs to take into account the potential impact of developments on Cross Forth travel patterns, particularly in the event of high growth land-use scenarios in the northern bridgehead area.

7.2.2 Therefore the following short-term measures are recommended:

- Make Public Transport More Attractive, as described in section 3.2 above and in particular as discussed in the Corridor Report;
- Provide new bus-based Park & Choose site at Halbeath and expand Rosyth into a Park & Choose location (see Appendix F);
- Provide a newly constructed southbound HOV Lane between Halbeath and the northern bridgehead (see Figures 7.1 and 7.2 for more detail on possible means of delivery);
- Introduce "quick win" bus priority measures in Fife on A907, A823 and around Rosyth, as described in section 3.2 and illustrated in Figure 3.1;
- Procure the additional bus services on key Cross Forth routes, as described in section 3.2 and illustrated in Figure 3.3;
- Improve the integration of bus and rail in Fife, including enhanced local bus feeders to key rail stations, as described in section 3.2 and illustrated in Figure 3.5; and
- Make those land reservations required to support future plans (e.g. Dunfermline South station).

7.2.3 Such an approach will require careful monitoring of Cross Forth travel trends, and this has been discussed in more detail in Chapter 5.

Benefits of Short Term Measures

7.2.4 The cost of the Short Term Measures has been estimated at £23.5 million of capital expenditure and £3.9 million per annum of ongoing operating costs (all figures quoted in this report are in 2004 prices and exclude optimism bias). The measures are likely to return a satisfactory Benefit Cost Ratio of 11.8 after allowing for Optimism Bias – for greater detail refer to Section 3.7 (TEE). The present value of benefits accruing from this package considerably outweighs the present value of costs, making this a highly recommended package.

7.2.5 The impact on public transport profitability would be a small operating surplus (circa £0.5 million per annum) - this might be made up of a small reduction in profits for bus operations and small increase for rail (from increased Park & Ride using the feeder services).

7.3 Medium Term Recommendations

7.3.1 Building on the short term measures, the following projects are recommended for implementation in the medium term:

- Revised rail patterns to maximise use of Cross Forth rail capacity, including "splitting the circle" to provide enhanced services throughout Fife on the existing line through Turnhouse, and providing two additional trains per hour both operating via Edinburgh Airport as set out in section 3.2 and in Table 3.5;
- Support for Park & Choose at key locations: Inverkeithing (extension of car park including access road), Ferrytoll (including the new overspill site) and Dalgety Bay, in addition to the site at Halbeath featured in the short-term recommendations (see Appendix F for more detail); and
- Completion of the Bus "Right-of-Way" network between Fife and Edinburgh, predominantly bus priority work on the A90 south of the Forth.

Benefits of Medium Term Measures

7.3.2 The cost of these measures has been estimated at £11.6 million of capital expenditure and £1.1 million per annum of additional operating costs. The Short and Medium Term packages in combination are likely to return a satisfactory Benefit Cost Ratio of 4.8 after applying Optimism Bias, yielding a considerable surplus of present value benefits above the present value costs associated with the proposals – for greater detail refer to Section 3.7 (TEE).

7.3.3 The Medium Term package is likely to require an annual subsidy to public transport operators (approx £1.5 million per annum).

7.4 Linking the Medium and Long Term Strategies

7.4.1 As a supplement to the Short and Medium Term Strategies, if demand for Cross Forth travel continued to rise in such a way that it could not be accommodated, particularly on the Forth Road Bridge, then it will be necessary to identify a strategy that links the Medium Term recommendations with a future Long Term Strategy embracing a new crossing.

7.4.2 As described in the main Corridor Report, Demand Management offers a way of controlling future demand for Cross Forth travel. This builds on the provision of the Short and Medium Term recommendations, supplementing them with a demand management regime focused on significant increases to Cross Forth tolls:

- Peak hour - £2 per SOV each way (i.e. if one-way tolling is in place, as at present, the toll would be £4);
- Hour before and hour after Peak - £1 per SOV each way; and
- Inter-peak – 50p per SOV each way.

7.4.3 In addition it encompasses the reduction of Cross Forth rail fares so that fares between south Fife and Edinburgh are capped at the level applied at Inverkeithing.

7.4.4 Introduction of such demand management will be feasible in a relatively short timescale and certainly can be considered within the Medium Term, and hence as an adjunct to the Medium Term recommendations already set out.

7.4.5 The additional cost of introducing the Demand Managed Strategy compared to the medium-term package is relatively small, but results in very significant user benefits, resulting in a very satisfactory Benefit Cost Ratio of 12.1 and substantial Net Present Value. The need for subsidy, identified under the medium-term package, would be eliminated.

7.5 Alternative Long Term Strategies

7.5.1 The following two Long Term Strategies were identified, based on the findings set out in Chapter 3.

Roads Based Strategy

7.5.2 This utilises the Short and Medium Term recommendations, and supplements them with the building of a new road-only crossing and associated link roads, at an estimated cost of £382 million with £1.3 million per annum of additional operating costs.

Balanced Strategy

7.5.3 As with the previous package, the foundation of the Balanced Strategy is the Short and Medium Term recommendations, in this case supplemented by the building of a Multi-Modal Crossing, capable of upgrading to accommodate a future busway or LRT system, and enhanced by road space reallocation so that all additional road space is reserved for HOVs and there is no increase in Cross Forth lanes provided for SOVs. In addition the following measures would also be introduced:

- Significant SOV tolling, in line with the Demand Managed Strategy; and
- Rail fares between Fife and Edinburgh would be capped at the Inverkeithing level, to encourage maximisation of the rail-based segment of Park & Choose trips.

7.5.4 The cost of providing a Forth Multi-Modal Crossing and associated roads has been estimated at £442 million of capital expenditure and £1.3 million per annum of additional operating costs.

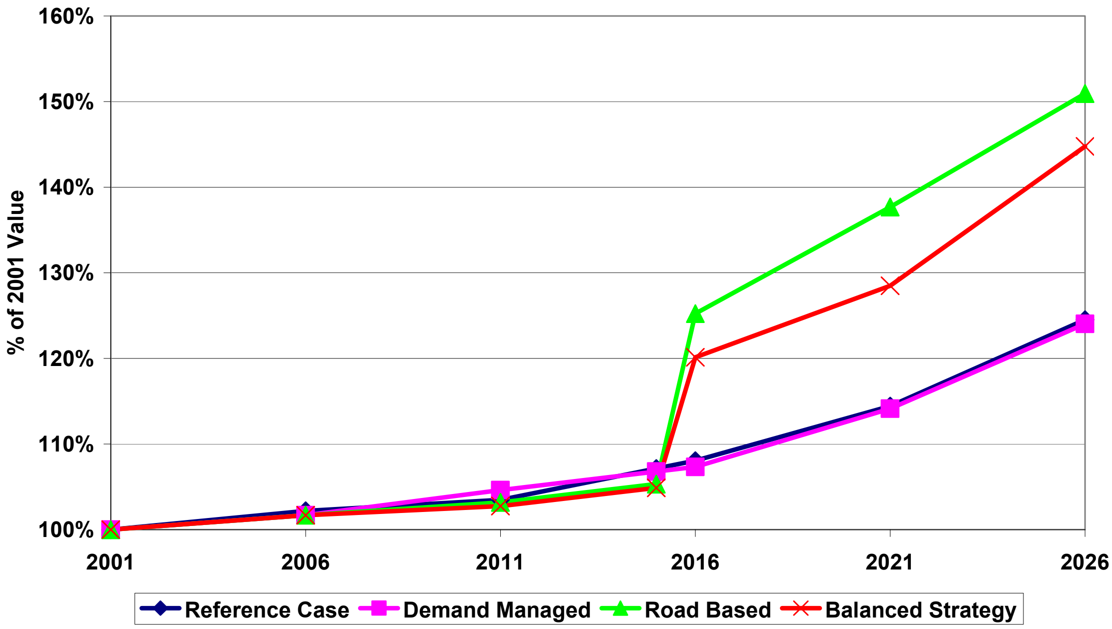
Economic Impact

7.5.5 A summary of the economic impact of the various recommendations and alternatives was given in Section 3.7[57]. This showed that, of the Long Term Strategies, only the Balanced Strategy Package offered a substantially positive Net Present Value (i.e. excess of benefits over costs),. The Demand Managed Package offered greater NPV than the Balanced Strategy, but nevertheless the latter had a good rate of return with a BCR of 2.7 for the Balanced Strategy. The BCR for the medium-term Demand Managed Strategy suggests there may be benefits from maintaining this into the long-term, but only if all future traffic requirements could be accommodated satisfactorily.

7.5.6 It is likely that the TEE analysis did not fully reflect all the potential disbenefits of the Demand Managed strategy, for example the long-term constraints this might place on economic development in Fife. Such disbenefits are not fully reflected in the TEE approach, but nevertheless should be borne carefully in mind when comparing the long-term strategies set out above.

7.5.7 Section 3.7 also demonstrated that the greatest benefits accrued from the Balanced Strategy (i.e. provision of a new Multi-Modal Crossing), although as a result of the high cost of this Package its Net Present Value was exceeded by that of the Demand Managed Strategy. Nevertheless there is a clear value-for-money case for supporting the Balanced Strategy, which brings with it the broader economic benefits also discussed in Section 3.7, and which would facilitate the high-growth land-use development strategy for south Fife. This is illustrated by the graphs set out below.

Figure 7.3: Cross Forth Person Trips (0700-1000 Southbound)

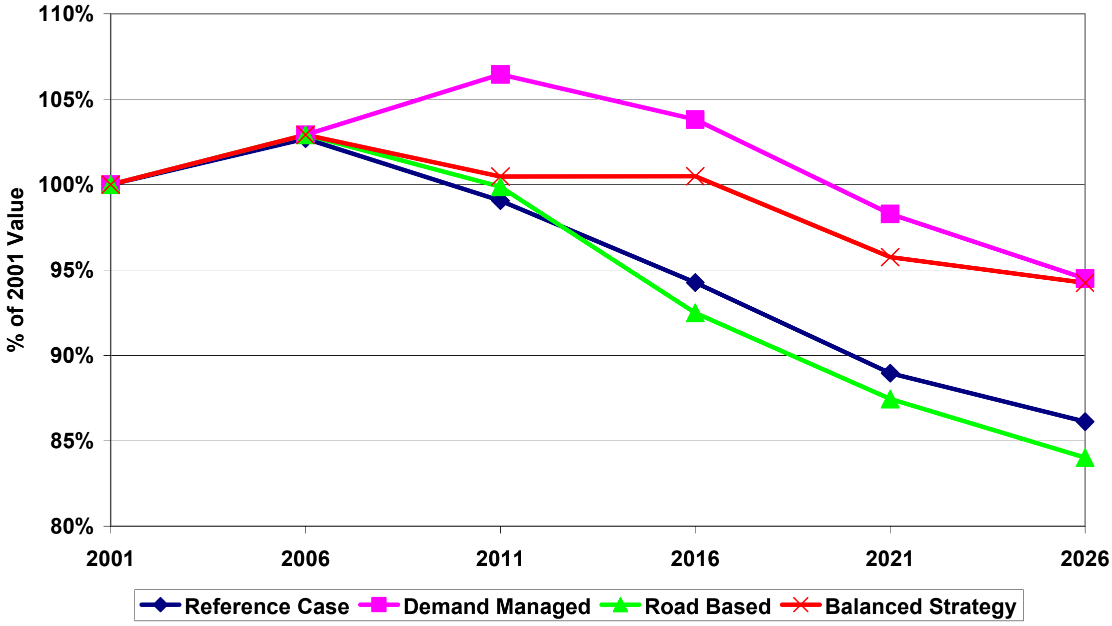


57 Costs and Benefits are cumulative. The Medium Term package includes all the costs and benefits associated with the Short Term package. Each of the Long Term packages incorporates all the costs and benefits associated with the Short and Medium Term packages.

7.5.8 Figure 7.3 demonstrates how the Balanced Strategy facilitates a significant increase in Cross Forth movements, compared to the situation with a Demand Managed Strategy that only accommodates increased movements equal to the underlying Reference Case. Greatest Cross Forth movements are facilitated by a Road-Based Strategy but this, of course, has significant other disbenefits.

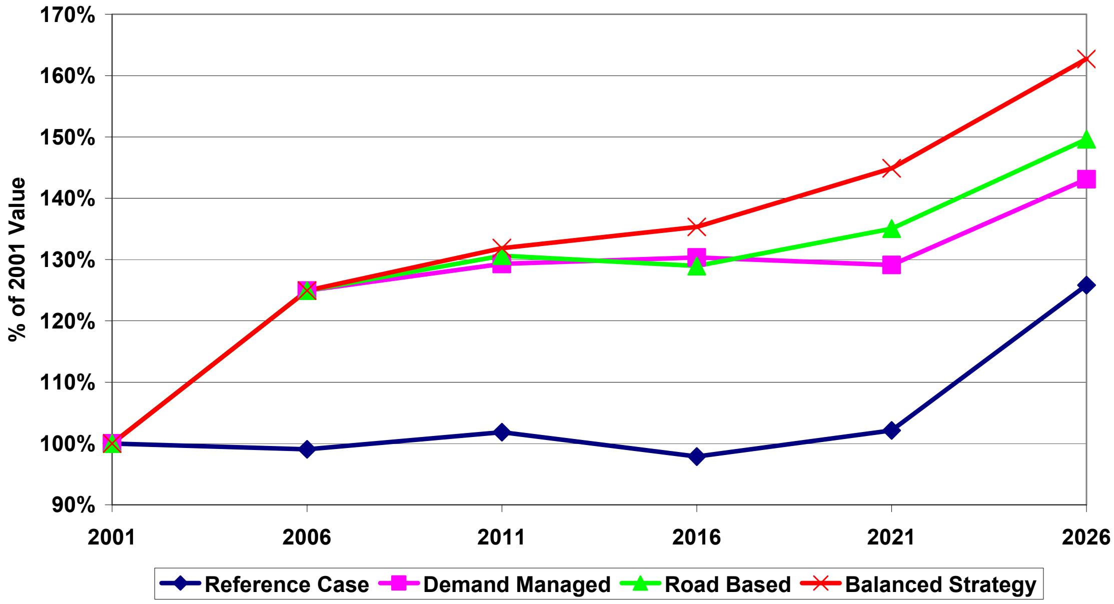
7.5.9 Looking in more detail at Cross Forth movements to/from Central Edinburgh, these are illustrated by Figure 7.4. This demonstrates that person trips into Central Edinburgh were anticipated to decline under the Reference Case, and the Roads Based Strategy actually exacerbates this decline. In contrast both the Demand Managed and Balanced Strategies facilitate high levels of accessibility into Central Edinburgh.

Figure 7.4: Cross Forth Person Trips to Central Edinburgh (0700-1000)



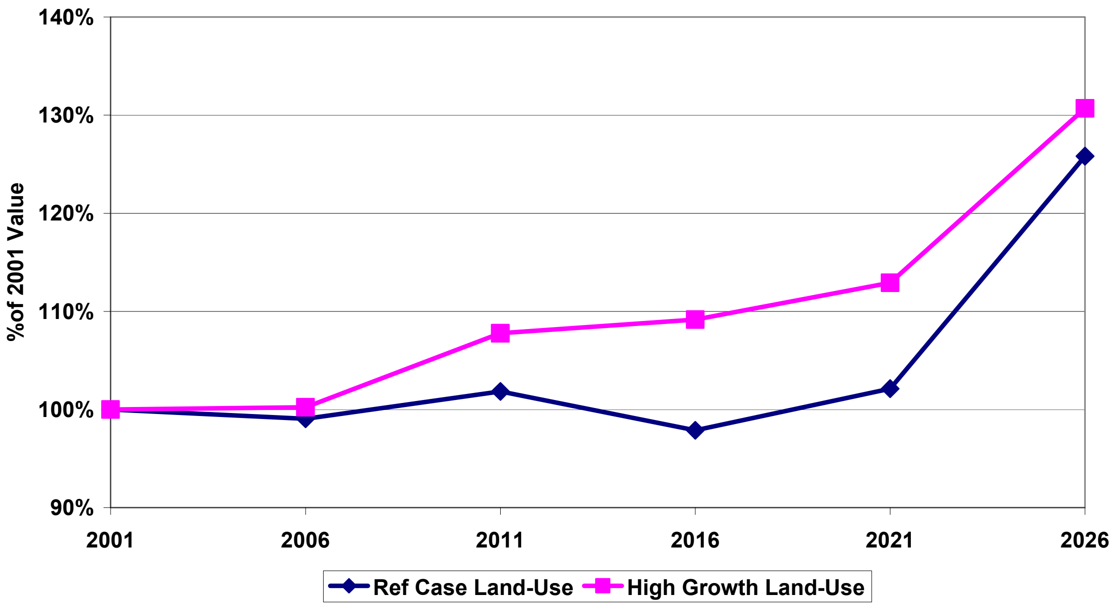
7.5.10 Considering the issue of "sustainability", Figure 7.5 illustrates the relative successes of each long-term strategy in encouraging Cross Forth public transport use. As can be seen public transport use was expected to grow by around 25% between 2001 and 2026 under the Reference Case. Each of the long-term strategies facilitates <u>**additional**</u> growth in Cross Forth public transport use, the most successful being the Balanced Strategy.

Figure 7.5: Growth in Cross Forth Public Transport Use (AM Peak, Southbound)



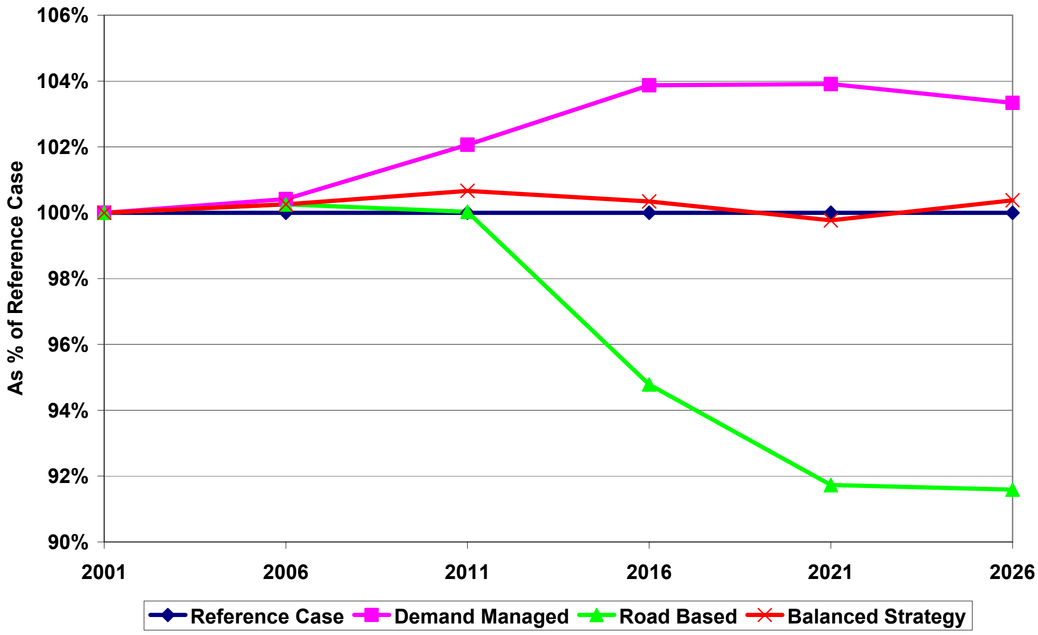
7.5.11 These would be even more successful in the event of a High Growth land-use scenario being adopted in south Fife. Figure 7.6 shows the potential impact of such a scenario over and above the Reference Case. This suggests that in each strategy, a High Growth land-use scenario could augment long-term demand for public transport by 4%.

Figure 7.6: Impact of High Growth Land-Use Scenario on Cross Forth Public Transport Demand (AM Peak, Southbound)



7.5.12 The overall impact on Cross Forth mode share is summarised in Figure 7.7 below. As already described, even under the Reference Case public transport mode share for Cross Forth journeys was anticipated to fall. This reduction in mode share is exacerbated under a Roads Based Strategy, whilst a Demand Managed Strategy achieves the lowest rate of decline. The Balanced Strategy achieves public transport mode shares almost identical to the Reference Case in each model year.

Figure 7.7: Public Transport Mode Share – All Cross Forth Trips (AM Peak)



7.5.13 The Road-based strategy would reduce Public Transport revenues by £1 million per annum, whilst Demand Managed and Balanced strategies both increase net Public Transport revenues by £4 million per annum

7.6 Long Term Recommendations

7.6.1 Based on the discussion set out above it would appear that the best approach would be to utilise the breathing space bought by implementing the short and medium term recommendations to ensure that once their benefits are exhausted a sustainable Long Term strategy is in place to accommodate growing demand for dispersed travel patterns, without excessively adverse impact on the SESTRAN economy or the local environment.

7.6.2 The Long Term Recommendation comprises the Short and Medium Term Recommendations set out in Sections 7.2 and 7.3 respectively, supplemented by the building of a new Forth Multi-Modal Crossing to provide flexible capacity for long-term Cross Forth travel. This includes the potential to upgrade to a LRT system in the future – a subject discussed in more detail in section 6.12. In addition this would be supported by the implementation of significant SOV tolling (see section 3.2) and the capping of south Fife rail fares at the Inverkeithing level (see section 3.2).

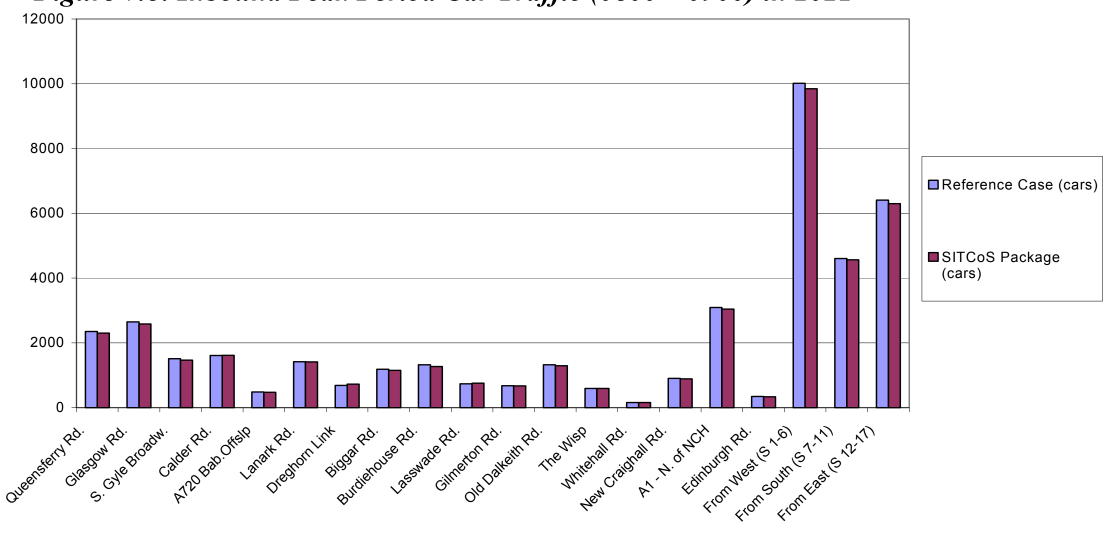
The clearly defined target of the Long Term Recommendation is to facilitate future increases in Cross Forth people movements that support the development of the local economy, whilst ensuring that demand for travel is controlled sufficiently that road traffic to/from Edinburgh rises no faster than the underlying rate of growth (i.e. the Reference Case).

7.6.3 It is essential that this Multi-Modal Crossing is supported by road space reallocation in favour of HOVs and incorporating the potential for future upgradability. The Multi-Modal Crossing would result in no additional capacity for single occupancy vehicles compared to the present two-lane Forth Road Bridge, and would also be designed to allow possible future upgrading to include LRT crossing the Forth.

7.6.4 The provision of an additional Forth crossing will also considerably improve the flexibility available to FETA in addressing its ongoing need to provide for future maintenance of the existing Forth Road Bridge. The provision of a state-of-the-art river crossing allows full consideration to be given to over-coming some of the existing road problems, such as the need to exclude high-sided vehicles during high winds. The preferred HGV route across the Forth would be the new bridge, and examination of predicted traffic flows in 2026 shows that HGVs could be accommodated within the proposed HOV Lanes north of the Forth[58].

7.6.5 Building a new crossing will have an adverse impact on the environment further details of which are contained in section 3.5. However investigation of AM peak traffic flows from the DAM-H model suggests that the Balanced Strategy increases AM peak 2026 southbound flows on the A90 approaching Barnton by less than 1%, and between Barnton and Blackhall by less than 0.5% (relative to the Reference Case). This would be further mitigated by other measures forming part of the five SITCoS Corridor recommendations – for further information refer to the over-arching SITCoS Report, but Figure 7.8 below provides an illustration of the predicted situation by 2021.

Figure 7.8: Inbound Peak Period Car Traffic (0800 – 0900) in 2021



58 Modelling results for the M90 southbound HOV Lane in 2026 suggest 850 car pcu's + 267 HGV pcu's = 1117 total pcu's - i.e. 56% of a 2000 pcu capacity HOV lane.

7.6.6 Compared to the Reference case there is an overall reduction of 2.3% in car traffic on Queensferry Road (at the outer cordon point) by 2021, and overall traffic from the west is reduced by 1.7%. In the event that the Edinburgh Cordon Charging Scheme had been introduced, these figures would have risen to 7.9% and 12.0% respectively. Further information is presented in Appendix G.

7.6.7 Set against any growth in traffic should be the potential economic benefits for the SESTRAN region – despite its cost, the Multi-Modal Crossing yields a Net Present Value of £1113 million in conjunction with the supporting short and medium term recommended packages, and the economic spin-offs have already been identified as follows:

- 0.5% boost to Fife economy, plus 0.1% boost to the Lothians' economy; and
- 0.8% increase in Fife employment (circa 1000 jobs) plus small increase in Lothians (see Figure 3.21).

7.6.8 Section 3.7 also set out a brief description of the potential economic benefits identified for other new river crossings.

7.6.9 The success of the Balanced Strategy (encompassing short, medium and long term recommendations) in supporting public transport has been demonstrated in Figures 7.3 to 7.7 above. The Demand Managed Strategy achieves a better modal share for public transport but at the expense of constrained Cross Forth travel opportunities and probable adverse impacts on the SESTRAN economy.

7.6.10 Finally the impact of the Balanced Strategy on Cross Forth accessibility was demonstrated in Section 3.9, which showed significant accessibility improvements for public transport users especially to/from West Edinburgh.

7.6.11 The overall impactsof both the long-term strategies are summarised in Table 7.1.

Table 7.1: Summary of Long Term Strategies against Objectives

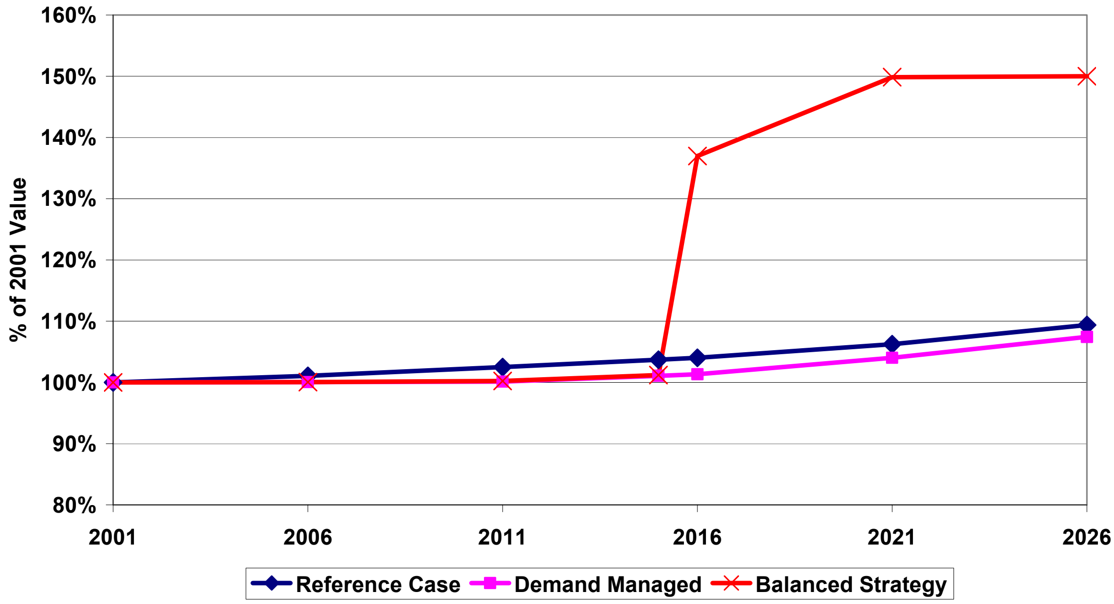
	Yardstick		Roads Based Strategy (A)	Balanced Strategy (B)
Planning Objectives	Reduce the number of people commuting in single occupancy vehicles within South East Scotland – especially for journeys to and from Edinburgh; but also for journeys to destinations outwith the SESTRAN area;		✘✘✘	✘
	Minimise the overall need for travel, especially by car;		✘	✓
	Maximise public transport provision and achieve public transport integration and intermodality;		O	✓
	Improve safety for all road and transport users;		✘	✓✓✓
	Enhance community life and social inclusion;		✘	O
	Maintain existing infrastructure properly in order that it can be fully utilised;		✓✓✓	✓✓✓
	Enhance movements of freight, especially by rail and other non-road modes;		O	O
	Sustain the economic health of the SESTRAN region;		✘	✓✓
	To stabilise (in the short term) and improve (in the long term) accessiblity to cross-Forth movement for people and goods;		✘	✓
	Ensure land-use planning is integrated with transportation plans.		O	✓
Government Objectives	Environment;	Noise & Vibration	✘	✘
		Air Quality	✓	✘
		Water quality, drainage & flood defence	✘✘	✘✘
		Geology, Agriculture & Soils	✘✘	✘✘
		Biodiversity	✘✘	✘✘
		Visual amenity	✘✘	✘✘
		Cultural Heritage	✘	✘
		Landscape	✓	✓
	Safety;		✘	✓✓✓
	Economy;		✘	✓✓
	Integration;		✘	O
	Accessibility/Social Inclusion;		✘	O
	Implementability		✘✘	✘✘

✓✓✓	Major Benefit
✓✓	Moderate Benefit
✓	Minor Benefit
O	No Benefit or Impact
✘	Small Minor Cost or Negative Impact
✘✘	Moderate Cost or Negative Impact
✘✘✘	Major Cost or Negative Impact

7.6.12 It is clear from Table 7.1 that a Roads-based Long-Term Strategy is not supported by appraisal against the majority of Objectives set for this study. The Balanced Strategy achieves positive appraisals against most Objectives. The long-term choice would therefore appear to come down to a choice between persevering with a Demand Managed Strategy into the Long Term, and providing a third Forth Crossing with the other recommendations of the Balanced Strategy.

7.6.13 The long-term impact of these two approaches, particularly on the bridgehead area, can be illustrated by Figure 7.9 below.

Figure 7.9: Cross Forth Car Trips (Southbound 0700-1000)



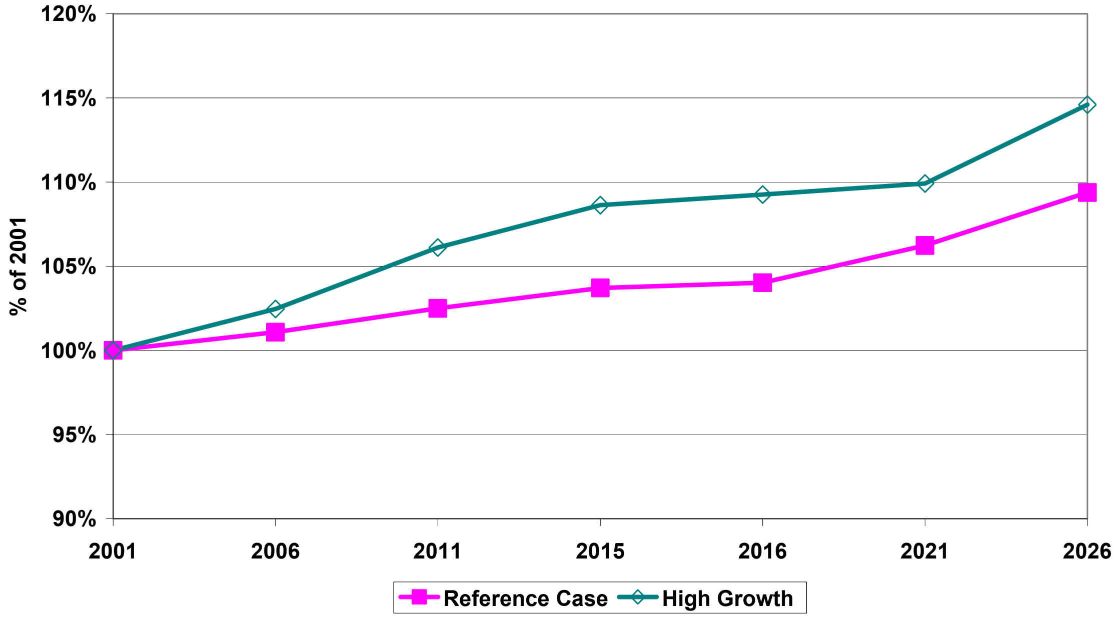
7.6.14 This shows that under the Reference Case (based only on existing Structure Plan development in south Fife) car trips continue to grow, by almost 10% between 2001 and 2026. The Demand Managed strategy has a modest impact on this growth, curtailing it to around 7% between 2001 and 2026. If this could be accommodated on the existing Road Bridge without further impact on maintenance, then there would be a case not to build a third crossing.

7.6.15 However in the event that the existing bridge is deemed unsuitable to cater for this future growth, even with the "favourable" impact of demand management, then there will be a case to consider a third crossing supported by all the other elements of the Balanced Strategy – this strategy has a positive NPV (including the highest PVB in absolute terms) and a BCR of 2.7, and therefore presents a positive economic case.

7.6.16 The Balanced Strategy delivers a third Forth crossing, but reserves all additional capacity created for HOVs. As well as therefore favouring sustainable transport, it has the added advantage of building in slack that can be utilised for emergency maintenance, etc.

7.6.17 The need to consider this strategy would be strengthened by adoption of higher growth scenarios for land-use planning in south Fife, as illustrated by Figure 7.10 overleaf. This shows that pursuing a high growth land-use scenario in south Fife could result in a 15% increase in Cross Forth car trips between 2001 and 2026, and the future "maintainability" of the existing Road Bridge may need to be reviewed in the light of such a scenario, placing further emphasis on the Balanced Strategy.

Figure 7.10: Impact of High Growth Land-Use on Cross Forth Car Trips (Southbound 0700-1000)



7.6.18 An approach to monitoring of the current situation, and the need for a "trigger" to stimulate commencement of the construction process associated with a third crossing has been set out in Chapter 6.

7.6.19 The cost of funding the long-term strategies is summarised in Section 7.7, and Section 7.8 presents the Appraisal Summary Table for the Balanced Strategy.

7.6.20 Reference to Figure 7.9 demonstrates a remaining challenge for the Balanced Strategy, namely that road traffic volumes will still be 50% above current levels in the peak period, with the prospect of peak-spreading resulting in these heightened traffic volumes being maintained for longer periods of the day than at present.

7.6.21 This means that it will be essential to retain in place **all** the short and medium term measures promoting modal shift towards more sustainable modes, including the demand management through tolling, and that it will be necessary to increase the tolls **in real terms** in order to restrict the growth in road traffic.

Implications for Demand Management

7.6.22 Given that the recommended long term approach is to adopt the Balanced Strategy, which incorporates demand management measures such as differential tolling and reduced rail fares, then it would be sensible to progress with these demand management measures as soon as practicable.

7.7 Funding of Forth Multi-Modal Crossing and Other Recommended Measures

7.7.1 The cost of the measures recommended can be summarised as set out in Table 7.2 below.

Table 7.2: Capital and Operating Costs for Possible Measures

Measure	Capital Costs	Operating Costs (per annum)
HOV Lane - Halbeath - FRB	£12,600,000	nil
Bus Right of-Way Priority Measures in Fife	£1,400,000	nil
Extra Cross-Forth bus services - as per Fig 7.5	£5,280,000	£3,000,000
Halbeath bus-based P&R site	£2,900,000	nil
Diversion of existing buses via Rosyth station	nil	£100,000
Improved Car Parking at Rosyth station	£1,400,000	nil
Additional feeder buses to Fife stations (as per Fig 7.6)	£1,320,000	£750,000
Car Park Extension at Inverkeithing (plus access road and improved pedestrian access)	£4,400,000	nil
Revised Rail Services on Fife Circle - splitting circle (as per Technical Annex, Volume 2) and adding one additional stopping train from Glenrothes and one from Kirkcaldy, both via EARL - additional costs relative to existing Fife Circle with EARL	£4,000,000	£1,500,000
Turnback at Markinch	£4,040,000	£50,000
Savings from withdrawing Kirkcaldy – Glasgow Queen Street service	-£2,000,000	-£500,000
2-lane bridge with link roads - LRT compliant	£442,000,000	£1,250,000
Total Cost of Balanced Strategy	***£477,340,000***	***£6,150,000***
Provision of LRT service from Fife Loop to central Edinburgh via Edinburgh Airport	£241,008,000	£8,350,783

7.7.2 The precise details of the year-on-year tolling regime are a matter for FETA to decide and outwith the scope of this study, however it is possible to make the following observations in the light of this study's recommendations.

7.7.3 Modelling of the impact of increased tolls showed minimal impact on Cross Forth traffic flows, but it may be necessary to raise tolls in order to finance the recommendations set out above, and particularly to provide sufficient investment for the proposed Multi-Modal Crossing. The tolling regime that raises most tolls per £ of traveller "pain" (i.e. disbenefit) is to re-introduce southbound tolling and implement differential tolls for single occupancy vehicles with particular emphasis on the peak periods.

7.7.4 The levels of these differential tolls should be set (and maintained) at a level just high enough to generate enough revenue to pay for the new crossing and the other recommendations after taking account of other sources of funding (e.g. Scottish Executive). Tolls in excess of this level will generate additional traveller disbenefits with no additional schemes to show for it, and minimal impact on managing Cross Forth travel demand.

7.7.5 In the event of differential southbound tolling proving unfeasible, the "next best" tolling regime is simply to increase northbound flat tolls year-on-year to generate the required flow of revenue.

7.8 STAG Part 2 Appraisal Summary for the Balanced Strategy

7.8.1 The Part 2 appraisal results have already been discussed in Chapter 3 – the appropriate Appraisal Summary Table is reproduced below. All prices quoted are in 2002 prices and include Optimism Bias, unless otherwise stated.

Proposal Details			
Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal)		SESTRAN	
Proposal Name:	Queensferry Cross Forth Recommendations	Name of Planner:	Scott Wilson/MVA
Proposal Description:	Balanced Strategy of Short, Medium and Long Term Recommendations arising from the SESTRAN Integrated Transport Corridors Study	Total Public Sector Funding Requirement:	Capital Costs £475.9 million
			Annual Revenue Support None
			Present Value Cost to Government £663.3million (inc 44% Optimism Bias Correction)
Funding Sought From: (if applicable)		Amount of Application:	

Background Information	
Geographic Context:	The proposal relates to the Queensferry Cross-Forth area, primarily South Fife and West/Central Edinburgh. This encompasses the north-western quadrant of Edinburgh's journey-to-work zone, including Western Edinburgh, South Queensferry, Inverkeithing, Rosyth and Dunfermline. The area includes the Firth of Forth particularly around the road and rail bridges at Queensferry.
Social Context:	The size of the Corridor results in a very diverse social mix. The area to the west of Edinburgh is predominantly suburban, with above average levels of owner occupied housing and high car availability. However the Corridor does include a Social Inclusion Partnership (North Edinburgh: Granton, Pilton and Muirhouse) which together with the Granton Waterfront area forms the focus of NEAR (North Edinburgh Area Renewal). North of the Forth the Fife towns of Dunfermline, Inverkeithing, Rosyth, Dalgety Bay and Cowdenbeath are similarly diverse, including Abbeyview, one of Fife's regeneration areas. Generally the South Fife area has a mixture of established communities (which have suffered from economic decline) and new developments such as the Dunfermline Eastern Expansion and Dalgety Bay (where a significant proportion of residents are commuting to Edinburgh).
Economic Context:	Western Edinburgh's economy has grown rapidly, particularly with financial sector companies, and this growth looks set to continue, albeit at a lower rate. Economic growth in the South of Fife has been more modest, although there has been considerable expansion in housing as a result of over-heating in the Edinburgh housing market. Development has also taken place at Rosyth Europarc and with the Rosyth – Zeebrugge ferry.

Planning Objectives	
Objective:	Performance against planning objective:
Environment	
Reduce the number of people commuting in single occupancy vehicles within South East Scotland.	Balanced Strategy will improve the overall Car Occupancy Rate by 5% in 2026, compared to 2001. This is in contrast to the Reference Case, where car occupancy will have declined by more than 20% by 2026.
Minimise the overall need for travel, especially by car.	Future technology may contribute to a reduced need to travel, but at present this is not considered sufficient to offset background growth in travel demand. The Balanced Strategy has no quantifiable impact on the overall need for travel.
Safety	
Improve safety for all road and transport users.	Refer to Government Objective
Economy	
Maintain existing infrastructure properly in order that it can be fully utilised.	Provision of a Multi-Modal Crossing will reduce pressure on existing Forth Road Bridge, allowing a more relaxed maintenance programme to ensure that all Cross Forth road links can be utilised as fully as possible. Increased number and length of passenger trains crossing the Forth Bridge, (using up the spare capacity created by the diversion of coal trains via Stirling-Alloa), to accommodate a predicted 70% increase in Cross Forth rail passengers by 2026.
Enhance movements of freight, especially by rail and other non-road modes.	No positive benefits for rail-borne freight and the use of freed-up cross-Forth freight paths for passenger services will reduce the flexibility for switching road freight to rail). Road-borne freight will benefit from increased provision of road-space for HGVs and generally reduced congestion.

Sustain the economic health of the SESTRAN region.	An additional Forth crossing is likely to have a positive economic impact within the bridgehead area given that Cross Forth movements are increasingly constrained and the opportunities for regeneration in the area. EALIs suggest that there will be particular benefits for jobs outwith Edinburgh and a minor net increase in jobs in the SESTRAN area.
Integration	
Maximise public transport provision and achieve public transport integration and intermodality.	Refer to Government Objectives for Accessibility and Integration.
Accessibility & Social Inclusion	
Enhance community life and social inclusion.	Refer to Government Objective for Accessibility.
To stabilise (in the short term) and improve (in the long term) accessibility to cross-Forth movement for people and goods.	40% increase in numbers of cross-Forth public transport trips in the AM peak, relative to the 'Do Minimum' Reference Case. Up to 30 minute reduction in AM peak journey times between Dunfermline and the main employment centres in West and Central Edinburgh and West Lothian
Rationale for Selection or Rejection of Proposal:	All components appraised at STAG Part 1 that were considered to potentially benefit Cross Forth transport were carried forward for more detailed appraisal at Part 2 level, and formed into a balanced long-term strategy as described in greater detail in the accompanying reports.

Implementability Appraisal	
Technical:	New bridging of the Forth poses obvious major infrastructure issues that will be unique to this important World Heritage site. Otherwise no obvious technical difficulties for most components of the Balanced Strategy. Some technological developments **may** be necessary to facilitate southbound tolling, as well as automatic recognition of car occupancy levels in order to ensure the correct toll is levied.
Operational:	Generally no complex operational problems foreseen, although assumes development of appropriate tolling technologies. Enforcement of HOV Lanes requires carefully consideration, and public transport operators may require funding/pump-priming of new services envisaged. More generally there is a heavy dependency on improved information/marketing to raise awareness and understanding of schemes such as Park & Choose and HOV Lanes. Continuing demand management and all the identified short/medium term measures will be essential to the long-term success of the strategy. In particular to avoid exhausting the new Cross Forth capacity it will be necessary to increase tolls **in real terms**.
Financial:	New river crossing is a major capital project, but can be supported by a significant revenue stream (tolls). Other schemes will also require elements of additional funding (e.g. additional rolling stock) and possible revenue support, but the levels involved should not be prohibitive.
Public:	Building of new crossing will tend to polarise public opinion. Supporting demand management measures will be perceived negatively as "sticks", but the remaining measures are essentially "carrots" and should generally be viewed positively by the public. The need for continued "sticks" as well as "carrots", particularly increasing tolls in real terms, is unlikely to be popular.

Environment					
Mitigation Options Included: (Costs & Benefits)	See below and Chapter 3				
Sub-objective	**Year**	**Qualitative Information**	**Quantitative Information**	**Magnitude of Effect**	**Significance of Impact**
Noise and Vibration	**06**	The Option will result in a decrease in the total number of people annoyed by traffic noise.	Estimated decrease in population likely to be annoyed by traffic noise = 20 (population exposed = 223713)		**Positive Minor**
	11	The Option will result in a decrease in the total number of people annoyed by traffic noise.	Estimated decrease in population likely to be annoyed by traffic noise = 111 (population exposed = 219677)		**Positive Minor**
	16	The Option will result in an increase in the total number of people annoyed by traffic noise.	Estimated increase in population likely to be annoyed by traffic noise = 190 (population exposed = 212447)		**Negative Minor**
	21	The Option will result in an increase in the total number of people annoyed by traffic noise.	Estimated increase in population likely to be annoyed by traffic noise = 158 (population exposed = 205049)		**Negative Minor**
	26	The Option will result in an increase in the total number of people annoyed by traffic noise.	Estimated increase in population likely to be annoyed by traffic noise = 129 (population exposed = 199586)		**Negative Minor**
Air Quality - Overall	**06**	There will be an overall minor decrease in emissions of CO_2, PM_{10} and NO_2.	There will be a net change in emissions of PM10 by –3.3 tonnes/yr (-1.1%). There will be a net change in emissions of NO2 by –93.3 tonnes/yr (-1%).		**Positive Minor**
	11	There will be an overall increase in emissions of CO_2, PM_{10} and NO_2.	There will be a net change in emissions of PM10 by +1 tonnes/yr (0.7%). There will be a net change in emissions of NO2 by +96 tonnes/yr (1.6%).		**Negative Minor**

	16	There will be an overall increase in emissions of CO_2 and PM_{10} and a decrease in NO_2.	There will be a net change in emissions of PM10 by +1 tonnes/yr (0.7%). There will be a net change in emissions of NO2 by –17 tonnes/yr (-0.4%).		**Neutral**
	21	There will be an overall decrease in emissions of CO_2, PM_{10} and NO_2.	There will be a net change in emissions of PM10 by -6 tonnes/yr (-5%). There will be a net change in emissions of NO2 by –288 tonnes/yr (-6.2%).		**Positive Minor**
	26	There will be an overall increase in emissions of CO_2, PM_{10} and NO_2.	There will be a net change in emissions of PM10 by +1 tonnes/yr (0.9%). There will be a net change in emissions of NO2 by +76 tonnes/yr (1.5%).		**Negative Minor**
CO2 - Global	**06**	CO_2 emissions from the roads in the study area decrease by 1.2% due to the operation of the Demand Management option in 2006.	Net change in CO_2 emissions is –17010 tonnes/yr against the reference case.		**Positive Minor**
	11	CO_2 emissions from the roads in the study area increase by 0.1% due to the operation of the Balanced Strategy option in 2011.	Net change in CO_2 emissions is +1023 tonnes/yr against the reference case.		**Neutral**
	16	CO_2 emissions from the roads in the study area increase by 0.2% due to the operation of the Balanced Strategy option in 2016.	Net change in CO_2 emissions is +2949 tonnes/yr against the reference case.		**Neutral**
	21	CO_2 emissions from the roads in the study area decrease by 5.6% due to the operation of the Balanced Strategy option in 2021.	Net change in CO_2 emissions is – 85665 tonnes/yr against the reference case.		**Positive Minor**
	26	CO_2 emissions from the roads in the study area increase by 0.6% due to the operation of the Balanced Strategy option in 2026.	Net change in CO_2 emissions is +10153 tonnes/yr against the reference case.		**Neutral**

PM_{10} - Local	**06**	The difference in the PM_{10} index in the study area is –3260 (-0.6%), between the reference and operational Demand Management option in 2006.	767779 (62%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of PM10 against the reference case. 477920 (38%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of PM10 against the reference case.		**Neutral**
	11	The difference in the PM_{10} index in the study area is –878 (-0.3%), between the reference and operational Balanced Strategy option in 2011.	876664 (70%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of PM10 against the reference case. 383354 (30%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of PM10 against the reference case.		**Neutral**
	16	The difference in the PM_{10} index in the study area is –1834 (-1%), between the reference and operational Balanced Strategy option in 2016.	1072908 (86%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of PM10 against the reference case. 177189 (14%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of PM10 against the reference case.		**Positive Minor**
	21	The difference in the PM_{10} index in the study area is –8336 (-4.8%), between the reference and operational Balanced Strategy option in 2021.	1203459 (98%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of PM10 against the reference case. 27660 (2%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of PM10 against the reference case.		**Positive Minor**
	26	The difference in the PM_{10} index in the study area is +994 (0.5%), between the reference and operational Balanced Strategy option in 2026.	448495 (37%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of PM10 against the reference case. 770250 (63%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of PM10 against the reference case.		**Neutral**

NO_2 - Local	**06**	The difference in the NO_2 index in the study area is –70874 (-0.5%), between the reference and operational Demand Management option in 2006.	761200 (62%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of NO2 against the reference case. 484499 (38%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of NO2 against the reference case.		**Neutral**
	11	The difference in the NO_2 index in the study area is +19332 (0.2%), between the reference and operational Balanced Strategy option in 2011.	751156 (60%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of NO2 against the reference case. 508862 (40%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of NO2 against the reference case.		**Neutral**
	16	The difference in the NO_2 index in the study area is –122303 (-1.7%), between the reference and operational Balanced Strategy option in 2016.	967476 (77%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of NO2 against the reference case. 282622 (23%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of NO2 against the reference case.		**Positive Minor**
	21	The difference in the NO_2 index in the study area –357065 (-5.4%), between the reference and operational Balanced Strategy option in 2021.	1202362 (98%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of NO2 against the reference case. 28757 (2%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of NO2 against the reference case.		**Positive Minor**
	26	The difference in the NO_2 index in the study area is +107363 (1.6%), between the reference and operational Balanced Strategy option in 2026.	631584 (52%) people in the study area are located in zones that are predicted to have an overall improvement in emissions of NO2 against the reference case. 587162 (48%) people in the study area are located in zones that are predicted to have an overall deterioration in emissions of NO2 against the reference case.		**Negative Minor**

Water Quality, Drainage and Flood Defence	During Construction	*Park & Ride site at Halbeath* Temporary construction impacts are possible as a result of groundbreaking. Construction best practice will reduce any adverse impacts *HOV lane* Temporary construction impacts are unlikely. Construction best practice will reduce any adverse impacts *Bus priority measures in Fife* Temporary construction impacts are unlikely. Construction best practice will reduce any adverse impacts *Enhanced bus services* Temporary construction impacts are unlikely. Construction best practice will reduce any adverse impacts *Expansion of Park and Ride sites at Inverkeithing, Ferrtoll, Rosyth, and Dalgety Bay* Temporary construction impacts are possible as a result of groundbreaking. Construction best practice will reduce any adverse impacts *Multi-Modal Crossing* The construction stage of the new Multi-Modal Crossing would potentially have severe impacts on water resources, due to groundbreaking work, potential construction activity within the Firth of Forth, and the possibility of accidental contamination. However, these impacts will be temporary and the implementation of best practice principles will ensure that the negative effects are moderate at worst.		Negative Slight	**Negative Minor** **Neutral** **Neutral** **Neutral** **Neutral-Minor Negative** **Negative Moderate-Major**

	During Operation	*Park A Ride site at Halbeath* Potential increase in surface run-off as a result of development *HOV lane* No permanent impacts are predicted *Bus priority measures in Fife* No permanent impacts are predicted *Enhanced bus services* No permanent impacts are predicted *Additional Trains* No permanent impacts are predicted *Expansion of Park and Ride sites at Inverkeithing, Ferrtoll, Rosyth, and Dalgety Bay* Permanent impacts relating to the potential increase in surface run-off *Multi-Modal Crossing* The effects due to operation will be dependant on the final bridge design.			**Neutral-Minor Negative** **Neutral** **Neutral** **Neutral** **Neutral** **Negative Minor** **Negative Minor-Moderate**

Geology, Agriculture and Soils	During Construction	*Park & Ride site at Halbeath* There will be a requirement for groundbreaking work during construction, which may have significant effects on geology and soils. Soils may be permanently affected by additional surface run-off as a result of additional hard-standings *HOV lane* Temporary and permanent impacts on groundwater and surface run-off. *Bus priority measures in Fife* Temporary and permanent impacts on groundwater, water features and surface run-off. *Enhanced bus services* Temporary and permanent impacts on groundwater, water features and surface run-off. *Additional Trains* No permanent impacts are predicted *Expansion of Park and Ride sites at Inverkeithing, Ferrtoll, Rosyth, and Dalgety Bay* Permanent impacts relating to the potential increase in surface run-off *Multi-Modal Crossing* Permanent impacts on the Firth of Forth are likely to relate to the change in channel characteristics, though these will be dependant on the final bridge design .			**Neutral-Negative Minor** **Neutral-Negative Minor** **Neutral** **Neutral** **Neutral** **Neutral** **Negative Minor** **Negative Minor-Moderate**

	During Operation	*Multi-Modal Crossing* Potential impacts on channel characteristics of the Forth of Forth			**Minor-Negative**
Biodiversity		Firth of Forth SSSI, SPA and Ramsar site. Direct impacts caused by construction disturbance and structures within the estuary channel.	Direct loss of habitat, and disturbance to bird species	Large negative	**Negative Major**
		Ferry Hills SSSI. Direct loss of habitat due to the construction of the different elements	Direct loss of habitat to allow construction of infrastructure	Large negative	**Negative Major**
		St Margaret's Marsh SSSI. Direct loss of habitat and potential disturbance or pollution risks	Direct habitat loss to allow construction of infrastructure, and decline in quality of remaining habitat	Large negative	**Negative Major**
		Jamestown Pond SINC. Indirect construction and disturbance impacts, with possible pollution or runoff risks during the operational phase	Decline in the water quality, with indirect impacts upon species within the habitat	Moderate negative	**Negative Moderate**
		Woodland habitats on ancient woodland inventory, semi-natural woodland inventory, and trees protected by tree preservation orders	Direct loss of habitats due to construction activity, and fragmentation of remaining habitats	Moderate adverse	**Negative Moderate**
		Impacts upon protected species, including badger, otter, great crested newts, water vole, salmon, invertebrates, bats, birds and marine species.	Direct impacts upon species, and indirect cts caused by reduction in size and quality of habitats and disturbance.	Moderate adverse	**Negative Moderate**
Visual Amenity	*Rail Improvements*	Residential, commercial and recreational receptors with varying sensitivity will notice a small intensification to the existing service.	Large numbers Adjacent to route to medium range. Medium to low sensitivity	Negative minor	**Negative Minor**

	Bus Priority Lanes	Residential, commercial and recreational receptors with varying sensitivity will notice small changes to the existing route (signage , green lanes, vehicle movements etc.)	Large numbers Adjacent to route Medium to low sensitivity	Negative small	**Negative Minor**
	M90 Priority Vehicle Lane	Adjacent properties (residential and commercial) will experience changes to their views accoding to their proximty to the route and the scale of the proposed works.	Small numbers Adjacent and close to route Medium/High sensitivity	Negative moderate	**Negative Moderate**
		Other road users will notice changes to the existing route (additional lane, sigage, changes in vehicle movements)	Large numbers Low sensitivity Adjacent	Negative small	**Negative Minor**
	Inverkeithing Park and Ride	Business premises overlooking the site will experience changes to their view.	4 properties Low sensitivity Adjacent	Neutral	**Neutral**
		Road and existing car park users	Moderate numbers Low sensitivity Adjacent	Neutral	**Neutral**
	3rd Crossing Alignment and associated Links/ A8000/M9 Spur	Residential receptors adjacent to the proposed works. Impacts will vary according to the proximity to the route and the scale of the works	Approx. 25 houses High sensitivity Adjacent to route	Negative large/ medium	**Negative Major**

Cultural Heritage		***Statutory Designations*** *Listed Buildings* Effects of construction and operation on the setting of Listed Buildings. *Scheduled Ancient Monument* Effects of construction and operation on the setting of Scheduled Ancient Monuments. *Conservation Areas* Effects of construction and operation on the setting of conservation areas. ***Non-statutory Designations*** Effects of construction and operation on the setting of conservation areas.			**Negative Minor** **Negative Minor** **Negative Minor** **Neutral-Negative Minor**
Landscape	*Rail Improvements*	Although the railway bridge is a prominent structure, the proposals are minor, representing a small intensification of the existing service	Major landmark structure, no designations Medium sensitivity	Negative minor	**Negative Minor**

	Bus Priority Lanes	The proposals will affect an existing route. The lanes will be introduced in some sensitive areas	High/Medium sensitivity. The route affects the following designations: -New Town Conservation Area (within) (CELP); -Dean Conservation Area (adjacent) (CELP); -Dunfermline Conservation Area (within) (DCLP); -North Queensferry Conservation Area (adjacent) (DCLP); -Dalmeny Estate Area of Outstanding Landscape Quality (adjacent) (RWELP); -Areas of Great Landscape Value and Green Belt within west Edinburgh (crosses) (WELP); -Open spaces of outstanding landscape quality and townscape significance within central Edinburgh (crosses) (CELP).	Negative small	**Negative Minor**
	M90 Priority Vehicle Lane	Widening an existing route,	Low sensitivity, no designations	Negative small	**Negative Minor**
	Inverkeithing Park and Ride	Extension to existing uses	Low sensitivity, no designations	Neutral	**Neutral**
	3rd Crossing Alignment and associated Links/ A8000/M9 Spur	an extension to the existing major route network which has been successfully integrated into the landscape. careful design is required to avoid cumulative effects.	Medium sensitivity. Duntarvie Castle A- Listed Building	Negative medium	**Negative Moderate**
	3rd Crossing	major landscape change with potential to introduce a striking new landmark feature	Medium sensitivity	Positive large	**Negative Major**

Safety			
Sub-objective	**Item**	**Qualitative Information**	**Quantitative Information**
Accidents	Change in Annual Personal Injury Accidents	Based on output from demand modelling. Significant reduction within SESTRAN area, partially offset by increases elsewhere in Scotland	Approximately 32 fewer Personal Injury Accidents per year
	Change in Balance of Severity	No quantified data, but not anticipated to be any significant changes in balance of severity	
	Total Discounted Savings		Over **£50.0** million PVB over sixty years
Security		No significant changes in security are envisaged.	

Economy (Transport Economic Efficiency)			
Sub-objective	**Item**	**Qualitative Information**	**Quantitative Information**
User Benefits	Travel Time	Significant public transport travel time savings, particularly between South Fife and West Edinburgh/West Lothian and moderate private vehicle travel time savings for cross-Forth movements savings (e.g. 5-10 minutes reduction in AM peak)	£906.3 million
	User Charges	Increased tolling to fund investment results in user disbenefits.	(£97.9 million) (disbenefits)
	Vehicle Operating Costs	Significant savings from reduced congestion	£103.6 million benefit
	Quality / Reliability Benefits	Increased reliability of road-based journey times (car and bus) for Cross-Forth movements (due to extra crossing provided additional capacity to deal with maintenance and incidents etc), possible reduction in rail reliability due to use of two extra cross-Forth rail paths	Not quantified
Private Sector Operator Impacts	Investment Costs	Assume all investment funded by Public Sector	Nil
	Operating & Maintenance Costs	Additional buses plus 2 additional cross-Forth trains per hour	£217.3M additional costs (PVC discounted over 60 years)
	Revenues	Fares from additional services and additional demand due to higher SOV peak tolls and reduced cross-forth Rail fares	£418.0 million (60-yr PVB)

	Grant/Subsidy payments	None – operating costs covered by extra revenue	
Economy (Economic Activity and Location Impacts)			
Sub-objective	**Item**	**Qualitative Information**	**Quantitative Information**
Economic Activity and Location Impacts	Local Economic Impacts	EALIs suggest that there will be particular benefits for jobs outwith Edinburgh and a minor net increase in jobs in the SESTRAN area.	Less than 100 net additional jobs created in SESTRAN area by 2026, although almost 1000 additional jobs in Fife/West Lothian offset by these jobs being attracted from Edinburgh.
	National Economic Impacts	Improved Cross Forth accessibility has positive benefits for the remainder of Scotland, particularly the surrounding areas (e.g. Perth & Kinross, Tayside)	Additional 400 jobs created outwith SESTRAN area by 2026.
	Distributional Impacts	Given scale of study, very localised impacts have not been quantified, but the benefits set out above are particularly beneficial to the Fife economy.	

Integration			
Sub-objective	**Item**	**Qualitative Information**	**Quantitative Information**
Transport Interchanges	Services & Ticketing	Key elements of the strategy have particular benefits for seamless travel, such as the improved bus and rail services and an increased number of transport interchanges. The Park & Choose concept is particularly beneficial.	45% of Cross Forth travellers will have experienced improved transport integration by 2026.
	Infrastructure & Information	Improved interchanges will bring better infrastructure and greater opportunities to provide improved information provision. Marketing campaign for public transport will have particular benefits.	
Land-use Transport Integration		All components of the Balanced Strategy comply with relevant Structure and Local Plans, Transport Strategies and other relevant planning documents.	
Policy Integration		Modal shift in favour of public transport will support the general disability, health and rural affairs' policies. Social exclusion will be tackled (see Accessibility below) and most of the transport-related targets will be supported (e.g. reducing trunk road congestion).	

Accessibility & Social Inclusion			
Sub-objective	**Item**	**Qualitative Information**	**Quantitative Information**
Community Accessibility	Public Transport Network Coverage	Improvements to Cross Forth travel times by PT particularly between South Fife and West Lothian/West Edinburgh.	Not quantified due to very broad geographical nature of the corridor appraisal.
	Access to Other Local Services	Impacts on local services anticipated to be minor – some positive (e.g. improved cycle access to PT interchanges), some negative (e.g. severance due to building associated with Multi-Modal Crossing).	
Comparative Accessibility	Distribution/Spatial Impacts by Social Group	Improvements are greater for PT users than non-PT users, principally because of significant PT service improvements proposed. This will clearly benefit non-car available households more than car-available households.	
	Distribution/Spatial Impacts by Area	Positive impacts for access between South Fife and West Lothian/West Edinburgh, which were identified as areas with particularly poor transport links at present.	

Cost to Public Sector		
Item	**Qualitative information**	**Quantitative information**
Public Sector Investment Costs	60 year PVC's quoted in 2004 prices	£580.7 million
Public Sector Operating & Maintenance Costs	60-year PVC, quoted in 2004 prices – assumes all additional PT operations will be funded from revenue by private sector - includes additional MMC maintenance	£45.9 million
Grant/Subsidy Payments	See above.	Nil
Revenues	Increased toll revenues	£146.5 million over 60 years
Taxation impacts	Modal shift and increased tolls results in reduction in Government revenues from indirect taxation	£183.2 million over 60 years
Monetised Summary		
Present Value of Transport Benefits	£1776.3 million over 60 years	
Present Value of Cost to Government	£663.3 million over 60 years (includes 44% Optimism Bias Correction)	
Net Present Value	£1113.0 million over 60 years	
Benefit-Cost to Government Ratio	2.7	

APPENDIX A

Bus Priority Schemes Considered

COSTINGS

Bus Priority

Desktop research into bus priority schemes suggests the following costs:

- Priority lanes - £100,000 per km[1];
- Junction improvements (including satellite monitoring) - £20,000 per junction[2];
- Real time passenger information - £11,000 per stop[3];
- Equipping buses - £35 per bus[4];
- Double painted lines (yellow/red) assumed allowance of £2,000 per km; and
- Bus Stop upgrade - £4,000 per stop.

Park and Ride Schemes

Schemes involved:

- Halbeath
- Rosyth
- Dalgety Bay
- Inverkeithing
- Ferry Toll

In order to provide a cost analysis, a suitable ground survey is required supplying spot levels/contours necessary to calculate earthworks.

Failing in a bid to gather such information, it is proposed that a grid survey be carried out on the sites of the proposed Park and Rides.

Priority Vehicle Lane

This is also awaiting detailed information in order to provide a suitable costing. Carriageway/hardshoulder details from Halbeath interchange to the North Bridge head providing contours and/or spot levels would refine the accuracy of the cost estimate.

It may be necessary to make certain assumptions in order to produce a cost estimate if information is not acquired.

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[1] Based on the London Bus Priority Network (reported in *Proceedings of ICE*, Volume 123, Issue 3, August 1997, page 156)
[2] Reported in *H&T* (March 1999 supplement)
[3] Reported in *H&T* (January 1999 supplement)
[4] *H&T* March 1999 supplement

Quality Bus Corridor: Halbeath Road – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 26	Kingseat roundabout	Leave as is	Leave as is	--	0
Jnt 25	Halbeath Retail Park Roundabout (east)	Leave as is	Leave as is	--	0
B.S. 1	Halbeath Road	Lack of Bus Priority	Bus Bay provided, leave as is	--	0
Jnt 24	Halbeath Road/conference centre assess road	Leave as is	Leave as is	--	0
Jnt 23	Halbeath Retail Park Roundabout (west)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Start Greenway on exit of Roundabout (Jnt 23 to Jnt 20) 650m at £100k/km	65
B.S. 2	Halbeath Road	Lack of Bus Priority	Provide Greenway	--	0
B.S. 3	Halbeath Road	Lack of Bus Priority	Provide Greenway	--	0
Jnt 21	Halbeath Road/ Linburn Road	Lack of Bus Priority	Provide Greenway	--	0
B.S. 4	Halbeath Road	Lack of Bus Priority	Provide Greenway	--	0
Jnt 20	Halbeath Road/ Halbeath Drive	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority through junction	£20k/juntion	20
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Halbeath Road – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 20	Halbeath Road/Halbeath Drive	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane up to traffic lights.	Stop Greenway at traffic lights, restart through Jnt 20 to Bridge. 150m at £100k/km	15
	Rail Bridge	Lack of Bus Priority	Leave as is	Stop greenway prior to bridge, restart after bridge. Greenway: Bridge to Jnt 7 (1.2km)	120
Jnt 18	Halbeath Road/Dalcross Way	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 5	Halbeath Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 17	Halbeath Road/Cheerybank	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 6	Halbeath Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 14	Halbeath Road/Scobie Place	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
Jnt 12	Halbeath Road/Lambert Drive	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 7	Halbeath Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Halbeath Road – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 8	Halbeath Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
	Halbeath Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Stop greenway as road narrows towards Jnt 7	0
Jnt 7	Roundabout at the end of Appin Crescent	Lack of Bus Priority on narrow street	Leave as is	--	0
Jnt 6	Appin Crescent/Transy Grove	Lack of Bus Priority on narrow street	Leave as is	--	0
B.S. 9	Appin Crescent	Lack of Bus Priority	Provide painted lane Bus stop in traffic	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 5	Appin Crescent/Couston Street	Lack of Bus Priority on narrow street	Leave as is	--	0
Jnt 4	Appin Crescent/Park Place	Lack of Bus Priority on narrow street	Leave as is	--	0
B.S. 10	Appin Crescent	Lack of Bus Priority	Provide painted lane Bus stop in traffic, reclaim grass margin on to roundabout	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 3	Sinclair Gardens roundabout	Peak hour traffic congestion	Leave as is	--	0

Sub Total	
Cumulative Total	

Quality Bus Corridor: Halbeath Road – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
	Carnegie Drive	Peak hour traffic on both lanes	Provide greenway, either reclaim footpath and grass margin or traffic lane	(£100k/km for 400m)	40
Jnt 1	Market Street/Carnegie Drive	Tight turning circle	Reclaim grass margin to provide easier turning onto Market Street	Allow £5k to remodel/construct	5
	Dunfermline Bus Station	--	--	Closed to all traffic except Buses and taxis	--
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
	Dunfermline Bus Station	--	--	Closed to all traffic except Buses and taxis	0
Jnt 1	Market St/Carnegie Drive	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority onto Carnegie Drive	£20k/juntion	20
	Carnegie Drive	Peak hour traffic on both lanes	Provide greenway, either reclaim footpath and/or traffic lane.	£100k/km for 400m	40
Jnt 2	Carnegie Drive	Peak hour traffic	Leave as is	--	0
Jnt 3	Sinclair Gardens roundabout	Peak hour traffic congestion onto roundabout	Provide Greenway onto roundabout by reclaiming footpath.	Accounted for	Accounted
B.S. 1	Bus Stop No. 1 (St Margaret's Drive)	Bus bay provided, merging back into traffic could be a problem at peak hours.	Provide Bus Priority lane from Jnt 3 exit to B.S. 1 include Real Time Passenger Information	Bus Priority Lane: 600m = £60k Bus stop equipment: £11k	71
Jnt 4	St Margaret's Drive	Exit from Rail station	Leave as is unless providing Bus Priority Lane then upgrade signage and road markings	Could possibly close and re route through Woodmill Street, upgrading parking	0
Jnt 5	Viaduct roundabout	Congested junction under viaduct	Limited space	No area for improvement	0
B.S. 2	Bus Stop No. 2 (Bothwell St)	Merging from Bus Bay	Move Pedestrian crossing to end of bus bay to allow priority, Real Time Passenger Information	£20k/juntion *Upgrade Bus Stop, Real Time Passenger Information (£11k)	35
				Sub Total	
				Cumulative Total	

* Assume £4k to upgrade Bus Stop

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 6	Bothwell St/Brucefield Av	Limited space to provide Bus Priority Lane	Leave as is	--	0
B.S. 3	Bus Stop No. 3 (Bothwell St)	Lack of Bus Priority on available road space	Provide Greenway from Bus Stop to roundabout by reclaiming footpath space.	20m at £100k/km = 2k *Upgrade Bus Stop, Real Time Passenger Information (£11k)	17
Jnt 8	St Leonard's Roundabout	Peak hour traffic congestion	Leave as is	--	0
Jnt 10	Hospital Hill/St Andrews Street	Limited space to provide Bus Priority Lane	Leave as is	--	0
Jnt 11	Hospital Hill/Aberdour Road	Limited space to provide Bus Priority Lane	Leave as is	--	0
B.S. 4	Bus Stop No. 4 (Hospital Hill/Pitbauchlie Bank)	Lack of Bus Priority on available road space	Start Bus Priority Lane. Real Time Passenger Information	Reclaim part of hard shoulder and central reservation (£100k/km at 1.3km = £130k) Bus stop equipment: £11k	144
Jnt 12	Hospital Hill/Pitbauchlie Bank	Realigned due to Bus Priority Lane	Upgrade signage and road markings	Bus Lane shall continue through junction	1
Jnt 15	Hospital Hill/Pitcorthie Road	Realigned due to Bus Priority Lane	Upgrade signage and road markings	Bus Lane shall continue through junction	1
B.S. 5	Bus Stop No. 5 (Queensferry Road)	Lack of Bus Priority on available space	Reposition, upgrade and provide Bus Priority Lane	*Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
				Sub Total	
				Cumulative Total	

*Assume £4k to upgrade Bus Stop
£1k allowance for signage improvements

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 16	Pitreavie Ind Estate Roundabout	Lack of Bus Priority on available space	Reclaim verge at roundabout to allow priority onto roundabout.	Allocated within £130k	0
B.S. 6	Bus Stop No. 6 (Queensferry Road)	Lack of Bus Priority on available space	Reposition, upgrade and provide Bus Priority Lane	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
Jnt 17	Golf Club (Queensferry Road)	Lack of signage illustrating entrance/exit	Upgrade signage and road markings	Bus Lane shall continue through junction	1
B.S. 7	Bus Stop No. 7 (Queensferry Road)	Lack of Bus Priority on available space	Reposition, upgrade and provide Bus Priority Lane	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
B.S. 8	Bus Stop No. 8 (Queensferry Road)	Lack of Bus Priority on available space	Reposition, upgrade and provide Bus Priority Lane	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
B.S. 9	Bus Stop No. 9 (Queensferry Road)	Lack of Bus Priority on available space	Reposition, upgrade and provide Bus Priority Lane	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
Jnt 20	Carnegie campus Roundabout	Lack of Bus Priority	Leave as is	Stop greenway on entry, start on exit	0
B.S. 10	Bus Stop No. 10 (Queensferry Road)	Lack of Bus Priority	Reposition and upgrade due to Bus Priority Lane	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
Jnt 21	Castle Drive Roundabout	Large Junction, 5 entrances/exits	Leave as is	Stop greenway on entry, start on exit	1
				Sub Total	
				Cumulative Total	

*Assume £4k to upgrade Bus Stop
£1k allowance for signage improvements

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 11	Bus Stop No. 11 (Queensferry Road)	Lack of Bus Priority on available space	Start bus priority lane. Real Time Passenger Information	Provide greenway from B.S 11 to Rosyth crossroads. (£100k/km at 1.3km = £130k) *Upgrade Bus Stop, Real Time Passenger Information (£11k)	145
Jnt 22	Primrose land Roundabout	Lack of Bus Priority	Provide greenway through large grass verge	--	Accounted
Jnt 23	King`s Road Roundabout	Lack of Bus Priority	Provide greenway through large grass verge	Mature Oak trees along route from King`s Rd roundabout to Rosyth crossroads	Accounted
Jnt 24	Queensferry Road/Wemyss Street	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	--	Accounted
B.S. 12	Bus Stop No. 12 (Queensferry Road)	Lack of Bus Priority on available space	Reposition and Real Time Passenger Information	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
Jnt 26	Queensferry Road/Woodside Av	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	--	Accounted
Jnt 27	Queensferry Road/Park Road	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	--	Accounted
B.S. 13	Bus Stop No. 13 (Queensferry Road)	Lack of Bus Priority on available space	Reposition and Real Time Passenger Information	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15

*Assume £4k to upgrade Bus Stop
£1k allowance for signage improvements

Sub Total	
Cumulative Total	

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 29	Queensferry Road/Hamilton Place	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	--	Accounted
B.S. 14	Bus Stop No. 14 (Queensferry Road)	Lack of Bus Priority on available space	Reposition and Real Time Passenger Information	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15
Jnt 30	Queensferry Road/Parkgate	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	Relocate/remove some on street parking	??
Jnt 31	Queensferry Road/Parkside Street	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	Relocate/remove some on street parking	??
B.S. 15	Bus Stop No. 15 (Queensferry Road)	Lack of Bus Priority on available space	Reposition and Real Time Passenger Information	Reposition and *Upgrade Bus Stop, Real Time Passenger Information (£11k)	15*
Jnt 32	Rosyth crossroads	Limited space to provide Bus Priority Lanes	Stop greenway	--	--
B.S. 16	Bus Stop No. 16 (Queensferry Road)	Lack of Bus Priority on available space	Reposition and Real Time Passenger Information	Relocate/remove some on street parking	??
Jnt 33	Queensferry Road/Selvage Street	On street parking	Relocate/remove some on street parking	--	--
Jnt 35	Queensferry Road/Fairybank Road	On street parking	Relocate/remove some on street parking	--	--

*Assume £4k to upgrade Bus Stop
£1k allowance for signage improvements

Sub Total	
Cumulative Total	

Quality Bus Corridor: Dunfermline – Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 36	Castlandhill Road/Hillwood Terrace	Lack of Bus Priority	Leave as is	--	--
Jnt 37	Castlandhill Road/ Dunfermline Wynd	Lack of Bus Priority	Leave as is	--	--
Jnt 38	Castlandhill Road/ A90 offramp	Lack of Bus Priority	Leave as is	--	--
Jnt 39	Small Ferry Toll Roundabout	Lack of Bus Priority onto roundabout	Leave as is	--	--
Jnt 40	Large Ferry Toll Roundabout	--	--	Bus Priority provided	--
Jnt 41	Ferry Toll P&R Roundabout	--	--	Bus Priority provided	--
				Sub Total	
				Cumulative Total	

*Assume £4k to upgrade Bus Stop
£1k allowance for signage improvements

Quality Bus Corridor: FerryToll - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
	Ferry Toll P&R Roundabout	--	--	Bus Priority provided	--
Jnt`s 1, 2, 3	Ferry Toll	--	--	Greenway provided	--
Jnt 4 B.S. 1	Bus Stop No. 1 (Bridgehead)	Re entering traffic	Remove Stop, allow £4k	Continues progression from Greenway onto bridge.	4
			Bus lane, Bus Pre-signals, with Priority onto bridge	*Predicted merging of traffic into one lane increasing congestion onto bridge*	
Jnt 5	Ferrymuir roundabout	Crossing of traffic	Provide roadmarkings on bridge deck		
	A 80	Lack of Bus Priority on available space	During peak traffic times, use hard shoulder as a Bus Priority Lane	Increase signage and roadmarkings, Allow £1k	1
Jnt 6	A800 underpass	Lack of Bus Priority	May need widening to construct greenway *	Providing necessary barriers	??
Jnt 7	Rail Track overpass	Lack of Bus Priority	May need widening to construct greenway *	Providing necessary barriers	??
Jnt 8	Rail Track overpass	Lack of Bus Priority	May need widening to construct greenway *	Providing necessary barriers	??

** Increased expense when interfering with bridge structure*

Sub Total	
Cumulative Total	

Quality Bus Corridor: FerryToll - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 9	Standingstane Road overpass	Lack of Bus Priority	May need widening to construct greenway *	Providing necessary crash barriers	??
Jnt 10	B924 merge	Lack of Bus Priority	Provide greenway	Reclaim hard shoulder and large grass margin (Jnt 10 to 14) 2.2km at £100k/km	220
	Edinburgh Road	Lack of Bus Priority on available space	Provide greenway from large reclaimed grass margin	May be sufficient to use hard shoulder at peak times	Accounted for
Jnt 11	New Burnshot	Lack of Bus Priority on available space	Priority given on Edinburgh Road	Phasing already exists	Accounted for
Jnt 13	New Burnshot merge	Short accelerating lane	Provide greenway	Maintaining bus on B924 route would avoid remerging.	Accounted for
Jnt 14 B.S. 2	Crammond Brig (Bus Stop No. 2)	Bus Stops in narrow hard shoulder	Provide greenway by reclaiming part of road pavement and footpath/grass margin	Construct Greenway: (B.S.2 – 4) 500m = 50k Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k)= =15*	65
Jnt 16	Edinburgh Road/Breahead Av	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway Upgrade signage	Accounted for
B.S. 3	Queensferry Road (Bus Stop No. 3)	Bus Stops in narrow hard shoulder and half traffic lane	Provide greenway by reclaiming part of road pavement and footpath,	Maintain 2 traffic lanes inbound Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k)= =15*	15
				Sub Total	
				Cumulative Total	

** Increased expense when interfering with bridge structure*

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 4	Queensferry Road (Bus Stop No. 4)	Bus Stops in traffic	Maintain position, upgrade bus stop. Provide safety rail.	Stop Greenway. Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 18	Queensferry Road /Whitehouse Road	Lack of Bus Priority	Roundabout, maintaining traffic flow.	At the moment, approx 8 sets of traffic signals	
B.S. 5	Barnton Hotel (Bus Stop No. 5)	Lack of Bus Priority	Bus Bay provided, could use last set of signals as a phasing system to remerge	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
B.S. 6	Queensferry Road (Bus Stop No. 6)	Bus Stops in traffic	Provide greenway by reclaiming footpath and part of Davidson's Mains park.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
	Bus Stop No. 6		Start Greenway	B.S.6 – B.S. 23 (5.25km = £525k)	525
Jnt 21	Queensferry Road/Barnton Park Drive	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 7	Queensferry Road (Bus Stop No. 7)	Bus Stops in traffic	Provide greenway by reclaiming footpath and part of Davidson's Mains park.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
B.S. 8	Queensferry Road (Bus Stop No. 8)	Bus Stops in traffic	Provide greenway by reclaiming footpath and part of Davidson's Mains park.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: FerryToll - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 9	Queensferry Road (Bus Stop No. 9)	Bus Stops in traffic	Provide greenway by reclaiming footpath and part of Davidson's Mains park. Stop Greenway at Jnt 25.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 25	Queensferry Road/Quality Street	Lack of Bus Priority	Claim part of existing road pavement and traffic island to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
Jnt 26	School access	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 10	Hillhouse Road (Bus Stop No. 10)	Bus Stops in traffic	Claim part of existing road pavement to provide greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
B.S. 11	Hillhouse Road (Bus Stop No. 11)	Bus Stops in traffic	Claim part of existing road pavement to provide greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 28	Hillhouse Road/Corbiehill Road	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 12	Hillhouse Road (Bus Stop No. 12)	Bus Stops in traffic	Claim part of existing road pavement to provide greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 29	Hillhouse Road/House 0`Hill Avenue	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
Jnt 31	Hillhouse Road/Telford Road	Lack of Bus Priority	Propose new road layout, one way system.	Provide painted Greenway Upgrade signage	Accounted for
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 13	Hillhouse Road (Bus Stop No. 13)	Bus bay provided, merging back into traffic could be a problem at peak hours	Claim part of existing road pavement to provide greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
	Hillhouse Road	On street parking	Relocate/remove some on street parking		Accounted for
B.S. 14	Hillhouse Road (Bus Stop No. 14)	Bus Stops in traffic	Claim part of existing road pavement to provide greenway. Very wide – maintain 2 traffic lanes inbound	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 33	Hillhouse Road/Forthview Terrace	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 15	Hillhouse Road (Bus Stop No. 15)	Bus Stops in traffic	Claim part of existing road pavement to provide greenway. Very wide – maintain 2 traffic lanes inbound	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 36	Hillhouse Road/Seaforth Drive	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
Jnt 38	Hillhouse Road/Maidencraig Crescent	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 16	Hillhouse Road (Bus Stop No. 16)	Bus Stops in traffic, road begins to narrow to single lane	Claim part of existing road pavement to provide greenway.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 39	Hillhouse Road/Maidencraig Crescent	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 17	Hillhouse Road (Bus Stop No. 17)	Bus Stops in traffic, road begins to narrow to single lane	Claim part of existing road pavement to provide greenway.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 41	Hillhouse Road/Craigleith	Lack of Bus Priority	Propose new road layout, one way system.	Provide painted Greenway Upgrade signage	Accounted for
B.S. 18	Queensferry Road (Bus Stop No. 18)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and footpath to provide greenway.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 42	Hillhouse Road/Orchard Drive	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 19	Queensferry Road (Bus Stop No. 19)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and footpath to provide greenway.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 43	Hillhouse Road/Orchard Road	Lack of Bus Priority	Claim part of existing road pavement to provide greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 20	Queensferry Road (Bus Stop No. 20)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and wide footpath to provide greenway.	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 44	Queensferry Road	Residential access	Claim part of existing road pavement to and taper footpath to provide greenway up to and through Jnt 45	Provide painted Greenway Upgrade signage	Accounted for
Jnt 45	Queensferry Road/ Queensferry Terrace	Lack of Bus Priority	Claim part of existing footpath, providing Greenway through Jnt 45	Provide painted Greenway Upgrade signage	Accounted for
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 46	Queensferry Road	Residential access	Claim part of existing road pavement to provide Greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 21	Queensferry Road (Bus Stop No. 21)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and footpath to provide Greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 47	Queensferry Road	Residential access	Claim part of existing road pavement to provide Greenway	Provide painted Greenway Upgrade signage	Accounted for
Jnt 49	Queensferry Road/Orchard Brae	Lack of Bus Priority	Claim part of existing road pavement to provide Greenway	Provide painted Greenway Upgrade signage	Accounted for
Jnt 51	Queensferry Road/Learmonth Terrace	Lack of Bus Priority	Claim part of existing road pavement to provide Greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 22	Queensferry Road (Bus Stop No. 22)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and footpath to provide Greenway	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
Jnt 52	Queensferry Road/Dean Path Crescent	Lack of Bus Priority	Claim part of existing road pavement to provide Greenway	Provide painted Greenway Upgrade signage	Accounted for
B.S. 23	Queensferry Road (Bus Stop No. 23)	Bus Stops in traffic, on inside lane	Claim part of existing road pavement and footpath to provide Greenway **Stop Greenway at Bus Stop No. 23**	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
B.S. 24	Queensferry Road (Bus Stop No. 24)	Bus Stops in traffic	Maintain position	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k) =15*	15
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Barnton – South Gyle

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 1	Barnton	Lack of Bus Priority	Leave as is	Dual carriageway in place	--
Jnt 3	A 902	Lack of Bus Priority	Leave as is	Dual carriageway in place	--
Jnt 4	Maybury Road/Craigs Road	Lack of Bus Priority	Leave as is	--	--
Jnt 6	Maybury Road/North Gyle Terrace	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority onto Glasgow Road	£20k/juntion 100m Greenway at £100k/km	21
Jnt 7	Maybury Road/Glasgow Road	Lack of Bus Priority	Leave as is	Possible Jnt remodelling	--
Jnt 8	A8 Roundabout	Lack of Bus Priority	Leave as is	Slip road in place	--
Jnt 9	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
Jnt 10	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
Jnt 11	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Hillhouse – Leith)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 1	Hillhouse/ Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway 2km at £100k/km	200
B.S. 1	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 2	Residential access	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
Jnt 4	Telford Road/Drylaw Crescent	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
Jnt 6	Telford Road/Groathill Road North	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 2	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim Bus Bay to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 9	Telford Road/Telford Drive	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 3	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Hillhouse – Leith)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 4	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 11	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 5	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim Bus Bay to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 12	Telford Road Roundabout	Lack of Bus Priority	Provide Greenway	Stop Greenway on entry, restart on exit	--
B.S. 6	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 13	Ferry Road/Pilton Drive	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway 1.3km at £100k/km	130
Jnt 14	Ferry Road/West Winnelstrae	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway	Accounted
B.S. 7	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Hillhouse – Leith)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 16	Ferry Road/West Ferryfield	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway	Accounted
B.S. 8	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 17	Ferry Road/Boswell Drive	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway	Accounted
Jnt 18	Ferry Road/Wardie Ave	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway up to Jnt 18 then stop	Accounted
Jnt 19	Ferry Road/A903	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Road narrows. Maintain bus within traffic, keeping position £2k/km at 250m (Jnt 19 – 23)	0.5
B.S. 9	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
B.S. 10	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 20	Ferry Road/Wardie Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Narrow Street. Maintain bus within traffic, keeping position £2k/km at 250m	0.5
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 23	Ferry Road/South Trinity Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Narrow Street. Maintain bus within traffic, keeping position	Accounted
B.S. 11	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 25	Residential access	Lack of Bus Priority, on street parking	Remove/Relocate Parking	Maintain bus within traffic, keeping position. Provided painted double yellow lines £2k/km at 250m (Jnt 25 – 28)	0.5
Jnt 27	Ferry Road/Bangholm Place	Lack of Bus Priority, on street parking	Remove/Relocate Parking	Maintain bus within traffic, keeping position. Provided painted double yellow lines	Accounted
B.S. 12	Ferry Road	Lack of Bus Priority	Remove/Relocate Parking Maintain bus within traffic, keeping position	. Provided painted double yellow lines Real Time Passenger Information (£11k)	11
Jnt 28	Ferry Road/Clarke Ave	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position £2k/km at 1.35km (Jnt 28 - 43)	2.7
Jnt 29	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 30	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Hillhouse – Leith)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 13	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 33	Ferry Road/Craighall Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 14	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 37	Ferry Road/Newhaven Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 15	Ferry Road	Lack of Bus Priority	P Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 38	Ferry Road/Summerside Street	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 39	Ferry Road/Summerside Place	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 40	Ferry Road/Dudley Ave	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 16	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 42	Ferry Road/North Fort Street	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 17	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 43	Ferry Road/Madeira Street	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position £2k/km at 120m	0.24
Jnt 45	Ferry Road/North Junction Street	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 45	Ferry Road/North Junction Street	Lack of Bus Priority	Remove/Relocate Parking	Maintain bus within traffic, keeping position. Provided painted double yellow lines £2k/km at 120m	0.24
B.S. 1	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double yellow lines	Real Time Passenger Information (£11k)	11
Jnt 44	Ferry Road/ Largo Place	Lack of Bus Priority	Remove/Relocate Parking	Maintain bus within traffic, keeping position. Provided painted double yellow lines	Accounted
B.S. 2	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double yellow lines	Real Time Passenger Information (£11k)	11
Jnt 42	Ferry Road/South Fort Street	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times (Jnt 42 – B.S. 9)	Maintain bus within traffic, keeping position £2k/km at 2.3km	4.6
Jnt 41	Ferry Road/ Trafalgar Lane	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 3	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 39	Ferry Road/Summerside Place	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 37	Ferry Road/Newhaven Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 4	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 36	Ferry Road/Gosford Place	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 35	Ferry Road/Connaught Place	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 34	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 5	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 32	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 31	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 6	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 30	Ferry Road/Warriston Road	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 7	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
B.S. 8	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Real Time Passenger Information (£11k)	11
Jnt 24	Ferry Road/Roysten Terrace	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 22	Ferry Road/B901	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
Jnt 21	Access	Lack of Bus Priority	Provided painted double Red lines – no parking at peak times	Maintain bus within traffic, keeping position	Accounted
B.S. 9	Ferry Road	Lack of Bus Priority	Maintain bus within traffic, keeping position. Provided painted double Red lines	Narrow Street. Real Time Passenger Information (£11k)	11
Jnt 18	Ferry Road/Arboretum Road	Lack of Bus Priority, on street parking	Start Greenway	Reclaim Cycleway to provide Greenway 1.3km at £100k/km	130
B.S. 10	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 11	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
B.S. 12	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 15	Ferry Road/East Fettes Ave	Lack of Bus Priority	Provide Greenway	Stop Greenway on entry, restart on exit 2km at £100k/km	200
B.S. 13	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
B.S. 14	Ferry Road	Lack of Bus Priority	Provide Greenway	Reclaim Cycleway to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 12	Telford Road Roundabout	Lack of Bus Priority	Provide Greenway	Stop Greenway on entry, restart on exit	Accounted
B.S. 15	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim Bus Bay to provide Greenway Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 10	Ferry Road/Grigor Drive	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 16	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
B.S. 17	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 8	Ferry Road/Wardie Ave	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
Jnt 7	Telford Road/Groathill Ave	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 18	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 7	Telford Road/Groathill Road South	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 19	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh (Leith - Hillhouse)

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 5	Telford Road/Drylaw Ave	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
Jnt 4	Telford Road/Fortview Terrace	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 20	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	Accounted
Jnt 3	Access	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
B.S. 21	Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway Real Time Passenger Information (£11k)	11
Jnt 1	Hillhouse/ Telford Road	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway and footpath to provide Greenway	Accounted
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: South Gyle – Barnton

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 11	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
Jnt 10	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
Jnt 9	South Gyle Ind Park	Lack of Bus Priority	Leave as is	--	--
Jnt 8	A8 Roundabout	Lack of Bus Priority	Leave as is	--	--
Jnt 7	Maybury Road/Glasgow Road	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority onto Glasgow Road	£20k/juntion 100m Greenway at £100k/km	21
Jnt 5	Maybury Road/access	Lack of Bus Priority	Leave as is	--	--
Jnt 4	Maybury Road/Craigs Road	Lack of Bus Priority	Leave as is	--	--
Jnt 3	A 902	Lack of Bus Priority	Leave as is	Dual carriageway in place	--
Jnt 2	A 902	Lack of Bus Priority	Leave as is	Dual carriageway in place	--
Jnt 1	Barnton	Lack of Bus Priority	Leave as is	Dual carriageway in place	--
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 1	Charlotte Sq	Bus Bay provided, remerging may be difficult	Leave as is	--	--
B.S. 2	Hope Street	Lack of Bus Priority	Leave as is	--	--
Jnt 61	Queensferry Street/Alva Street	Lack of Bus Priority	Provide Greenway	Reclaim part of carriageway to provide Greenway	
B.S.3	Queensferry Street	Bus stops in half lane allowing traffic to pass, remerging difficult	Provide Greenway	Reclaim part of carriageway to provide Greenway	
Jnt 60	Queensferry Street/ Melville Street	Lack of Bus Priority	Reclaim cycleway and part of carriageway to provide greenway	Start of cycleway	
Jnt 58	Queensferry Street/ Chester Street Gardens	Lack of Bus Priority	Stop greenway, street narrows	End of cycleway	
Jnt 56	Queensferry Street/ Belford Road	Lack of Bus Priority	Leave as is	--	--
Jnt 55	Queensferry Street/ Bells Brae	Lack of Bus Priority	Leave as is	--	--
Jnt 54	Queensferry Street/ Belgrave Crescent	Lack of Bus Priority	Leave as is	--	--
				Sub Total	
				Cumulative Total	

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 4	Queensferry Road	Bus stops in half lane allowing traffic to pass, remerging difficult	Provide Painted Bus Stop	--	--
Jnt 53	Queensferry Road/Buckingham Terrace	Lack of Bus Priority	Leave as is	--	--
B.S. 5	Queensferry Road	Bus stops in half lane allowing traffic to pass, remerging difficult	Provide Painted Bus Stop	--	--
Jnt 50	Queensferry Road/Buckingham Terrace	Lack of Bus Priority	Leave as is	--	--
Jnt 49	Queensferry Road/Dean Path	Lack of Bus Priority	Start Greenway	Reclaim carriageway and remove on street parking to provide greenway (Jnt 49 – 45) 800m	80
B.S. 6	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim carriageway and remove on street parking to provide greenway	Accounted for
Jnt 47	Queensferry Road/Assess to School	Lack of Bus Priority	Provide Greenway	Reclaim carriageway and remove on street parking to provide greenway	Accounted for
B.S. 7	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim carriageway and remove on street parking to provide greenway	Accounted for
Jnt 45	Queensferry Road/Queensferry Terrace	Lack of Bus Priority	Provide Greenway on to roundabout	Stop Greenway on entry and restart on exit	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 43	Queensferry Road/Orchard Road South	Lack of Bus Priority	Provide Greenway	Start of Cycleway. Reclaim cycleway and part of wide carriageway. (Jnt 45 – 37) 1.1km	110
B.S. 8	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim cycleway and part of wide carriageway to provide greenway	Accounted for
B.S. 9	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim cycleway and part of wide carriageway to provide greenway	Accounted for
Jnt 42	Queensferry Road/Craigleith Drive	Lack of Bus Priority	Provide Greenway	Reclaim cycleway and part of wide carriageway to provide greenway	Accounted for
B.S. 10	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim cycleway and part of wide carriageway to provide greenway	Accounted for
Jnt 40	Queensferry Road/ Craigleith Crescent	Lack of Bus Priority	Provide Greenway	End of cycleway.	Accounted for
B.S. 11	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
Jnt 37	Queensferry Road/ Craigrock Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 35	Hillhouse Road/ Gardiner Road	--	--	Painted Bus lane provided	--
Jnt 34	Hillhouse Road/ Columba Road	--	--	Painted Bus lane provided	--
B.S. 12	Hillhouse Road	--	--	Painted Bus lane provided	--
Jnt 32	Hillhouse Road/ Columba Road	--	--	Painted Bus lane provided	--
B.S. 13	Hillhouse Road	Lack of Bus Priority	Provide Greenway from B.S 13 – B.S. 19, 2.6km	End of Painted Bus lane	260
Jnt 30	Hillhouse Road/ Strachan Road	Lack of Bus Priority	Provide Greenway	Painted Bus lane provided	Accounted for
B.S. 14	Hillhouse Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
Jnt 27	Hillhouse Road/ Residential assess	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
B.S. 15	Hillhouse Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 16	Hillhouse Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
Jnt 25	Queensferry Road/ Craigcrook Road	Lack of Bus Priority	Provide Greenway	Reclaim wide carriageway to provide greenway	Accounted for
B.S. 17	Hillhouse Road	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
Jnt 24	Queensferry Road/ Clermiston Road North	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
Jnt 23	Queensferry Road/ Clermiston Drive	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
B.S. 18	Queensferry Road	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
Jnt 22	Queensferry Road/ Parkgrove Street	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
Jnt 20	Queensferry Road/ Parkgrove Road	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway	Accounted for
B.S. 19	Queensferry Road	Lack of Bus Priority	Provide Greenway	Obtain part of Davidson`s mains to provide Greenway.	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 19	Queensferry Road/ B 701	Lack of Bus Priority		Stop greenway prior to junction	0
B.S. 20	Queensferry Road	Lack of Bus Priority	Maintain position within traffic lane	Provide Painted Bus Stop, allow £4k	4
Jnt 18	Queensferry Road/ A 902	Lack of Bus Priority	Maintain position within traffic lane	--	0
B.S. 21	Queensferry Road	Lack of Bus Priority	Maintain position within traffic lane	Provide Painted Bus Stop	4
Jnt 17	Queensferry Road/ Strathalmond Rd	Lack of Bus Priority	Leave as is	--	0
B.S. 22	Queensferry Road	Lack of Bus Priority	Maintain position within traffic lane	Provide Painted Bus Stop	4
Jnt 15	Queensferry Road/ Assess Rd	Lack of Bus Priority	Leave as is	Road widens, start greenway (Jnt 15 – 5, 5km)	500
B.S. 23	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
Jnt 12	Queensferry Road/ Riverside Road	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Edinburgh - Ferry Toll

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 24	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
Jnt 11	Overpass	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
B.S. 25	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
B.S. 26	Queensferry Road	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
Jnt 9	Bridge	Lack of Bus Priority	Provide Greenway	Upgrade bridge to accommodate greenway*	Accounted for
Jnt 8	Rail Bridge	Lack of Bus Priority	Provide Greenway	Upgrade bridge to accommodate greenway*	Accounted for
Jnt 7	Rail Bridge	Lack of Bus Priority	Provide Greenway	Upgrade bridge to accommodate greenway*	Accounted for
Jnt 6	Overpass	Lack of Bus Priority	Provide Greenway	Reclaim hard should to provide greenway	Accounted for
Jnt 5	Ferrymuir Roundabout	Lack of Bus Priority	Provide Greenway onto roundabout with priority signals at Jnt 5, £20k/juntion	Provide greenway on exit ramp to roundabout	20
Jnt 5	Ferrymuir Roundabout	Lack of Bus Priority	Provide Greenway	Provide greenway on exit of roundabout to bridge toll and onto bridge	Accounted for
				Sub Total	
				Cumulative Total	

** Increased expense when interfering with bridge structure*

Quality Bus Corridor: Ferry Toll – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
	Ferrtytoll			Greenway provided to roundabout	
Jnt 39	Rosyth Roundabout	Lack of Bus Priority onto roundabout	Provide Greenway	Reclaim hard shoulder to construct greenway on to Queensferry Rd	
B.S. 1	Queensferry Rd	Lack of Bus Priority	Provide greenway from large reclaimed grass margin	--	--
B.S. 2	Queensferry Rd	Lack of Bus Priority	Reclaim bus bay to provide Greenway	--	--
Jnt 32	Rosyth Crossroad	Lack of Bus Priority	Greenway provided to roundabout	Stop greenway around roundabout	
B.S. 3	Queensferry Rd	Lack of Bus Priority and space, retail area with limited drop off/unloading	Reclaim bus bay to provide Greenway	--	--
B.S. 4	Queensferry Rd	Lack of Bus Priority	Provide greenway	--	--
Jnt 30	Queensferry Rd/Backmarch Rd	Lack of Bus Priority	Provide greenway	--	--
Jnt 29	Queensferry Rd/Hamilton Place	Lack of Bus Priority	Provide greenway	--	--
B.S. 5	Queensferry Road	Lack of Bus Priority on available space	Provide greenway, either reclaim path of footpath and/or traffic lane.		
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Ferry Toll – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 28	Queensferry Road	Lack of Bus Priority	Provide greenway	--	--
Jnt 27	Queensferry Road/Park Road	Lack of Bus Priority	Provide greenway	--	--
B.S. 6	Queensferry Road	Lack of Bus Priority on available space	Provide greenway, either reclaim path of footpath and/or traffic lane.	--	--
Jnt 25	Queensferry Road/Dick Place	Lack of Bus Priority	Provide greenway	--	--
B.S. 7	Queensferry Road	Lack of Bus Priority on available space	Provide greenway, reclaim Bus Bay and continue on to roundabout.	--	--
Jnt 23	Kings Road Roundabout	Lack of Bus Priority	Provide greenway up to roundabout entry	Reclaim large grass margin to provide priority to Jnt 22	
Jnt 22	Queensferry Road/Primrose lane Roundabout	Lack of Bus Priority	Reclaim verge at roundabout to allow priority onto roundabout.	--	--
	Rail Bridge	Lack of Bus Priority	Reclaim footpath to provide Greenway	Bridge width may not allow greenway	
Jnt 21	Castle Drive Roundabout	Large Junction, 5 entrances/exits	Leave as is	Stop greenway on entry, start on exit	--
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Ferry Toll – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 8	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming grass margin		
Jnt 20	Carnegie campus Roundabout	Lack of Bus Priority	Leave as is	Stop greenway on entry, start on exit	--
B.S. 9	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming Bus Bay/lane	Acceleration/deceleration lane provided for industrial	
B.S. 10	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming Bus Bay/lane		
B.S. 11	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming Bus Bay/lane		
B.S. 12	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming grass margin		
Jnt 16	Pitreavie Ind Estate Roundabout	Lack of Bus Priority on available space	Reclaim verge at roundabout to allow priority onto roundabout.		
B.S. 13	Queensferry Road	Lack of Bus Priority on available space	Provide greenway reclaiming grass margin		
Jnt 14 and 13	Access to St Leonards House	Lack of Bus Priority on available space	Reclaim part of footpath and grass margin to provide Bus Priority	Stop greenway opposite Jnt 12	
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Ferry Toll – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 10	Hospital Hill/St Andrews Street	Lack of Bus Priority on available space	Leave as is		
B.S. 14	Hospital Hill	Lack of Bus Priority	Reclaim Bus Bay to start Greenway		
B.S. 15	Hospital Hill	Lack of Bus Priority	Reclaim Bus Bay to provide Greenway	Stop Greenway on exit of Bus Bay	
Jnt 9	Hospital Hill/St Leonards Place	Lack of Bus Priority	Leave as is	Start Greenway after Jnt 9 onto Roundabout, Jnt 8	
Jnt 8	St Leonards Roundabout	Lack of Bus Priority	Leave as is	Start Greenway on exit	
B.S. 16	Bothwell Street	Lack of Bus Priority	Reclaim Bus Bay to provide Greenway		
B.S. 17	Bothwell Street	Lack of Bus Priority	Reclaim Bus Bay to provide Greenway	Using pedestrian crossing as a phased signal system	
Jnt 5	Viaduct roundabout	Congested junction under viaduct	Limited space	No area for improvement	--
B.S. 18	St Margarets Drive	Lack of Bus Priority	Reclaim grass margin to provide Greenway	Start Greenway to Bus Stop 18	
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Ferry Toll – Dunfermline

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 3	Sinclair Gardens roundabout	Peak hour traffic congestion onto roundabout	Provide Greenway onto roundabout by reclaiming footpath.	--	--
Jnt 2	Carnegie Drive	Lack of Bus Priority	Provide Greenway, reclaiming grass margin and relocating footpath	Start greenway on exit of Jnt 2 and stop at Jnt 1	--
Jnt 1	Market St/Carnegie Drive	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority onto Carnegie Drive	--	--
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Dunfermline – Halbeath Road - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
	Dunfermline Bus Station	--	--	Closed to all traffic except Buses and taxis	--
Jnt 1	Market Street/Carnegie Drive	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority onto Carnegie Drive	£20k/juntion	20
	Carnegie Drive	Peak hour traffic on both lanes	Provide greenway, either reclaim footpath and/or traffic lane.	(£100k/km for 400m)	40
Jnt 2	Carnegie Drive	Peak hour traffic	Leave as is	--	0
Jnt 3	Sinclair Gardens roundabout	Peak hour traffic congestion onto roundabout	Provide Greenway onto roundabout by reclaiming footpath.	Accounted for	Accounted
B.S. 1	Bus Stop No. 1 (Appin Crescent)	Bus stops in half lane, traffic can pass on outside	Maintain within traffic lane	Upgrade Bus Stop: painted lane, and Real Time Passenger Information (£11k)	15
	Appin Crescent	On street parking	Relocate/remove on street parking to provide a Priority Bus Lane (200m)	200m of greenway (£100k/km)= 20k	20
B.S. 2	Bus Stop No. 2 (Appin Crescent)	Bus stops in half lane, traffic can pass on outside making it difficult to remerge	Maintain Bus Stop within traffic lane	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
	Appin Crescent	Remerging after Bus Stop	Reclaim footpath to provide Priority onto roundabout to avoid remerging	20m of greenway (£100k/km)= 2k	2
Jnt 7	Roundabout at the end of Appin Crescent	Lack of Bus Priority on available road space	Provide through way lane onto Halbeath Road by a Bus Priority Lane from B.S 2	20m of greenway (£100k/km)= 2k	2
				Sub Total	
				Cumulative Total	

* Assume £4k to upgrade Bus Stop

Quality Bus Corridor: Dunfermline – Halbeath Road - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 8	Halbeath Road/Athol Place	Residential Area, limited space for Bus Lane	Reclaim footpath and part of road pavement to provide Bus Priority	Subject to further survey, might not be possible to fit Bus Priority	--
B.S. 3	Bus Stop No. 3 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide Bus Priority Lane. Start Greenway.	Painted Bus Stop in place. Provide Real Time Passenger Information (£11k). Greenway: (£100k/km) 1.6km = £160k (*from B.S. 3 – Jnt 19*).	171
Jnt 9	Halbeath Road (west of East End Park)	Entrance and exit to stadium	--	Possibly used by emergency vehicles	0
B.S. 4	Bus Stop No. 4 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place. Provide Real Time Passenger Information (£11k).	11
Jnt 10	Halbeath Road (east of East End Park)	Entrance and exit to stadium	--	Possibly used by emergency vehicles	0
Jnt 11	Halbeath Road/Ronaldson Gardens	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 5	Bus Stop No. 5 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 13	Halbeath Road/residential access	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
Jnt 15	Halbeath Road/residential access	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
				Sub Total	
				Cumulative Total	

Quality Bus Corridor: Dunfermline – Halbeath Road - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
B.S. 6	Bus Stop No. 6 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 16	Halbeath Road/Strathmore Drive	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 7	Bus Stop No. 7 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
B.S. 8	Bus Stop No. 8 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 19	Halbeath Road/Daviot Road	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
	Rail Bridge	Lack of Bus Priority	Stop and restart greenway	Stop greenway prior to bridge allowing bus to merge	0
B.S. 9	Bus Stop No. 9 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Upgrade Bus Stop. Real Time Passenger Information (£11k). Provide Greenway B.S 9 to Jnt 20 (20m = £2k)	17
Jnt 20	Halbeath Road/Halbeath Drive	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane up to traffic lights.	Stop Greenway at traffic lights.	--
Jnt 20	Halbeath Road/Halbeath Drive	Signals do not have sufficient Bus Priority, and introduce additional delay.	Bus lane, Bus Pre-signals, with Priority through junction	£20k/juntion	20
				Sub Total	
				Cumulative Total	

* Assume £4k to upgrade Bus Stop

Quality Bus Corridor: Dunfermline – Halbeath Road - Edinburgh

Refer	Location	Problem	Possible Solution	Comments	Costs £`000
Jnt 20	Halbeath Road/Halbeath Drive			Restart Greenway: *(Jnt 19 – Jnt 23)* (£100k/km) 600m	60
Jnt 22	Halbeath Road/Hotel	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway	Accounted for
B.S. 10	Bus Stop No. 10 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
B.S. 11	Bus Stop No. 11 (Halbeath Road)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	11
Jnt 23	Halbeath Retail Park Roundabout (west)	Lack of Bus Priority on available road space	Claim part of existing road pavement to provide a Bus Priority Lane.	Provide painted Greenway up to junction then stop	Accounted for
B.S. 12	Bus Stop No. 12 (Halbeath Road)	Bus Bay provided, remerging into traffic could be a problem at peak hours	Reclaim hard shoulder to provide a Priority Lane on to roundabout (£100k/km for 30m= 3k)	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	14
Jnt 25	Halbeath Retail Park Roundabout (east)	Leave as is	Leave as is	--	--
Jnt 26	Kingseat roundabout	Leave as is	Leave as is	--	--
B.S. 13	Bus Stop No. 13 (Halbeath Road)	Bus Bay provided, remerging into traffic could be a problem at peak hours	Reclaim hard shoulder to provide a Priority Lane on to roundabout (£100k/km for 30m= 3k)	Painted Bus Stop in place Provide Real Time Passenger Information (£11k)	14
				Sub Total	
				Cumulative Total	

* Assume £4k to upgrade Bus Stop

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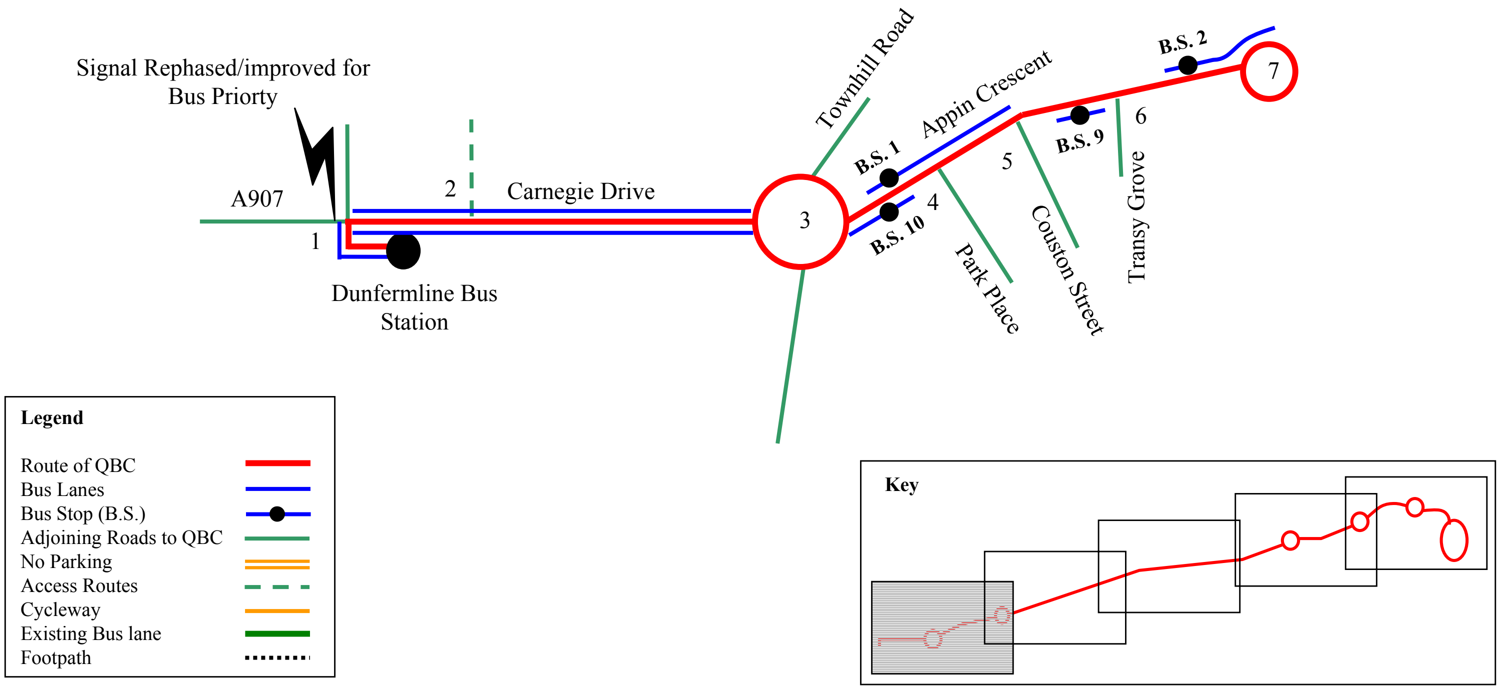
NORTH



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Queensferry Cross Forth Corridor

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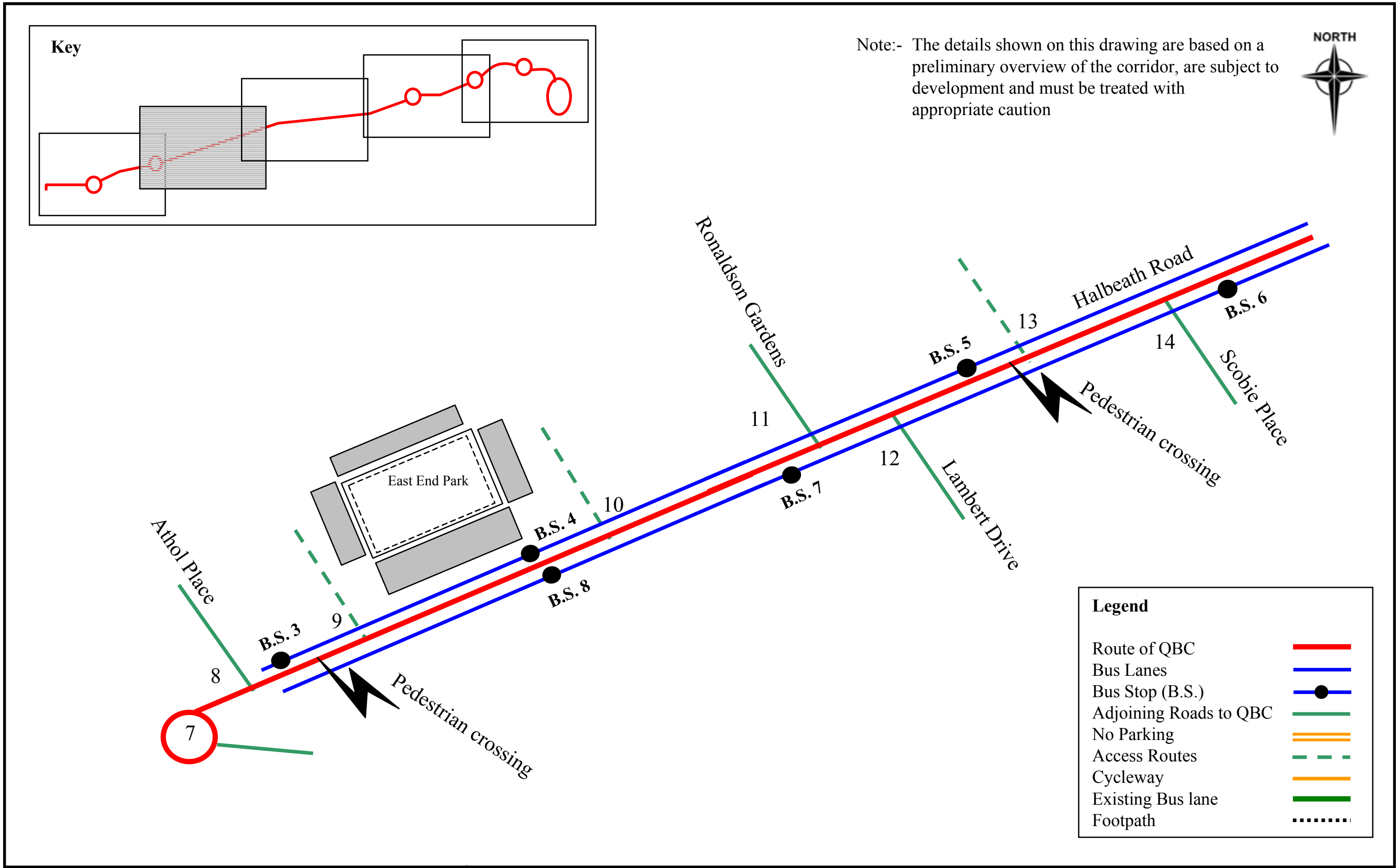

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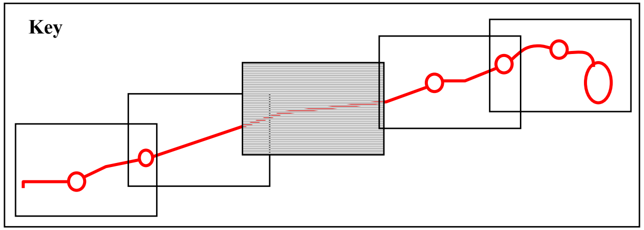

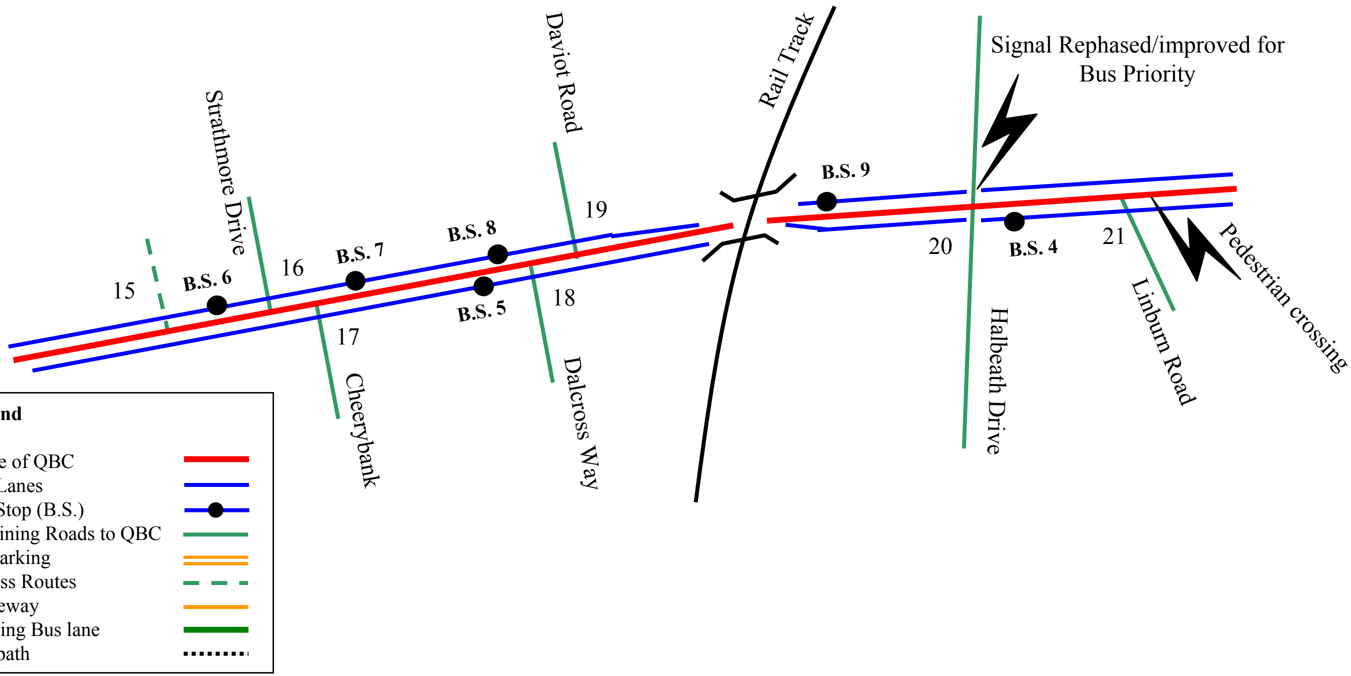

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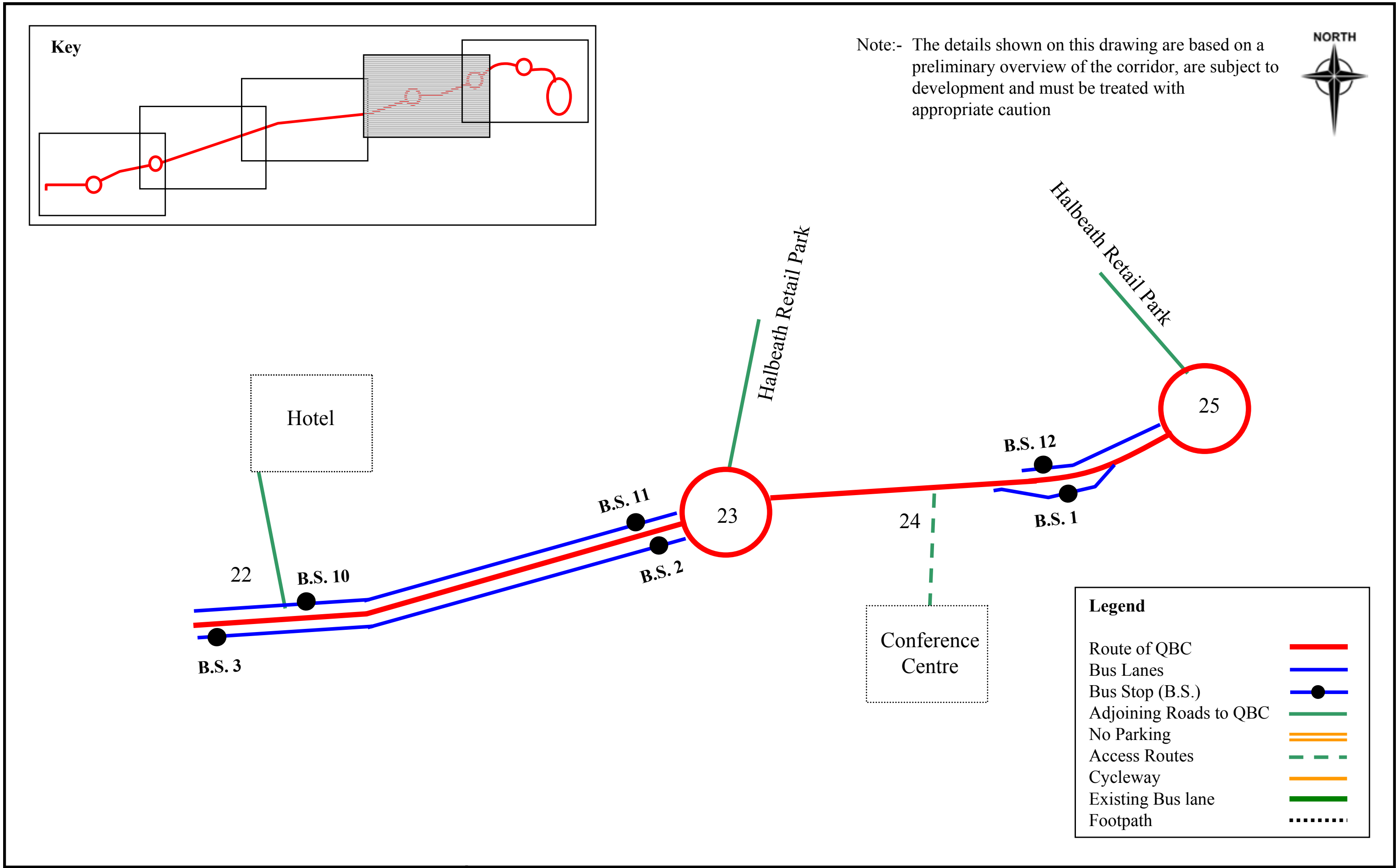

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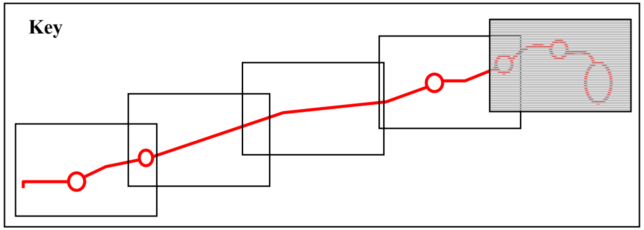

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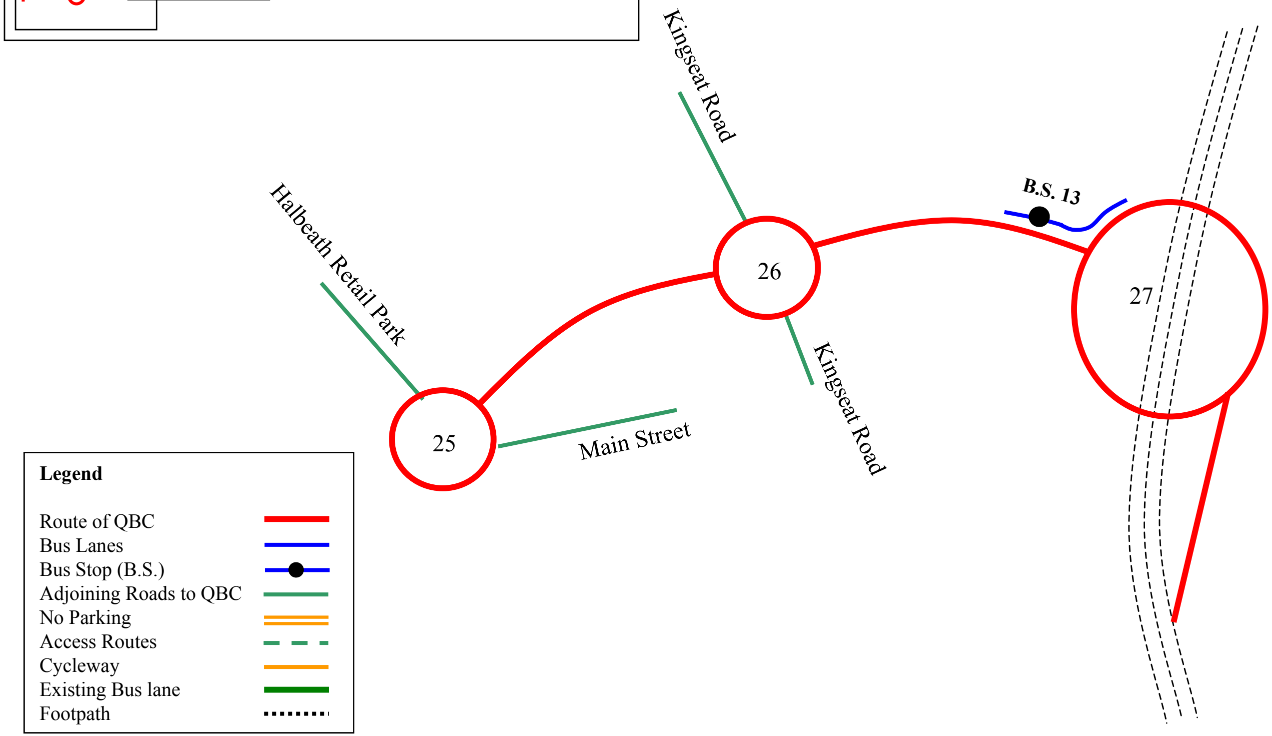

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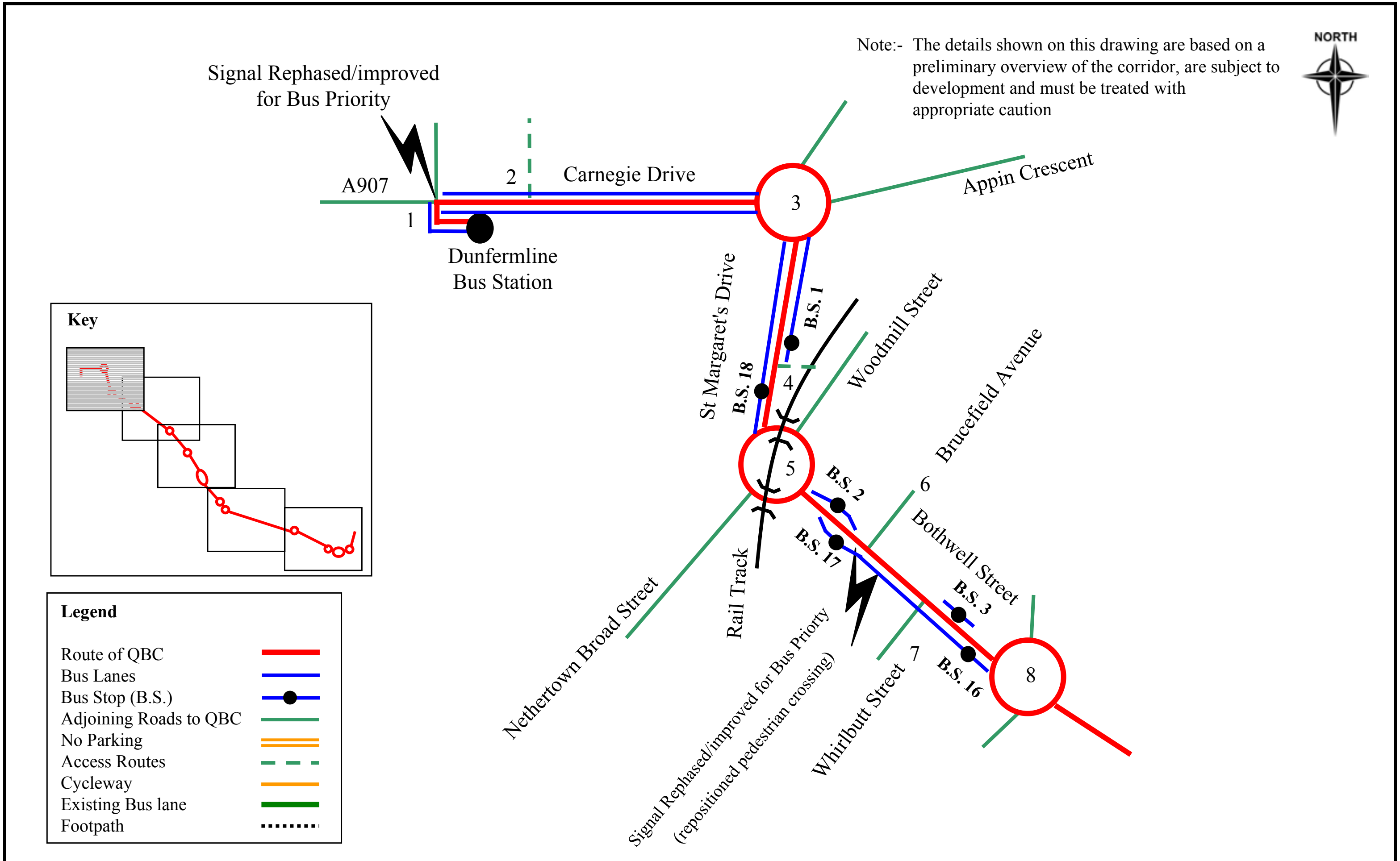

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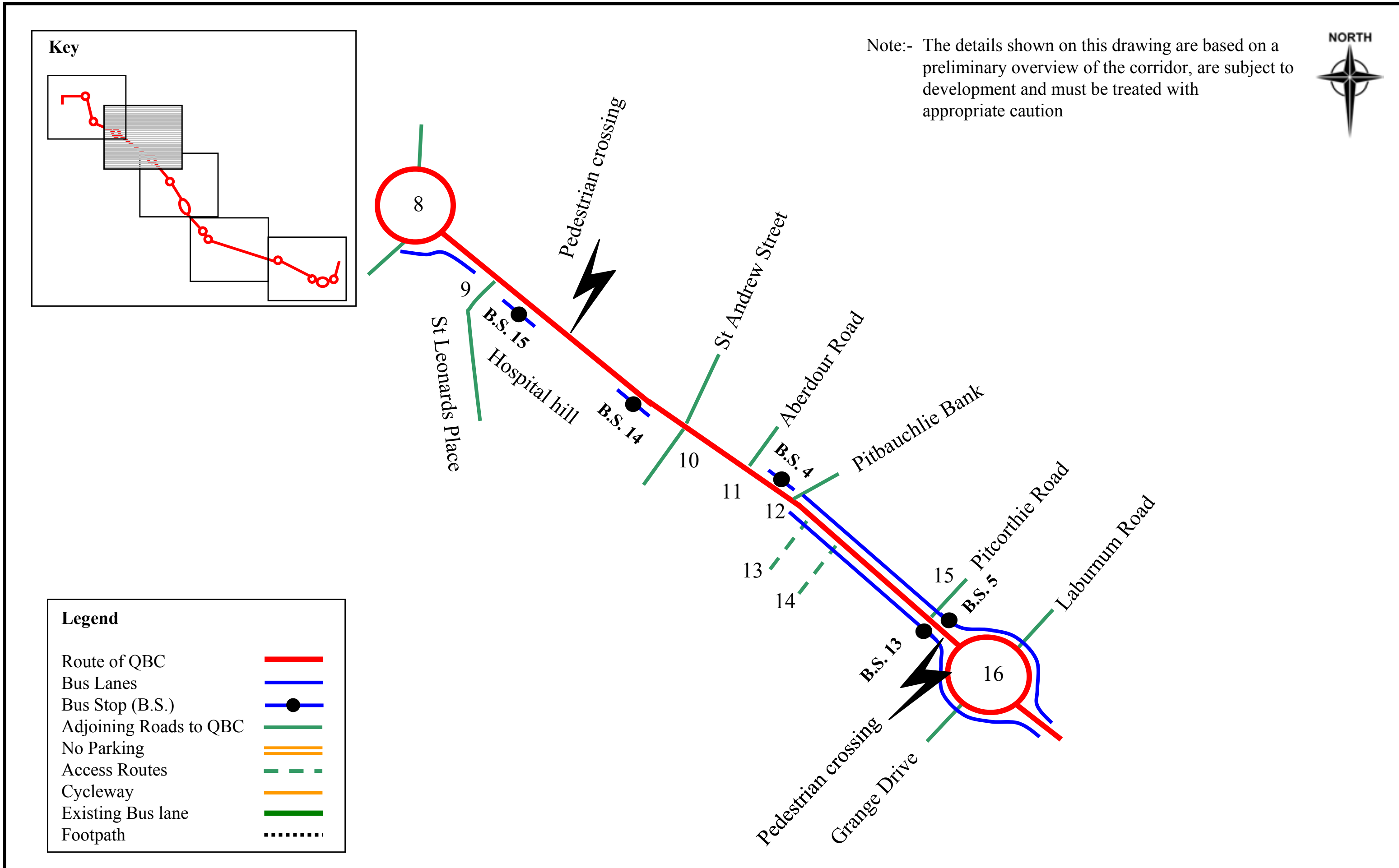

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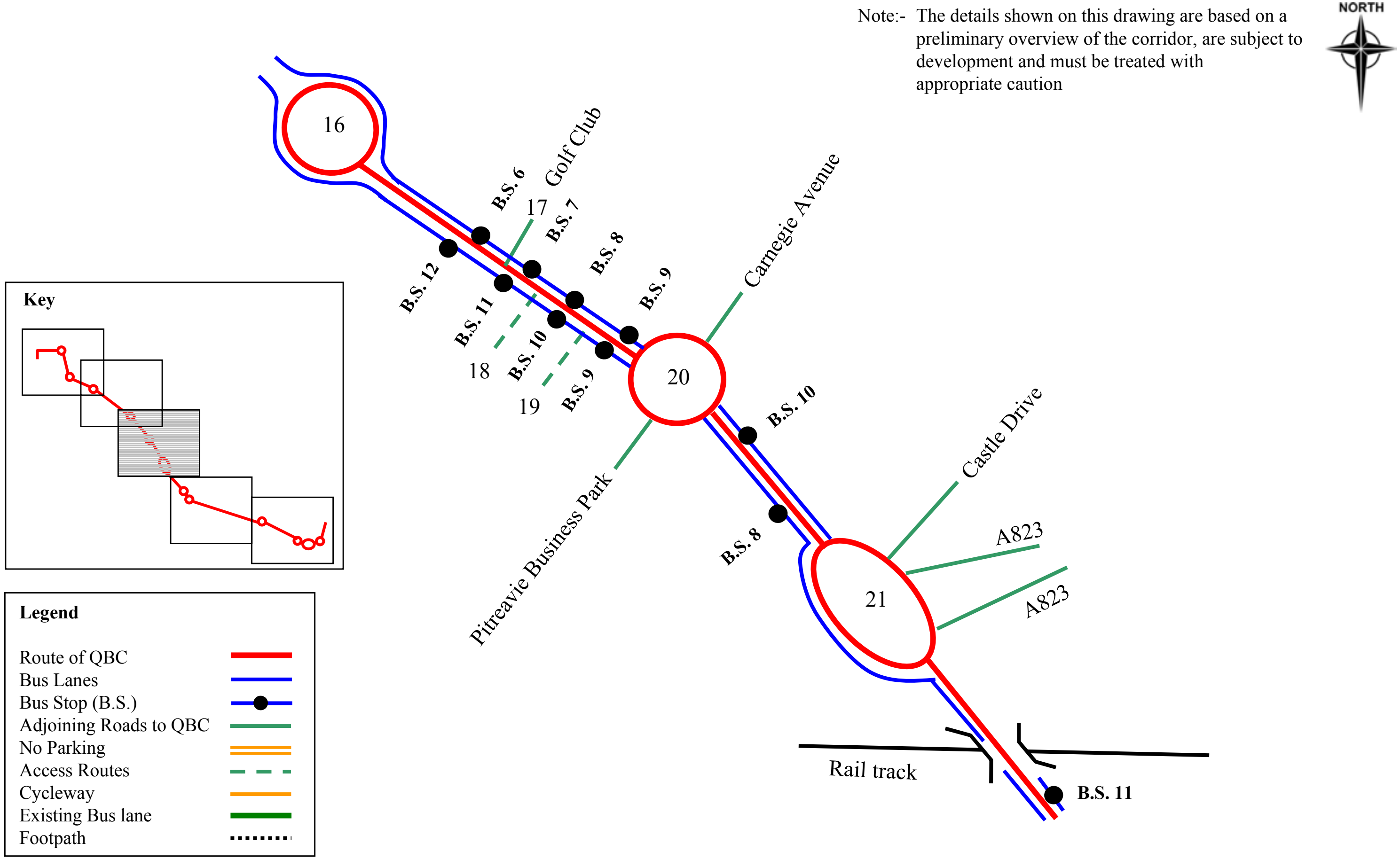

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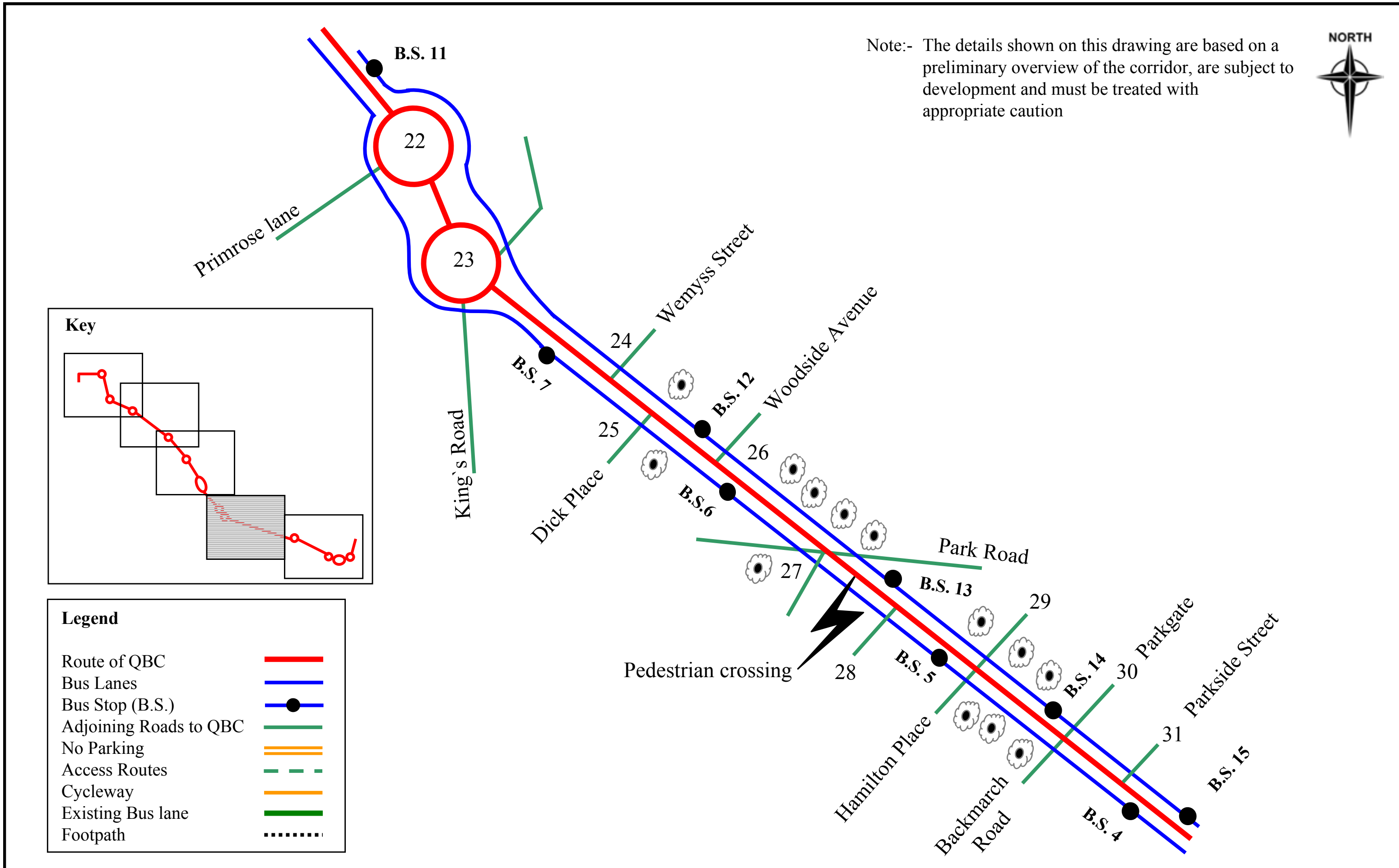

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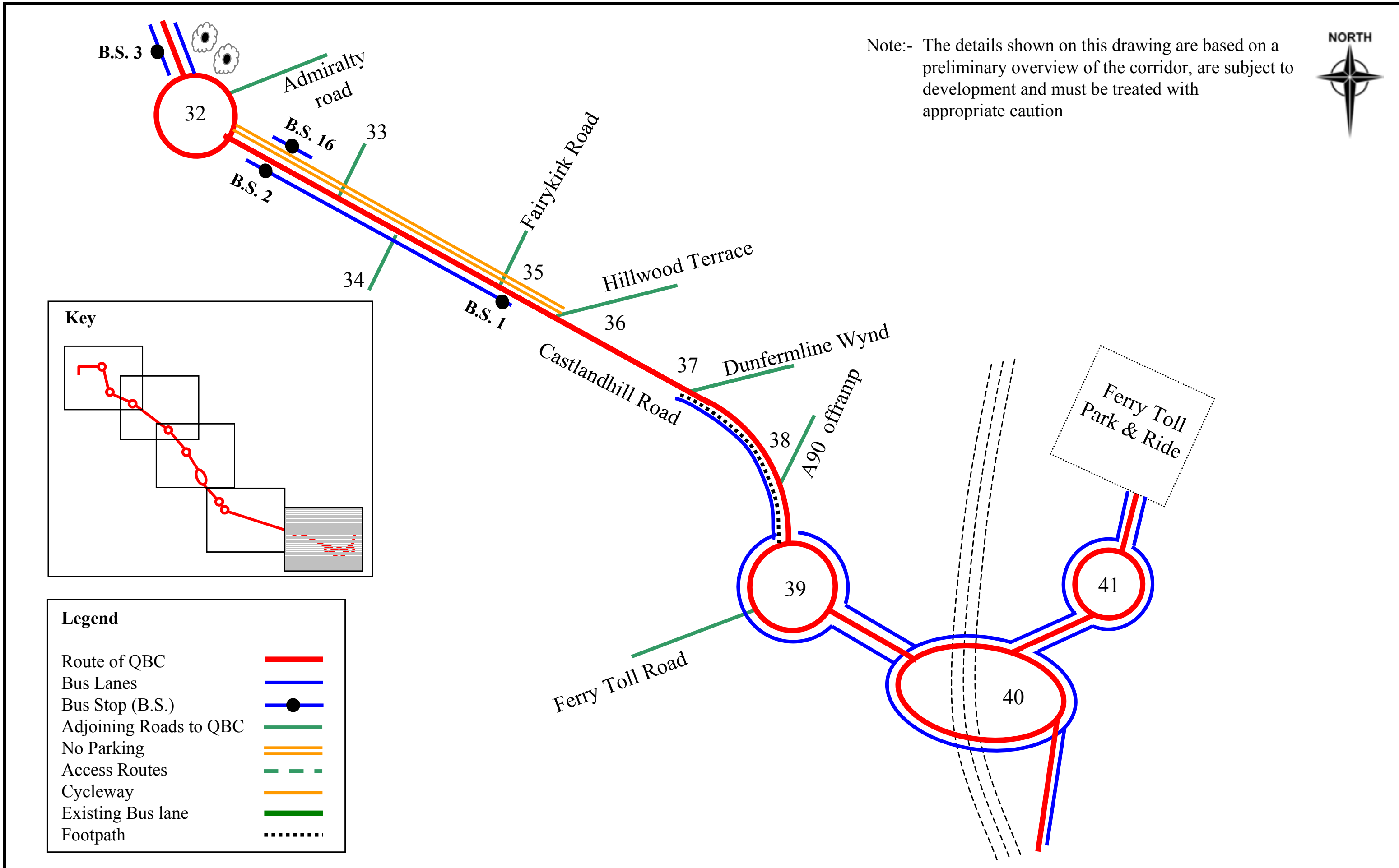

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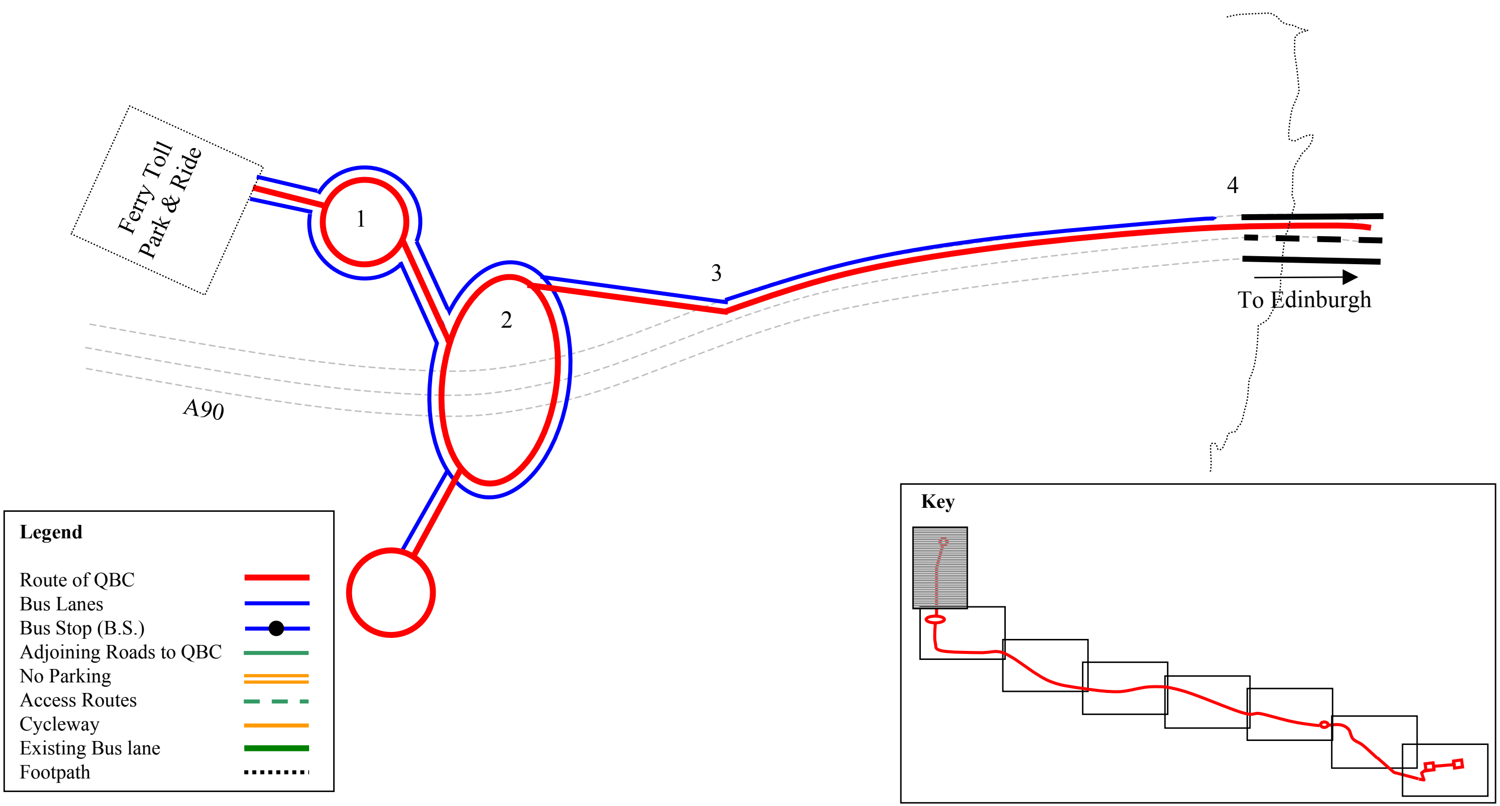

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Queensferry Cross Forth Corridor

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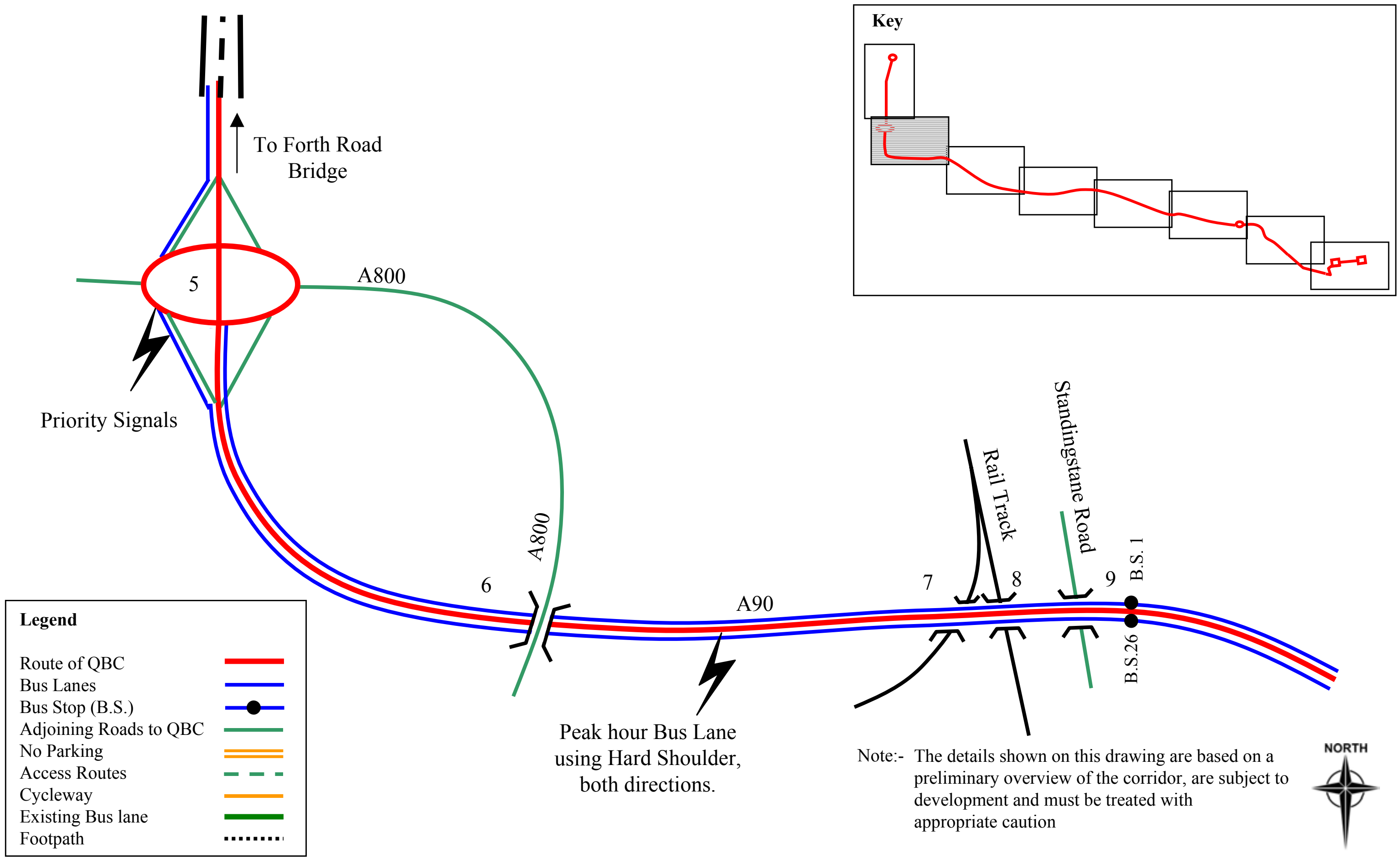

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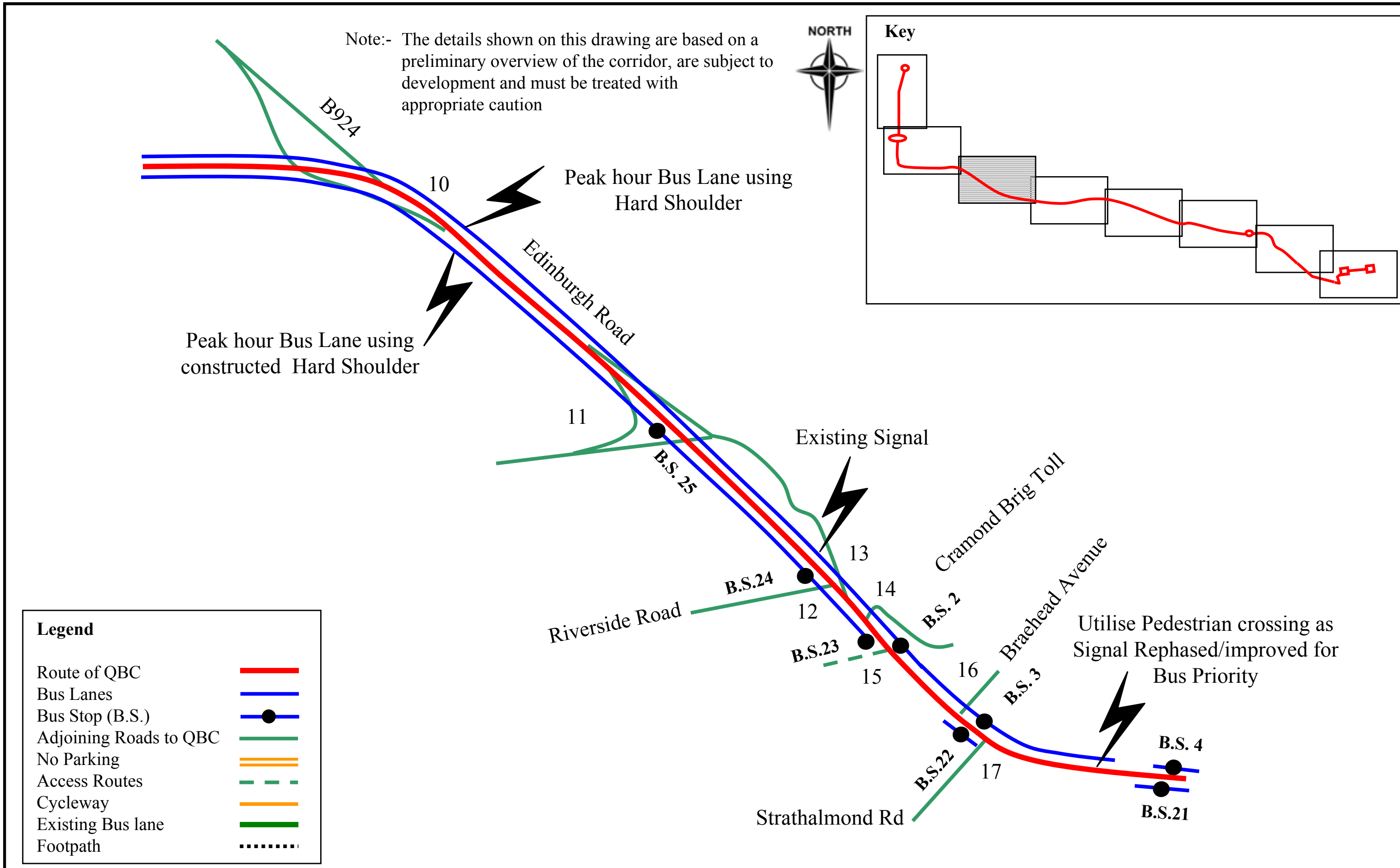

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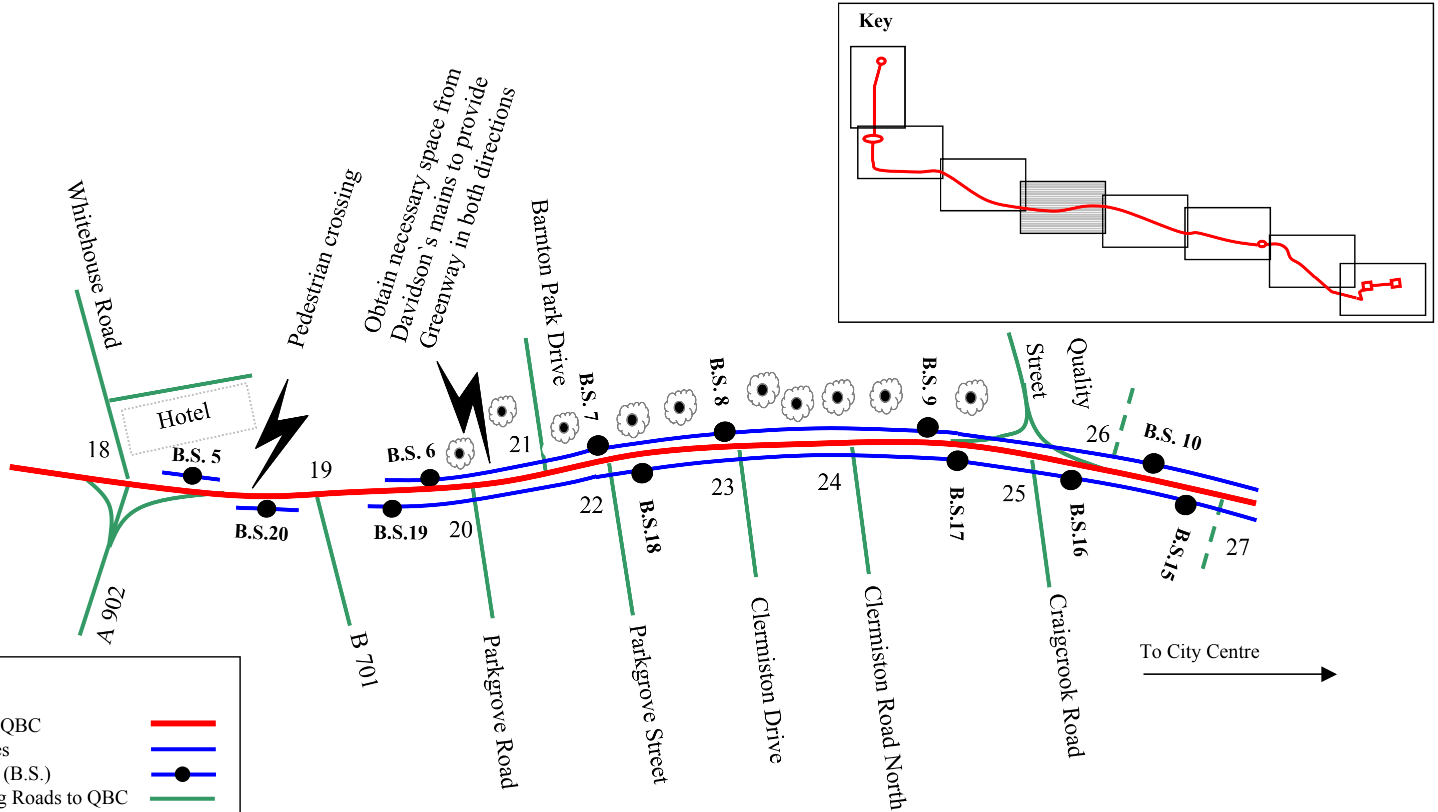

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- Access Routes
- Cycleway
- Existing Bus lane
- Footpath

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NORTH

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Queensferry Cross Forth Corridor

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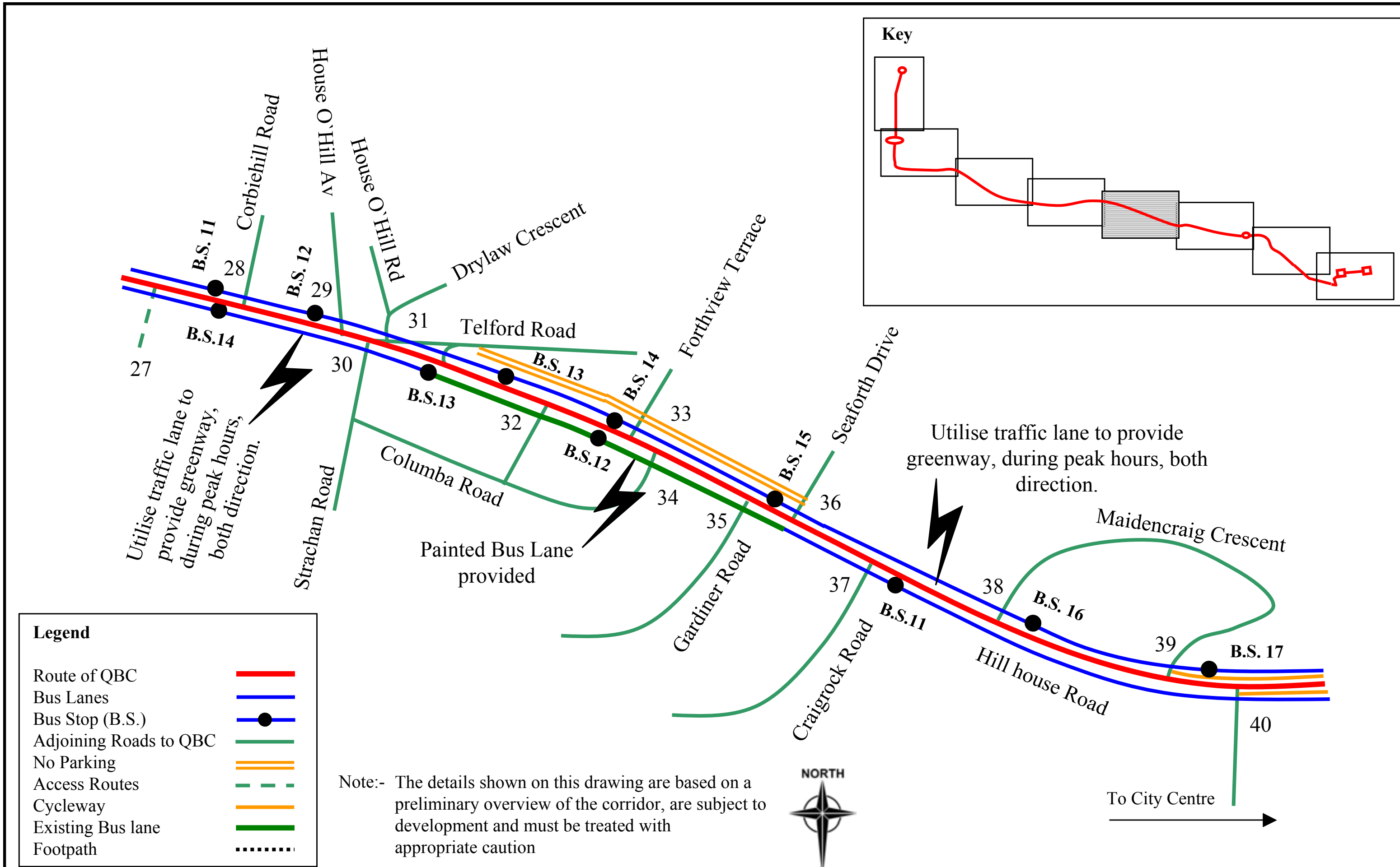

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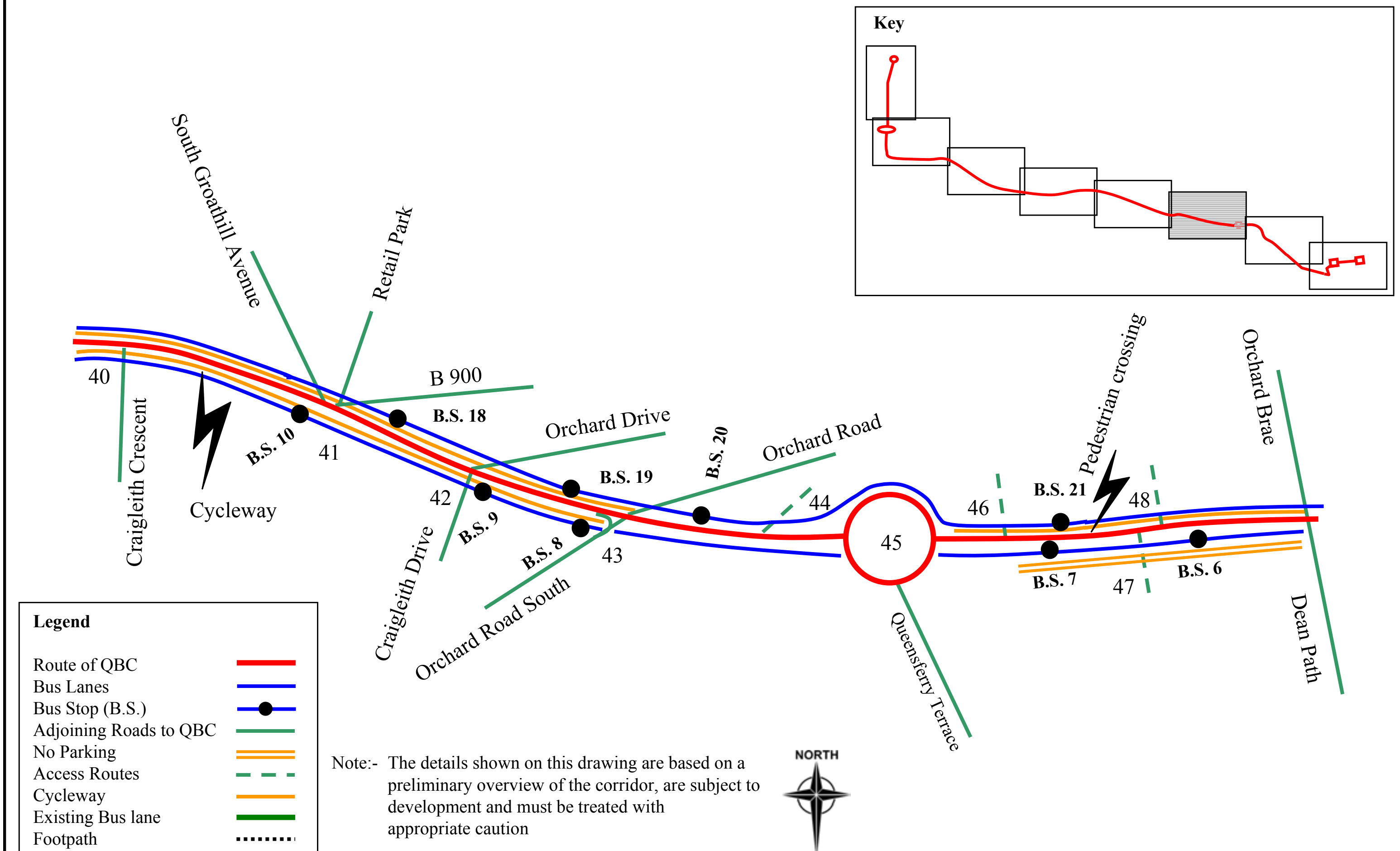

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Queensferry Cross Forth Corridor

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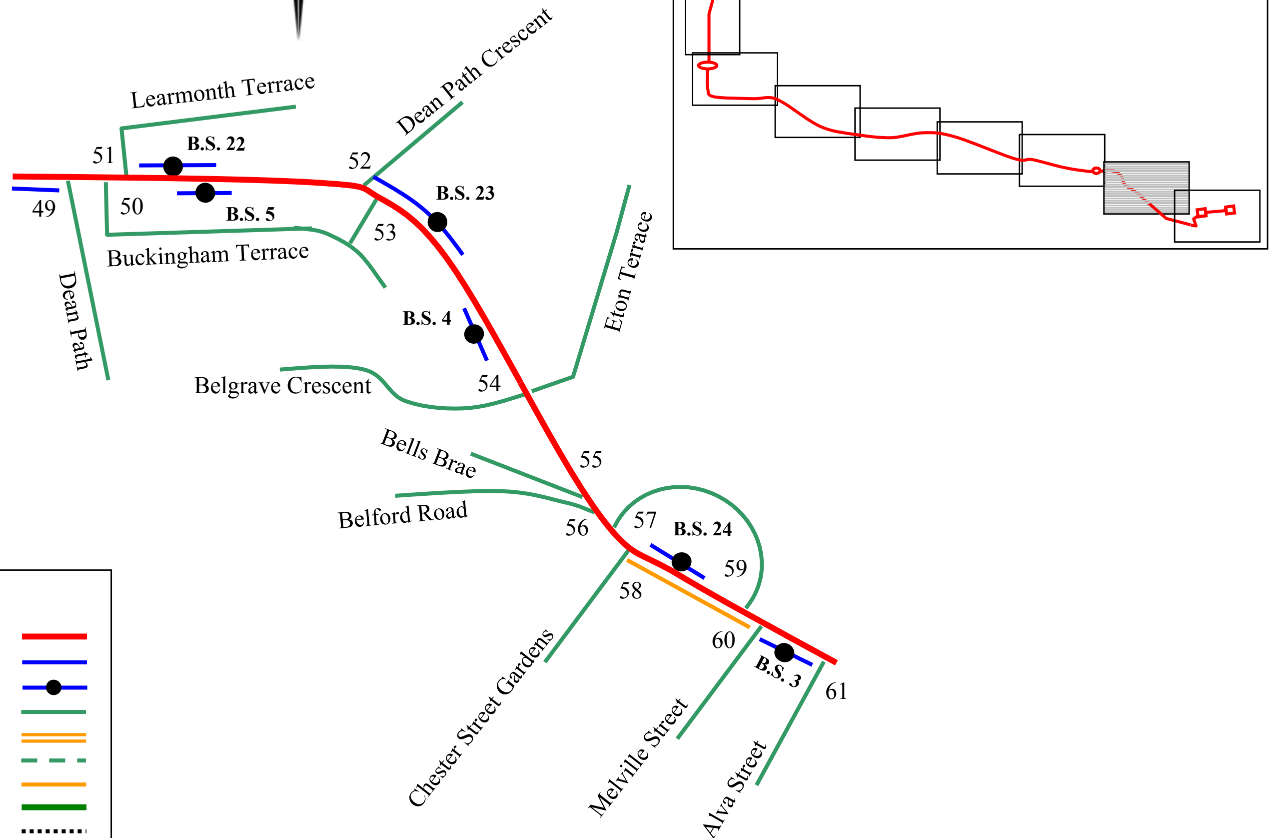

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- Access Routes
- Cycleway
- Existing Bus lane
- Footpath

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Queensferry Cross Forth Corridor

Not To Scale

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- Access Routes
- Cycleway
- Existing Bus lane
- Footpath

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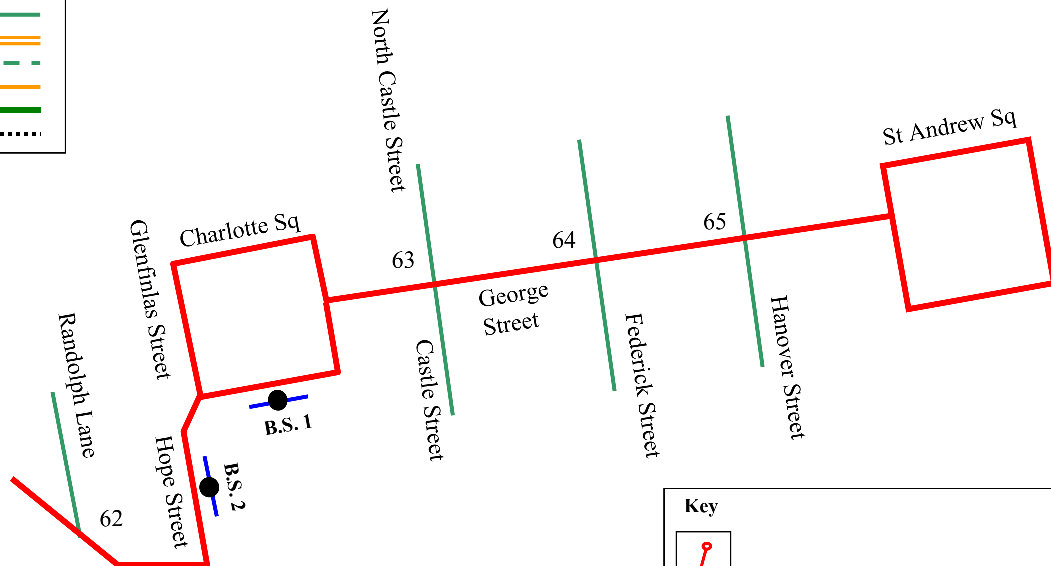

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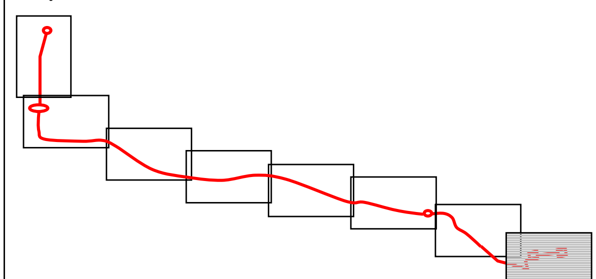

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Queensferry Cross Forth Corridor

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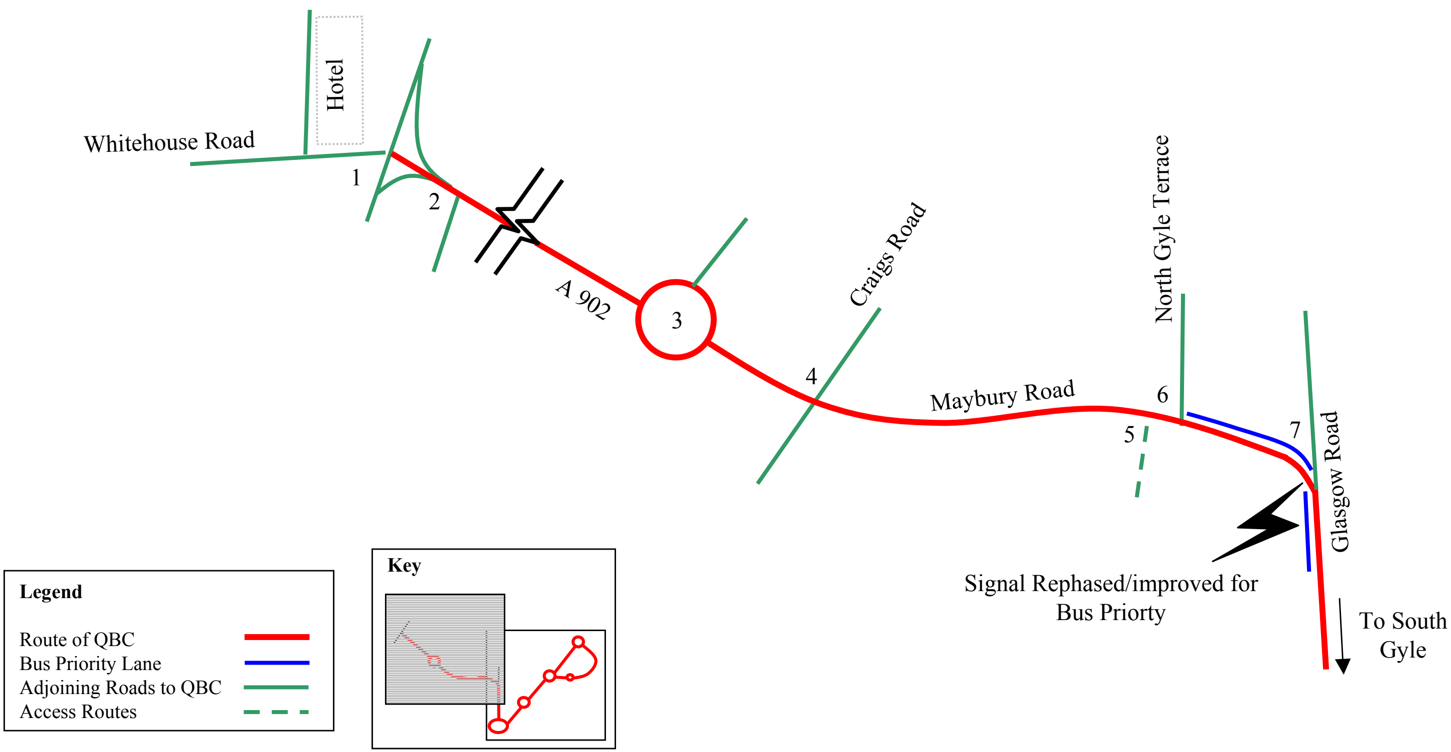

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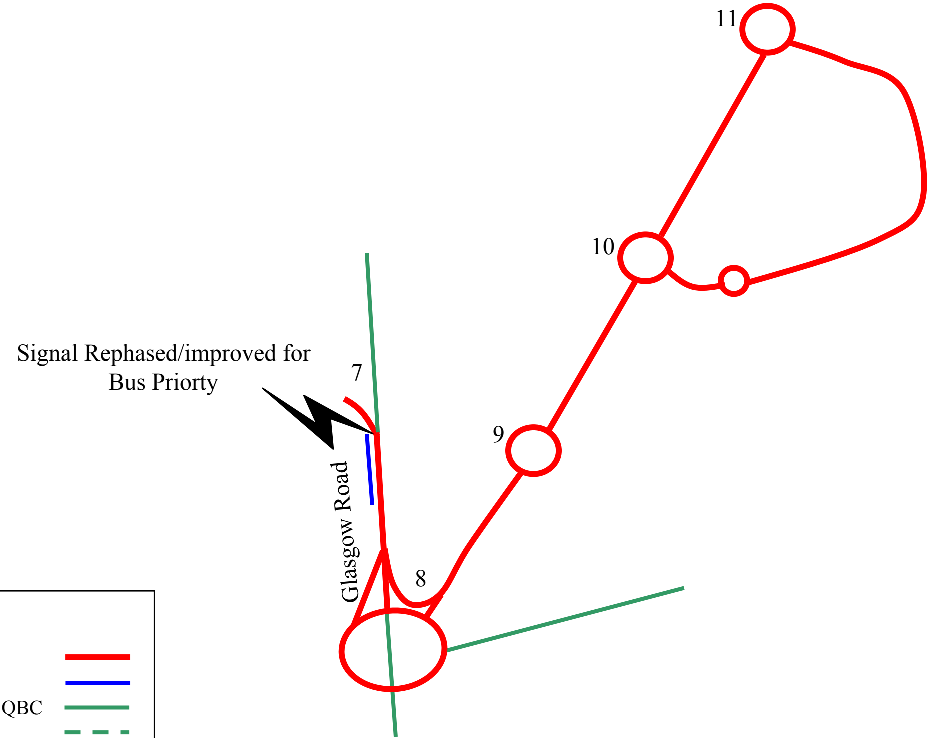
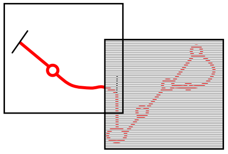


Legend

- Route of QBC
- Bus Priority Lane
- Adjoining Roads to QBC
- Access Routes

Key



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Queensferry Cross Forth Corridor

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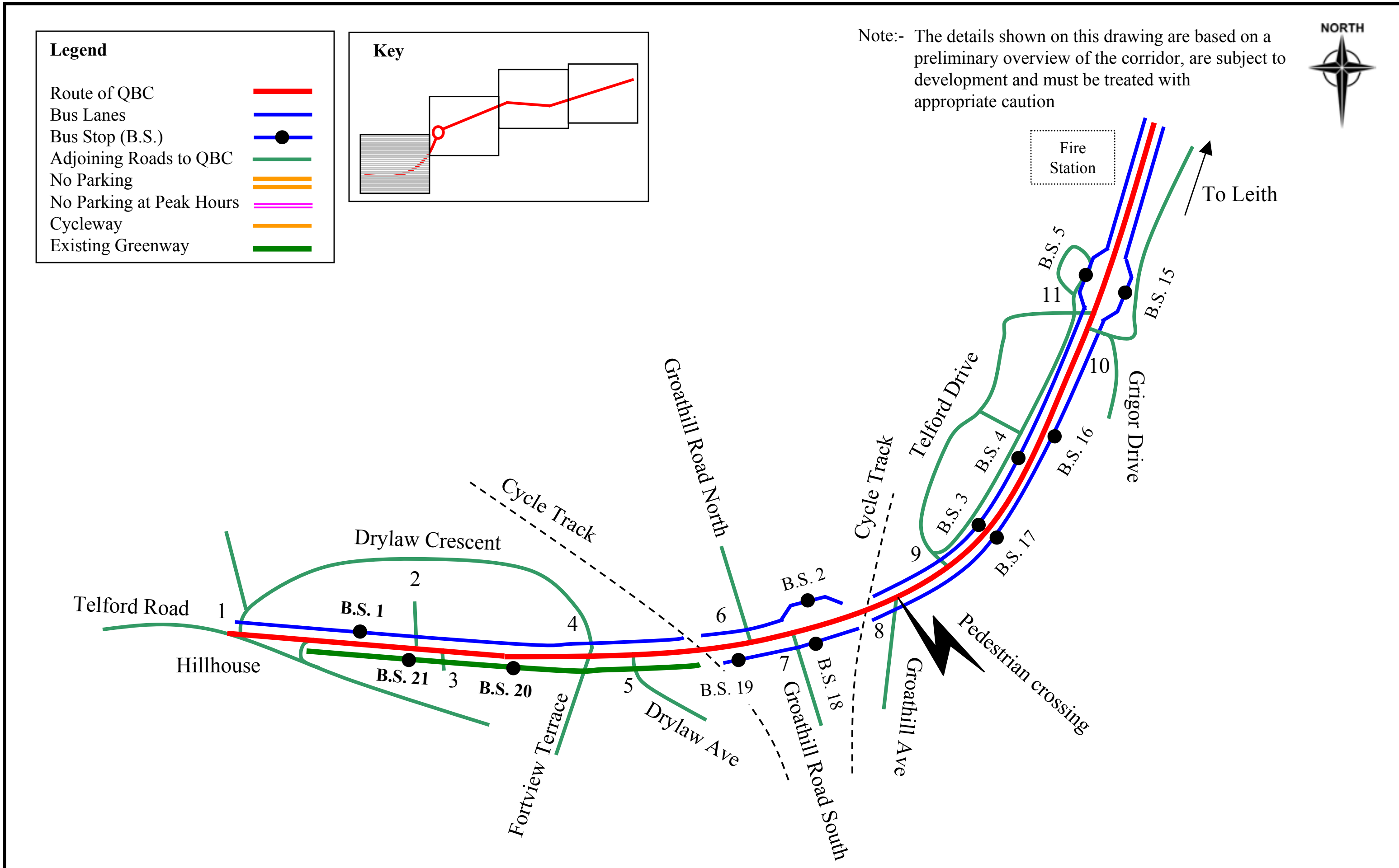

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Queensferry Cross Forth Corridor

Not To Scale

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- No Parking at Peak Hours
- Cycleway
- Existing Greenway

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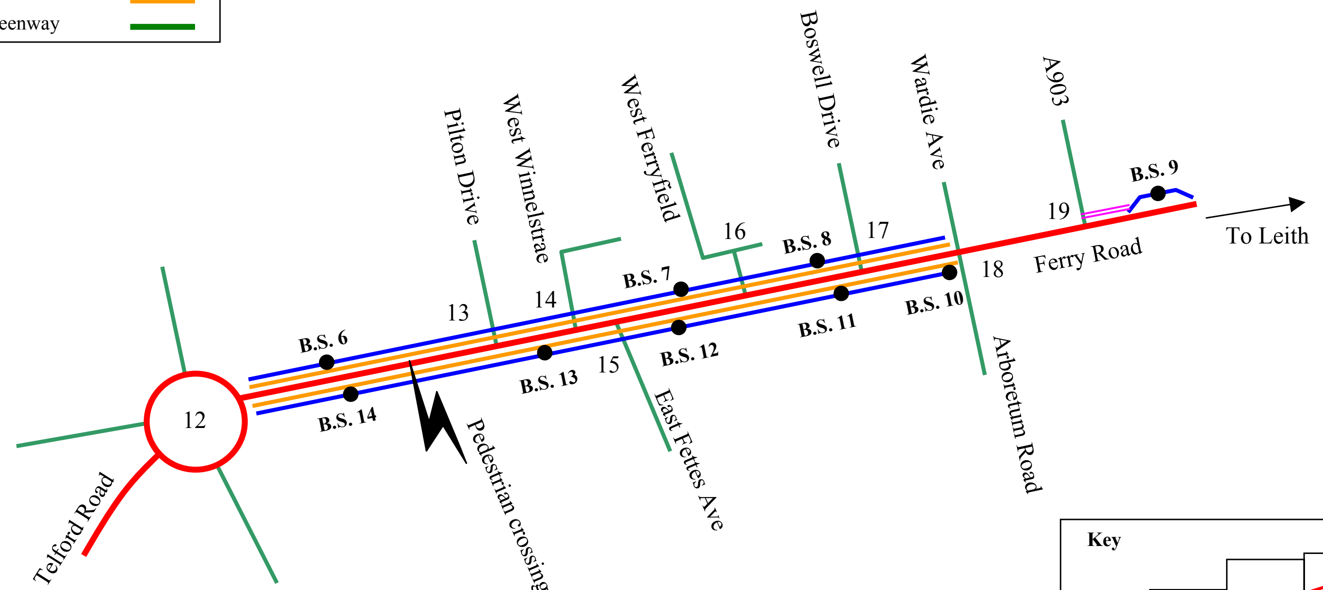
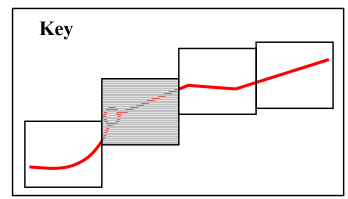




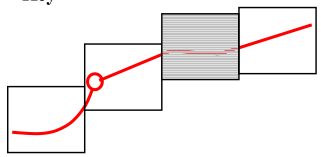
SESTRANS Corridor Studies
Queensferry Cross Forth Corridor

Not To Scale

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- No Parking at Peak Hours
- Cycleway
- Existing Greenway

Key



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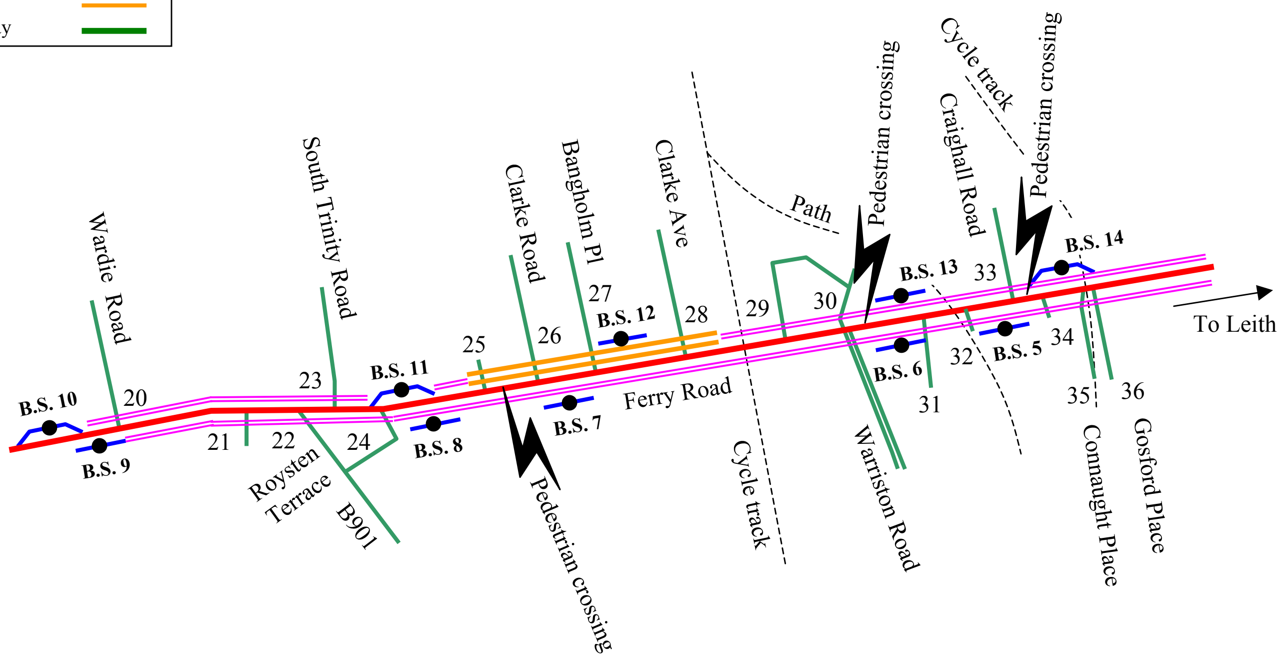


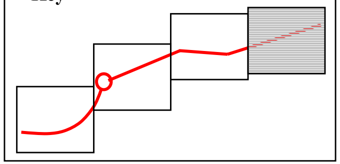
SESTRANS Corridor Studies
Queensferry Cross Forth Corridor

Not To Scale

Legend

- Route of QBC
- Bus Lanes
- Bus Stop (B.S.)
- Adjoining Roads to QBC
- No Parking
- No Parking at Peak Hours
- Cycleway
- Existing Greenway

Key



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Queensferry Cross Forth Corridor

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APPENDIX B

Rail Improvement Options

Scott Wilson Railways
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HG
UK

Telephone (0141) 335 3223
Int. Code 44 141
Fax (0141) 335 2757
Website www.scottwilson.com

Mr Neill Birch
Scott Wilson Scotland
6 Park Circus
Glasgow

Your Reference
Our Reference S100307LE1
Date 04 June 2004

Reply To Stephen Kerr
Direct Dial 0141 335 2641
Email stephen.kerr@scottwilson.com

Dear Neill,

Queensferry Cross Forth Corridor
Engineering and Operational Reports

We have considered the requirements for the rail inputs to the schemes as highlighted by you in your "Technical Note 5A: Schemes for STAG Part 2" as follows:

1. <u>Item C: Optimisation of Rail Services</u>

We have enclosed a report "Fife Rail Network Service Enhancements" covering the operational aspects of optimising the available train paths around the Fife circle. This gives options for possible increased frequency of services.

We have assumed that there will be no capacity restrictions in respect of the airport link, Haymarket and Waverley Stations, and that existing signalling restrictions on the Forth Bridge remain.

Current signalling can be upgraded to four aspect and additional signalling over the Forth Bridge would do much to improve the current position, allowing potentially an extra 3 trains per hour (15 rather than 12). We understand that there is currently an Incremental Output Statement project being carried out by Network Rail for signalling work on the Forth Bridge.

The option of lengthening trains to 8 cars has been costed at £12m at +/- 50%.
This has allowed for the required rail infrastructure works at each station on the Fife Circle service including Dalmeny and South Gyle, including signalling and structural works.

Specific restrictions exist at a number of stations, these are summarised in the following table:

Station	Civils Issues	Signalling Issues
South Gyle	Extend north U/B to south	1 or 2 signals affected
Dalmeny	Possible trackworks Proximity to Forth Bridge approach spans.	Down loop and sidings to south Signals to north Bi-directional both lines over Forth Bridge.
North Queensferry	Tunnel to north, U/B and x-over	Issues with bi-directional

	to south. Extend southwards	working on Forth Bridge and requirement to move x-over. May preclude use of station for 8 cars when bi-directional working in operation.
Inverkeithing	Junction to south and north. Existing retaining walls	Possible alterations
Rosyth	Extension appears ok to south	Appears to be no impact.
Dunfermline Town	x-over to south	Possible alterations.
Queen Margaret	O/B's to south and north, may require partial re-construction of bridge to north.	Possible alterations.
Cowdenbeath	Appears ok.	Possible alterations.
Lochgelly	Steep embankments, Corus system proposed for extension to 6 car	Appears to be no impact.
Cardenden	Appears ok. Maintain vehicular track access.	Possible alterations.
Glenrothes	O/B and x-over at south, Thornton Junction to north	Definite alterations, currently under review for extension to 6 cars. Potentially significant works.
Kirkcaldy	Track works.	Alterations due to S&C works.
Kinghorn	High viaduct to north, retaining wall on south end of down line. Footbridge at south end. Significant works required.	Possible alterations.
Burntisland	U/B to south	Possible alterations.
Aberdour	Tight radius. Previous problems with stepping and passing distances. O/B to south. Extend north	Appears to be no impact.
Dalgetty Bay	O/B to north and south.	Signal on down line approach to station

2. Item 7: Halbeath Station

The engineering aspects of the introduction of a new station at Halbeath are evaluated in the enclosed "Engineering Feasibility Report", with operational aspects being covered in the enclosed report "Fife Rail Network Service Enhancements".

3. Item 32 "Improved PT rolling stock and travel environment"

We are awaiting details of current and forecast passenger numbers by station from you to allow us to progress with this item.

4. Item 43 Ferry Toll Station

The engineering aspects of the introduction of a new station at Ferry Toll are evaluated in the enclosed "Engineering Feasibility Report", with operational aspects being covered in the enclosed report "Fife Rail Network Service Enhancements". Two locations were examined to the north and south of Jamestown Viaduct.

5. Item 45 "Dunfermline – Stirling Rail Link and Dunfermline Chord"

We have enclosed a report "Fife Rail Network Service Enhancements" covering the operational aspects of optimising the available train paths between Dunfermline and Stirling.

Yours sincerely
For SCOTT WILSON RAILWAYS LTD

Stephen Kerr

Enc(s)

SESTRANS

FERRYTOLL / HALBEATH STATIONS

ENGINEERING FEASIBILITY REPORT FOR STAG 2

JUNE 2004

DRAFT

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Ref: S10007 Draft Report

Contact: Douglas Binns

Approved for Issue:

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Date:

CONTENTS

EXECUTIVE SUMMARY

This study examined the engineering options for constructing a new railway station at Ferry Toll on the existing rail line between North Queensferry and Inverkeithing, and Halbeath on the line between Dunfermline and Cowdenbeath. Three locations were looked at.

The locations examined were:

> Adjacent to the existing Park and Ride at Junction 1 of the A90, to the north of Jamestown Viaduct
>
> To the South of Jamestown Viaduct
>
> Adjacent to Halbeath Junction on the A90 on the Fife Circle Line

It is essential that key rail industry organisations such as Her Majesty's Railway Inspectorate, Network Rail, the Train Operating Company and the Strategic Rail Authority be consulted to determine the preferred solution should these options be developed.

Total costs (£) (+50/-20%) for the options are as follows:

Item	**Option 1 Ferry Toll North £k**	**Option 2 Ferry Toll South £k**	**Option 3 Halbeath £k**
Construction	2697	1903	1892
Design	235	166	165
Network Rail	188	132	132
Total	**3119**	**2201**	**2188**

1. INTRODUCTION

1.1 Scott Wilson Scotland commissioned Scott Wilson Railways to carry out an engineering study into opening a twin-platform station at Ferry Toll on the existing rail line between North Queensferry and Inverkeithing, and Halbeath on the line between Dunfermline and Cowdenbeath. The study has not examined rail operational issues.

1.2 For the Ferry Toll site, two potential locations were identified to the north and south of Jamestown Viaduct and are shown in Figure 5.8.

1.3 One location was identified at Halbeath and is shown in Figure 5.2.

1.4 The study examines the requirements for rail infrastructure and does not look at the requirements for road access, parking or pedestrian access to the overall site.

1.5 Outline costs for the options have been given with an accuracy of +50/-20%.

.

2. LOCATION OPTIONS

Three sites were considered to determine their suitability for the introduction of a station, and these sites are described in the following paragraphs. A drawing showing the location of the sites is included in Appendix B to this report.

Scott Wilson are currently not aware as to whether any of the sites are included in the Council's Local Plan, and have not discussed the project with rail industry or community organisations.

2.1 Option 1: Ferry Toll, North of Jamestown Viaduct

2.1.1 The line immediately to the north of Jamestown Viaduct was identified as a potential location.

2.1.2 The station site is immediately adjacent to and east of the Park and Ride facility at Junction 1 on the A90. It is situated on a high embankment at the northern end of Jamestown Viaduct and is shown in drawing S100307-SC-CV-0001.

2.1.3 Mobility impaired access to the platforms would be via a lift to the Down platform , with an access from the lift to a walkway beneath the northern span of the Viaduct at a raised level, and a ramp of circa 200 metres in length to the Up (east) platform. This arrangement would dispense with the requirement for any ramp (circa 400 metres required) on the Down side and reduce the required ramp length on the Up side. A lift would be required for the proposed car park if a multi-storey option is deemed appropriate, and there is scope to combine the need for a lift and stairs for the platforms access with the car park.

2.1.4 Alternative access via steps would be provided to both platforms from car park / street level

2.1.5 The ownership of the land between the Network Rail boundary and existing roads and car park would require to be determined.

2.1.6 General car parking facilities have been considered by others, and mobility impaired parking would be required adjacent to the down platform access ramp / lift.

2.1.7 The track is on a gradient of 1:70. This is significantly greater than recommended in HMRI Guidance and Railway Standards (1:500). This may not preclude the use of this location, although specific additional safety measures may be required. This will require to be further investigated.

2.2 Option 2: Ferry Toll, South of Jamestown Viaduct

2.2.1 The proposed location is shown in drawing S100307-SC-CV-0002, and is located to the east of the railway and the west of Ferryhill Road.

2.2.2 Land ownership details for the area will be required to be ascertained.

2.2.3 Confirmation is required that there is space available within Network Rail property to locate the new platforms, although there may be restrictions for a nine car platform as the site is positioned on an embankment between Jamestown Viaduct and a rock cutting. Access ramps may extend out with Network Rail property

2.2.4 Access from the car park is available to the Up (east) platform, and access to the Down (west) platform would be via a footbridge. Ramped access to the Up platform would be via a ramp of circa 100 metres.

2.2.5 Ferryhill Road is a minor through road with a quarry immediately to the east where it runs adjacent to the station site. A car park, turning area, drop off point and mobility impaired parking could be constructed within the area illustrated in drawing S100307-SC-CV-0002.

2.2.6 The access to the existing Park and Ride would be relatively poor (circa 500metres distant) compared with Option 1, resulting in the possibilities for use as a modal interchange being restricted. There is a rail underbridge positioned immediately adjacent to the junction between Ferryhill Road and the B981.

2.2.7 A car park will be designed by others. The current topography slopes down from south to north and the car park design will impact on the length of access to the Up platform.

2.2.8 The track is on a gradient of 1:70. This is significantly greater than recommended in HMRI Guidance and Railway Standards (1:500). This may not preclude the use of this location, although specific additional safety measures may be required. This will require to be further investigated.

2.2.9 There may be existing track drainage at the south of the site and the requirement for alterations to this would have to be confirmed.

2.3 Option 3: Halbeath

2.3.1 The proposed location is and is shown in drawing S100307-SC-CV-0003, and is bounded to the north by the railway, the south by the A92 and the west by the M90 at Junction 3. The site is located on an embankment.

2.3.2 Land ownership details for the area will be required to be ascertained.

2.3.3 Confirmation is required that space is available within Network Rail property to locate the new platforms. Access ramps may extend out with Network Rail property.

2.3.4 Access from the car park is available to the Up (south) platform, and access to the Down (north) platform would be via a footbridge. Ramped access to the south platform would be via a ramp of circa 150 metres length.

2.3.5 The A92 is a dual carriageway. Access would be taken to the station from the existing M90 access roundabout to the south east of the proposed station. A car park, turning area, drop off point and mobility impaired parking could be constructed within the area illustrated on Figure 5.2.

2.3.6 Access for pedestrians from adjacent housing areas (Crossgates and Halbeath) does not appear to be good. No access for these areas has been included.

2.3.7 A car park will be designed by others. Due to the current topography, the car park design will significantly impact on the length of access to the southern platform.

2.3.8 The track is on a gradient of 1:100. This is again significantly greater than recommended in HMRI Guidance and Railway Standards (1:500). This may not preclude the use of this location, although specific additional safety measures may be required. This will require to be further investigated.

3. OPERATIONAL ASPECTS

3.1 General

3.1.1 The operational aspects of the proposed stations are covered fully in our report "Fife Rail Network Service Enhancements" (draft) of 31.5.04. The main points for Ferry Toll and Halbeath are summarised below.

3.1.2 The option of "skipping" services has not been included but this could be considered, for example by providing additional services at the new proposed stations in lieu of the service stopping at an existing station. This would result in a reduced service to the existing affected station.

3.1.3 Increasing the capacity of existing trains by lengthening them to 8 cars would allow greater usage in the stations examined, although train services may already be crowded at peak periods prior to reaching Ferry Toll Station.

3.2 Ferry Toll

3.2.1 An hourly service can be provided off peak as part of the service between Edinburgh and Alloa, with an additional hourly peak service between Haymarket (platform 1a) and Inverkeithing.

3.3 Halbeath

3.3.1 An hourly off peak service could be provided, increasing to half hourly at peak periods.

4. STATION WORKS

4.1 Station Layout

4.1.1 The platform construction would consist of precast concrete cross wall units and longitudinal precast slabs, supporting standard precast concrete copes. The final surface is of tactile slabs and tarmacadam. Other platform designs could also be considered. The sites are located on embankments and may require piling to support the platforms.

4.1.2 A minimum platform width of 2.5m may not cater for the passenger numbers envisaged at peak times, therefore a 3.5m platform has been assumed.

4.1.3 All station services are contained within ducts in the platform and require access manholes to each at say 30m centres. Existing telecommunications and other cables would be incorporated in their current locations within split ducts.

4.1.4 Car parking facilities have been considered by others.

4.1.5 The provision of bicycle stands or lockers should be considered.

4.2 Platform Length

4.2.1 The proposed 147 metre platform would accommodate all trains that are currently envisaged would stop at Ferry Toll / Halbeath and would comply with HMRI guidelines and Railway Standards with respect to length. There may be a requirement to consider an eight coach train.

4.3 Waiting Facilities

4.3.1 Proprietary "bus shelters" constructed of steel frames and polycarbonate panels are proposed to provide passenger waiting facilities. There are numerous proprietary systems available in different sizes.

4.4 Station Platform Access

4.4.1 Mobility impaired ramps will be required for each location with the following specification:

1:20 slope
2.0m landings at 6m intervals
2.0m width between handrails
Overall ramp length would be circa 140m
A change in direction every second landing.

4.4.2 It should be noted that the ramps should be compliant with the Strategic Rail Authority (SRA) Code of Practice. It may be possible to introduce steeper and shorter ramps through consultation with the SRA, Her Majesty's Railway Inspectorate and local mobility impaired groups. The ramp widths may also be able to be reduced to 1.3m.

4.5 Footbridge

4.5.1 A footbridge would be required for Option 2 Ferry Toll South and Option 3 Halbeath.

4.5.2 The footbridge and stairs would be formed from structural steelwork. In the main, the components would be formed from square and rectangular hollow sections. The floors to the stairs would be from steel plates treated with a non-slip tiled surface.

4.5.3 The footbridge span crossing the railway would be an open steel structure of approximately 16m in length. Parapets would be 1500mm high with smooth interior facings to ensure there are no hand or footholds. The floor to the footbridge would be a non-slip flooring material.

4.5.4 The minimum clear height under the bridge from top of highest rail has been assumed to be approximately 5.1m, although a full clearance of 5.8m may be requested by Network Rail / HMRI.

4.5.5 The stairs comprise of flights on each side using risers of approximately 130 mm and goings of 300 mm on each flight. Double handrails would be provided to all stairs, with a 300mm overrun at ground and top floor landings.

4.5.6 Derailment protection to the footbridge is not deemed necessary, as the column supports are located at the rear of both platforms in excess of 2.0m from the nearest rail.

4.5.7 The foundations may require to be piled.

5. SIGNALLING AND TELECOMMUNICATIONS WORKS

5.1 Option 1: Alterations to Infrastructure

5.1.1 The signal sighting implications will need to be assessed at the detailed design stage.

5.1.2 It is assumed that the station will be approximately 30 metres from U/B 31 and extends a distance of 150 metres (top of ramps) towards Inverkeithing.

5.1.3 Signal EV407 will need to be repositioned a distance of approximately 166 metres towards Signal EV413 (at Inverkeithing Station). The preliminary calculations indicate that the braking distance from new Signal EV407 to Signal EV413 is adequate. The braking distance from Signal EY665 (at North Queensferry) to existing Signal EV407 is currently adequate. Repositioning Signal EV407 approximately 166 metres northwards will not result in over-braking.

5.1.4 The braking distance from the repositioned EV407 to Signal EV413 is 1402 metres. The required braking at 40 mph and an average falling gradient of 1/124 is 1240 metres. The braking distance is therefore adequate.

5.1.5 An existing Down Fife Line PSR board (50 mph) will have to be repositioned approximately 25 metres north of the new Down Fife Line Platform.

5.1.6 An existing Up Fife Line PSR board (40 mph) will have to be repositioned approximately 25 metres north of the new Up Fife Line Platform.

5.1.7 The existing Signal EV407 and Aster Track Circuit equipment will need to be renewed approximately 166 metres northwards. A new apparatus case will be required. Power and signalling cables will cut and terminated in the new apparatus case.

5.1.8 The new station / signalling alterations will need to be shown on Edinburgh Signalling Centre Panel and Inverkeithing Relay Room Emergency Panel.

5.2 Option 2: Alterations to Infrastructure

5.2.1 The signal sighting implications will need to be assessed at the detailed design stage.

5.2.2 It is assumed that the station will be approximately 30 metres from U/B 31 and extends a distance of 150 metres (top of ramps) towards North Queensferry.

5.2.3 An existing Down Fife Line PSR board (40mph) will have to be repositioned approximately 25 metres south of the new Down Fife Line Platform. An existing Up Fife Line PSR board (50mph) will have to be repositioned approximately 25 metres south of the new Up Fife Line Platform.

5.2.4 The new station will need to be shown on Edinburgh Signalling Centre panel and Inverkeithing Relay Room Emergency Panel.

5.2.5 Signal EV407 has a high SPAD incidence and any new infrastructure must not exacerbate the current sighting etc.

5.3 Option 3: Alterations to Infrastructure

5.3.1 The Signal Centre Diagram will have to be altered.

5.3.2 The signal sighting implications will need to be assessed at the detailed design stage.

5.3.3 The new station is proposed to be positioned approximately 135 metres (Top of Ramp) on the Thornton side of Signal EO 734. A Track Circuit joint with 3 Aster units would be situated within the platform limits. The position of this joint cannot be moved and the Aster units would need to be located in platform recesses.

5.3.4 It would be desirable to relocate the station a further 60 metres towards Thornton Junction to avoid providing platform recesses which would not be favoured by the Territory Signal Engineer.

6. PERMANENT WAY WORKS

6.1.1 The alignment and level of any new platform must comply with HMRI Guidance with respect to stepping distances and passing clearances between trains and the platform.

6.1.2 It is normal practice to install the copings to the new platform with a tolerance to allow for future track maintenance thereby negating the need to alter the copes after nominal track maintenance works and resurfacing works.

7. ELECTRICAL WORKS

7.1 Lifts

7.1.1 A lift has been specified for the Down platform access for Option 1: Ferry Toll North. This will require to be installed in accordance with the Strategic Rail Authority, HMRI and Railway Standard requirements for mobility-impaired access.

7.2 Power supplies (operational and domestic).

7.2.1 A new main electrical supply for the station services should be established comprising of a Regional Electrical Company (REC) cable head/cut-out and metering, housed in metal cabinet to the rear of the new platform. New final circuit distribution arrangements for essential domestic and signalling supplies along with non-essential domestic supplies should also be established in the same cabinet.

7.3 Lighting

7.3.1 Station Lighting should be installed to provide a minimum illumination of 100 lux to platform and ramp areas to meet current Disability Discrimination Access (DDA) requirements, as given in the SRA's Code of Practice, with the ratios of the minimum and average values of illumination compliant with current Railway Standards.

7.3.2 The new lighting should comprise of roadside lanterns mounted on galvanised tubular columns. The lanterns should be free from side glare to remove any affect toward railway traffic movements and signalling. The lighting columns should be raising and lowering type to allow maintenance to be carried out on the ground, with the columns being raised and lowered using a hydraulic counterbalance unit.

7.3.3 The new lighting system and associated wiring should be connected to a control panel established in a metal cabinet located to the rear of the new platform.

7.4 Closed Circuit Television

7.4.1 Closed Circuit Television (CCTV) should be established at the Station for Passenger Safety and Crime Prevention or to assist in possible cases where prosecution may take place. The CCTV system equipment and associated power/data wiring should be connected to a control panel established in a metal cabinet to the rear of the new platform. The cabinet door should be fitted with alarm contacts and a lockable door.

7.4.2 The new CCTV system shall comprise of fixed camera and units distributed at intervals along the platform area mounted on lighting columns. A help point post should also be provided on each platform complete with a passenger audio communication facility to a control centre Dunfermline. A Pan Tilt-Zoom (PTZ) camera should be mounted on a separate column positioned to focus on the CCTV cabinet and the help points.

7.4.3 The new CCTV system should be digitally recorded at the local cabinet and linked via a communication link to a remote operator Dunfermline. The communication link should be via the most appropriate means e.g. Integrated Services Digital Network (ISDN) or (Wide Area Network) WAN etc.

7.5 Customer Information Systems

7.5.1 Customer Information System (CIS) equipment should be established at the station to provide passengers with real-time visual and audio train information including automated local Public Address (PA) announcements. The CIS system equipment and associated power/data wiring should be connected to a control panel established in a metal cabinet to the rear of the new platform.

7.5.2 The CIS system should be synchronised locally with real-time train arrivals and departures including information from other parts of the network connected by route and the train services being operated. The CIS system should source information from Train Services Data Base (TSDB) and Train Describer (TD) systems. The CIS system should be intelligent and be capable of independent working, but be connected via a communication link to a central control facility for normal running. The communication link should be via the most appropriate means e.g. ISDN or WAN etc

7.6 Long Line Public Address

7.6.1 A Long Line Public Address (LLPA) system should be connected into a new control panel established in a metal cabinet to the rear of the new platform. The cabinet door should be fitted with alarm contacts and a lockable door.

7.6.2 The new LLPA system should comprise of new amplifier unit housed and micro speaker units mounted on lighting columns at the platform. The new LLPA system should be intelligent and capable of independent working, but be connected via a communication link to a central control facility Dunfermline for normal running. The communication link should be via the most appropriate means e.g. ISDN or WAN etc.

7.7 Public Telephone

7.7.1 The provision of station telephones should be considered at the station to facilitate passenger convenience and to offer a communication link for CIS, LLPA and CCTV systems operation.

8. PROGRAMME

8.1 Timescales

8.1.1 The principal activities within the programme are:

- Obtaining funding
- Rail Industry Negotiations
- Public consultation
- Design
- HMRI approval
- Planning permission
- Implementation.

8.1.2 At present it is difficult to estimate an overall timescale to complete the project, as this is dependant on a number of external influences.

8.1.3 To allow the introduction of new train services, timetable alterations require to be agreed between the Train Operating Company and Network Rail a minimum of 61 weeks prior to the change.

8.2 Possessions

8.2.1 Rules of the route possessions will be required for a number of activities. These possessions are normally readily available although checks require to be made to ensure there are no clashes with other works on the line.

8.2.2 Applications for possessions are normally made some 52 weeks in advance. However, Network Rail may be amenable to shorter timescales.

9. HEALTH & SAFETY

9.1 Main Safety Issues

9.1.1 The main safety risks are:

- Construction adjacent to an operational railway
- The impact on rail infrastructure of piling works on embankments.

10. APPROVALS AND CONSENTS

10.1 There are a number of approvals to be secured prior to and during the construction works.

	Item	**Approval by**	**Timescale**
1	Approval of Railway Plant and Equipment Regulations for station construction and operation.	HMRI	Acceptance in principle prior to work commencing. Approval on completion (timescale not given).
2	Network Change Procedure	Office of the Rail Regulator	Prior to work commencing.
3	Station design Forms A, B and C in accordance with Network Rail Company Standard RT/CE/S/003	NR Outside Parties Engineer / NR Investment Department	Prior to work commencing.
4	Network Rail "Agreement" with SESTRANS	NR	Prior to work commencing.
5	Planning permission for station	Fife Council	Prior to work commencing.
6	Construction Health and Safety Plans, Method Statements	NR Outside Parties Engineer / NR Investment Department	Prior to work commencing.
7	Station layout acceptance	SRA	Prior to work commencing.
8.	Introduction of station into the TOC's Passenger Service Agreement	SRA	Prior to work commencing

11. KEY COMMERCIAL OPPORTUNITIES AND RISKS

11.1 Opportunities

11.1.1 Station access ramp lengths could be made shorter and steeper given a favourable response from mobility-impaired groups, HMRI and SRA.

11.1.2 The lift and stair access for Option 1: Ferry Toll North, may be able to be combined with the car park access requirements.

11.2 Risks

11.2.1 Other projects on the rail network may impact on the project. We are not currently aware of any such projects.

11.2.2 Significant signalling alterations may be required.

11.2.3 Availability of signalling design and implementation resources.

11.2.4 The study has not looked at engineering issues outwith the rail infrastructure.

11.2.5 Land ownership for construction of new or use of existing access roads, access ramps and car parking areas. Landowners have not yet been identified to our knowledge, and may not be willing to sell.

11.2.6 The cost of land purchase.

11.2.7 The existing power supply adjacent to the station may not be sufficient to cater for new demand. This will require further investigation.

11.2.8 There may be local opposition from neighbouring houses to the station proposal.

11.2.9 Poor ground conditions may exist, and a site investigation should be carried out at the design phase.

12. COST SUMMARY

12.1 Cost Summary

12.1.1 The costs have been prepared on limited information and therefore represent an approximate order of costs for the works. An allowance of 8% of the project cost has been allowed for Network Rail's involvement, 10% for design and 15% for contractor mobilisation.

12.1.2 The breakdown of costs for each option by discipline is included in Appendix B.

12.1.3 Accuracy of costs is approximately +50/-20%.

12.1.4 The following costs are excluded:

Train Operating Company Costs
Station maintenance
Legal and other fees
Land purchase
Car park and access road construction

12.1.5 At Option 1: Ferry Toll North, the costs for the lifts may be able to be split with the requirements for a lift for any proposed multi-storey car park.

13. LIAISON WITH RAIL INDUSTRY

13.1 Liaison To Date

13.1.1 Scott Wilson Railways have not liased with the rail industry during this study.

13.2 Future Liaison

13.2.1 Following the review of this report the following interested parties will require to be consulted:

The Strategic Rail Authority,
The Office of the Rail Regulator,
Her Majesty's Railway Inspectorate,
Network Rail,
Train Operating Companies,
Freight Operating Companies,
SESTRANS.

13.2.2 The Strategic Rail Authority will be involved with the following issues:

Station layout
Possible funding.

The SRA plan to publish guidance on the new station application process in the near future. This will include information on the procedures to be followed to gain new station approval.

13.2.3 The Office of the Rail Regulator will be involved with the following issues:

Alterations to Rail Franchises
Network Change Procedure

13.2.4 Her Majesty's Railway Inspectorate will be involved with the following issues:

Approval of all safety aspects of the works
Station layout

13.2.5 Network Rail will be involved with the following issues:

Agreement of the scope and specification
Review of the proposed alterations to current rail operations
Design approvals
Supervision / monitoring and acceptance of the Construction Works
Agreement on ownership and operation of the station.
Gaining approval of scheme from HMRI
Providing access to their infrastructure
Providing land for the station

Network Rail will require a formal "Agreement" to be put in place between the promoter and themselves, to ensure any costs they incur are reimbursed.

13.2.6 The Train Operating Companies will be involved with the following issues:

Provision of passenger services
Operation and possible leasing of station
Station layout
Network Change.

It should be noted that re-franchising of ScotRail is currently taking place during 2004.

13.2.7 The Freight Operating Companies will be involved with the following issues:

Impact on Rosyth yard branch line
Network change.

13.2.8 SESTRANS may be involved with the following issues:

Station layout and specification,
Funding of infrastructure and additional facilities

13.2.9 Without formal discussions with the relevant parties, SWR have used their judgement in proposing the layouts contained within this report.

14. CONCLUSION

14.1 Three possible station sites were looked at for a new station at Ferry Toll / Halbeath.

14.2 A summary of the main pros and cons of each site is as follows:

Option	Pros	Cons
1. Ferry Toll North	Existing Park and Ride adjacent	Signalling alterations Difficult access to both platforms Relatively high cost.
2. Ferry Toll South	Easier access to platforms	Distance from existing Park and Ride. Restricted length of track on embankment between rock cutting and viaduct.
3. Halbeath	Easier access to platforms	Difficult pedestrian access from adjacent housing. Adjacent level crossing.

14.3 Land ownership is important to the choice of site.

14.4 The costs identified for the options 2 and 3 are within 1% of each other, with Option 1 being approximately £900,000 more expensive.

14.5 Scott Wilson Railways have not contacted rail operating companies or community organisations to discuss the project.

15. RECOMMENDATIONS

15.1 To determine the preferred location for the station it will be necessary to examine the land ownership issues and associated costs.

15.2 Formal discussions should take place with the rail industry and community organisations.

15.3 The length and steepness of ramps should be investigated to enable potential cost savings.

15.4 Further investigation of the allowable track gradient should be made, and HMRI and Network Rail should be consulted.

APPENDIX A: DRAWINGS

Drawing List

S100307-SC-CV-0001	Option 1
S100307-SC-CV-0001	Option 2
S100307-SC-CV-0001	Option 3

APPENDIX B: COSTS

Item	Option 1 Ferry Toll North £k	Option 2 Ferry Toll South £k	Option 3 Halbeath £k
Site clearance and demolition	5	5	5
Re-route& protect cables	50	50	50
Pway drainage	0	10	0
Platforms	800	650	600
Access Road	0	0	0
Car Park	excl.	excl.	excl.
Shelters and fencing	40	40	40
Access ramps/stairs from car park	400	100	150
Footbridge incl. Ramps	0	400	400
Lift	400	0	0
Lighting	110	90	90
CIS, LLPA, CCTV	150	150	150
Signalling	250	50	50
Utilities	50	50	50
Safety Supervision	90	60	60
Land purchase	excl.	excl.	excl.
Sub-totals	2345	1655	1645
Contractor Mobilisation (15%)	352	248	247
Design (10%)	235	166	165
Network Rail (8%)	188	132	132
Total	**3119**	**2201**	**2188**

SESTRANS

Fife Rail Network
Service Enhancements

Draft
31 May 2004

SESTRANS

Fife Rail Network

Service Enhancements

REPORT VERIFICATION

	Name	Position	Signature	Date
Prepared By:	H A Baillie	POA		31 May 2004
Checked By:	D Binns	PE		2 June 2004
Approved By:				

VERSION HISTORY

Date	Changes Since Last Version	Issue Status	Version

CONTENTS

1. REMIT

This study will examine the current rail services in Fife with a particular emphasis being placed on service enhancements i.e. looking at improvements to peak hour services, examining the possible re-opening of the Dunfermline – Stirling rail link and the construction of two new stations, one at Ferry Toll (between North Queensferry and Inverkeithing) and one at Halbeath (between Dunfermline Queen Margaret and Cowdenbeath).

2. PEAK HOUR SERVICES

The current service levels at peak hours use virtually all available capacity between Edinburgh and Inverkeithing. This is because there are a mixture of stopping services and express services. An all stations stopping train from Edinburgh has to leave 12 minutes ahead of an express service (calling at Haymarket and Inverkeithing only) in order to maintain the correct planning headway of five minutes at Inverkeithing. Therefore the intervening 12 minutes can be viewed as 'dead time' because no train can run between those services unless it is refuged in Dalmeny Loop for the express to pass. See Figure 1 for details of the current stopping services at each of the station within the study area.

2.1 DOWN EVENING PEAK

The services that currently operate between 1630 and 1815 are:

Edinburgh	1640	1647	1700	1705	1710	1714
Haymarket	1644	1651	1704	1709	1714	1718
	All stations	All stations except N Queensferry	Express	Express	Express	All stations
Inverkeithing	1702	1708	1716	1722	1730	1736

Edinburgh	1727	1740	1750	1755	1810	1813
Haymarket	1731	1744	1754	1759	1814	1817
	All stations	Express	All stations	All stations	Express	All stations
Inverkeithing	1749	1756	1812	1817	1826	1834

Following the service from Edinburgh at 1813 there is a Glasgow – Kirkcaldy train that arrives at Inverkeithing at 1839.

From the above table it can be seen that there is a regular 6 minutes gap between trains arriving at Inverkeithing and therefore impossible (with present signalling arrangements) to insert any more services. There is a gap between 1736 and 1749 but this could be filled by a new service for Alloa. This forms a later part of this report.

A new Fife service could depart Edinburgh at 1745 and run fast to a new station at Ferry Toll but would have to arrive Inverkeithing at 1806 and depart 1807 to maintain the correct headway. It may be desirable to terminate this train at Inverkeithing and run it empty to nearby sidings. There is, however a freight train currently in this path which is planned to be diverted via Stirling. If the diversions via Stirling do not take place this option would have to be revisited.

2.2 UP MORNING PEAK

The service that currently operate between 0715 and 0900 are:

Inverkeithing	0719	0726	0733	0737	0743	0752
	express	Calls S Gyle	All stations	Glasgow Q St	Express	All stations
Haymarket	0737	0745	0755		0758	0814
Edinburgh	0740	0748	0758		0802	0817

Inverkeithing	0802	0808	0815	0820	0828	0843
	express	All stations	All stations	All stations except N Queensferry	Calls S Gyle	All stations
Haymarket	0821	0830	0837	0841	0847	0905
Edinburgh	0824	0833	0840	0844	0850	0908

There is a slot available between 0743 and 0752 for an additional service, which could start at Inverkeithing and serve a new station at Ferry Toll. By adjusting some of the intermediate times on the service at 0808, this service could run slightly later to Edinburgh without affecting following trains. This would leave a slot for a possible additional service from Alloa and calling at Ferry Toll station. This is dealt with later in this report.

A reasonable slot still exists for a train to arrive in Edinburgh after 0850 although this may be deemed to late to serve peak travel, given onward walking time to places of employment.

2.2.1 Edinburgh Airport

The above tables are the current timetables operating across the Forth Bridge. None of the proposed services via the Airport have been considered because they are, as yet, an unknown quantity. It can be assumed that some of the Fife services will be routed via the Airport. However, the pinchpoint in the network between Dalmeny Junction and Inverkeithing will still remain and for the purposes of this study it is still the main focus of debate.

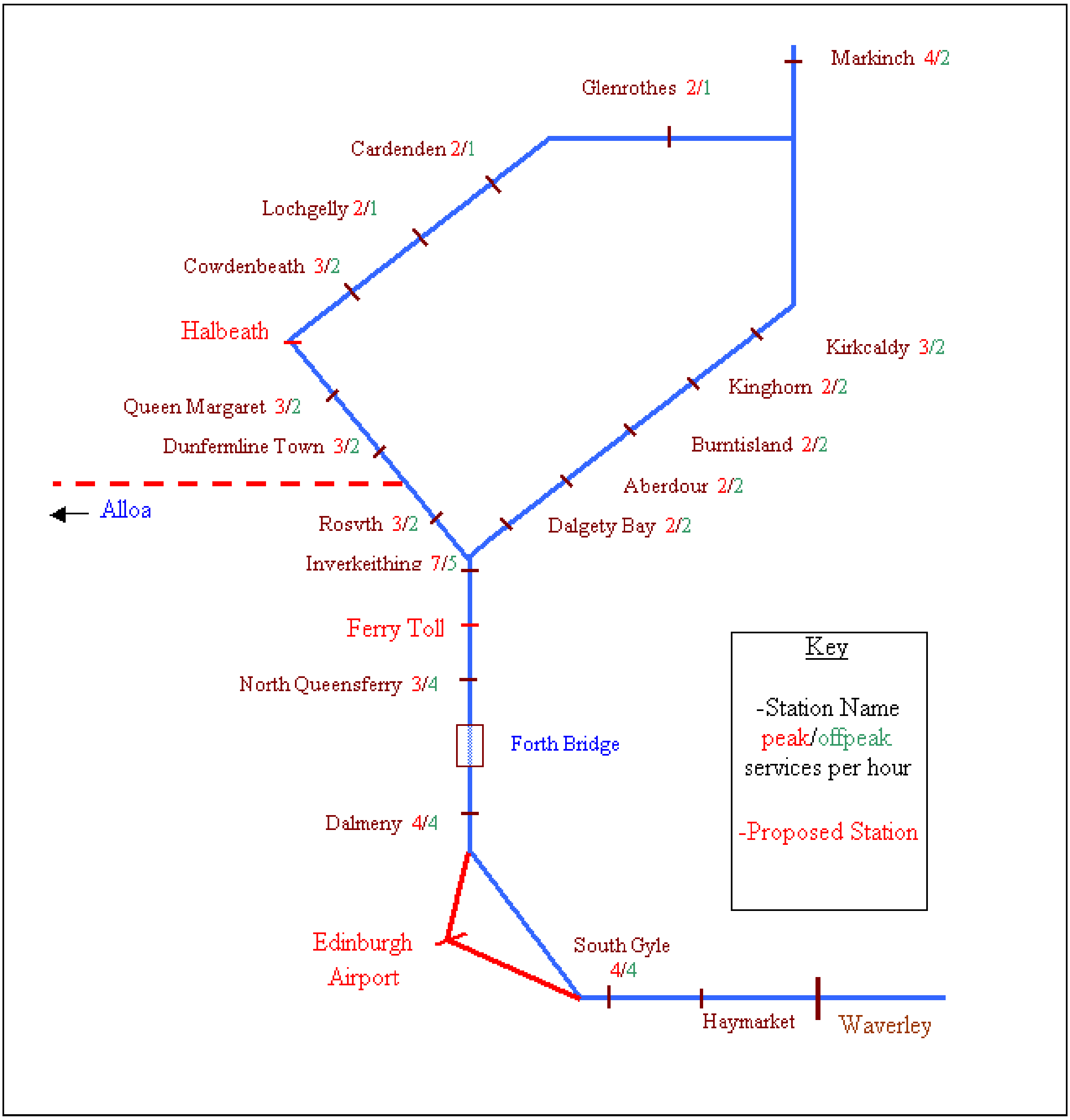

Figure 1: Current Stopping Service Levels

3. NEW STATIONS

3.1 FERRY TOLL

This station is proposed between North Queensferry and Inverkeithing at the proposed site of a 'park and ride' facility and bus turning point. There is a steep gradient at the site that will result detailed scrutiny by HMRI. There will be some significant alterations to signalling and, as a result, these too will be subject to examination by HMRI. Any alterations to signalling will improve the headways between trains although not the planning headways unless new signals become four aspect signals. This can reduce the planning headways to four (or in some cases three) minutes.

From the tables above it can be seen that there is scope for some trains to serve the station although the view is that they would have to be additional trains as present ones are full. These trains could either be trains starting at Inverkeithing, serving Ferry Toll only, which could give over 250 seats on a four car unit, or trains running to/ from Alloa which would also have the potential to create extra seating at peak times. This will be dealt with in a later section.

[The Alloa service could provide one train per hour in each direction with a possible train running on the opposite half hour between Inverkeithing and Haymarket only.]

3.2 HAYMARKET PLATFORM 1A

Any new services over the Forth Bridge may not be able to be accommodated at Edinburgh Waverley due to platforming constraints. This would need to be considered as part of a separate study but the station is currently operating at capacity and would not be expected to cater for these additional trains in its current state.

It is our view that part of the package for Fife should include the new platform at Haymarket Station, adjacent to the present Platform 1 and currently part of the station car park. This would allow an hourly Alloa service to operate (as shown below) and a possible hourly service to/from Inverkeithing that would both serve Ferry Toll.

This option has been identified as an infrastructure enhancement in other Edinburgh rail studies.

3.3 HALBEATH

A new station at Halbeath, whilst possible within the present timetable, will add to problems of overcrowding on current service unless the proposal to lengthen trains (and station platforms) is carried out.

The Fife circle service has no spare time in the schedules on all trains in both directions so additional time for a new station is not possible. This is because the junctions at Thornton and Inverkeithing have very tight margins for regulation of trains running via Glenrothes. However the present hourly service between Cowdenbeath and Edinburgh has sufficient turnround time at Cowdenbeath to allow a later arrival from Edinburgh and an earlier departure back to Edinburgh. This would allow time for an additional call at Halbeath. In the evening, the hourly service to/from Glenrothes could be adjusted to cater for Halbeath new station.

The 1727 service from Edinburgh to Perth would have to depart Edinburgh at 1724 to call additionally. There is no time in the schedule of the 1755 service unless both the 1750 Inner Circle service and the 1755 Outer Circle service were to leave Edinburgh three minutes earlier.

4. STIRLING – ALLOA – EDINBURGH

4.1 BACKGROUND

The Act of Parliament to re-open the line between Stirling and Alloa for passenger traffic and between Alloa and Longannet for freight traffic is expected to be passed later this year. This will restore the rail link from Dunfermline through to Stirling, severed in 1979. It is proposed to initially run an hourly passenger service and an hourly freight service, diverting all coal traffic for Longannet Power station away from crossing the Forth Bridge.

4.2 PROPOSAL

To extend the passenger service from Alloa to Haymarket running via Longannet and a new chord line at Charlestown Junction (Dunfermline) on to the existing Fife Circle line. Trains would terminate at the new Haymarket Platform 1a. A new station could be built at Kincardine (original platform remains) and on the present freight line at Charlestown Junction serving Dunfermline. As most of the freight services would be coming off the section of line east of Longannet when Alloa is opened then there is plenty of capacity to run an hourly passenger service.

4.2.1 Timetable Implications

The key factors in writing a timetable over new lines is to meet the requirements at both ends of the route. The Alloa service has been envisaged as an extension of the Glasgow Queen Street – Stirling service in order to fit the rigid pathing requirements between Greenhill Junction and Queen Street.

Similarly, as has been shown above, any new service running over Fife lines is constrained not only by the pinchpoints in rail infrastructure but by the existing service which cannot be altered as it would impact on services in many other areas of Scotland. With these factors taken in to account the following pattern for a new through service emerges:

Glasgow Queen St	0618	COAL	0718	COAL	
Stirling arr	0659		0759		
dep	0701	07/25	0801	08/25	
Cambus	07/10	07*X38	08/10	08*X38	
Alloa arr	0718		0818		
dep	0720	07/44	0820	08/44	
Hilton Road arr	07*24	07*48	08*24	08*48	
dep	07X26	08X00	08X26	09X00	and
Kincardine	07/33	08/08	08/33	09/08	hourly
Longannet	07/38	0815	08/38	0915	thereafter
Charlestown Jn	07/55		08/55		
Inverkeithing	08a06 $		09a03		
Ferry Toll	08a09		09a06		
Dalmeny Jn	08/15		09/12		
	[2]		[2]		
Haymarket West Jn	08/23		09/20		
Haymarket Plat 1a arr	0825		0922		

$ - present 0808 service ex Inverkeithing can run three minutes later, allowing a call at new Halbeath station.
/ - passing time
* X – stops to pass train on single line
[2] – engineering recovery time
(2) - time inserted for pathing purposes

Haymarket Plat 1a dp	0835	COAL	0935	COAL	
Haymarket West Jn	08/37		09/37		
Dalmeny Jn	08/43		09/43		
Ferry Toll	08a48		09a48		
Inverkeithing	08a51		09a51		
	(2)		(2)		
Charlestown Jn	08/58		09/58		
Longannet	09/13	0940	10/13	1040	and
Kincardine	09/18	09/48	10/18	10/48	hourly
Hilton Road arr					thereafter
dep	09/X25	09/X58	10/X25	10/X58	
Alloa arr	0930		1030		
dep	0931	10/02	1031	11/02	
Cambus	09/X36	10*X11	10/X36	11*X11	
Stirling arr	0945		1045		
dep	0949	10/23	1049	11/23	
Glasgow Queen St	1029		1129		

Based on current coal paths between Townhill and Longannet, this level of passenger service can only operate if the Stirling – Alloa line does become the main route for traffic to/from Longannet. There is currently a limited freight service between Thornton and Longannet which can continue as traffic levels between Longannet and Charlestown would be reduced to one passenger train each hour in each direction. Coal traffic form Millerhill may still have to run via Fife but it is envisaged that the bulk of traffic for Longannet will come from Hunterston and the new open cast sites in Ayrshire.

The passenger service would allow direct access to Edinburgh from Alloa. The new service between Stirling and Alloa has been planned as an extension of the Glasgow service. The present Stirling – Edinburgh trains already operate near to capacity at peak periods and journey times between Alloa and Edinburgh via Stirling would be approximately 75 minutes as against one hour via Dunfermline.

4.2.2 Resource requirements

A detailed rolling stock and train crew analysis will be required. A minimum of four new units is seen as vital to the operation (cost c. £8m) in order to provide two units (four car set) on the first train from Glasgow Queen Street (0618) to Haymarket via Alloa (arriving Haymarket at 0825). Two of these additional units would be required to provide resources for the first West Highland service of the day which is currently formed by the 0618 Glasgow – Stirling, returning as the 0714 Stirling – Oban/Mallaig.

4.2.3 CHARLESTOWN JUNCTION

The Longannet branch presently joins the Fife Circle lines just south of Dunfermline station but trains must run on to Townhill Loops to run round in order to travel south across the Forth Bridge. The former link allowing direct access to the branch from Inverkeithing was closed many years ago and part of the solum is now the site of the local relay room, constructed when the line was resignalled in the 1970s.

In order to allow a passenger service to operate between Haymarket and Alloa this old line would have to be re-opened with the relay room moved. A station could be built on the branch to serve passengers travelling between Dunfermline and Stirling (time is allowed in the above timetables for potential new stations). The chord would also have the advantage of removing the need for any freight trains to round at Townhill and become a useful freight diversionary route.

5. CONCLUSIONS

The report demonstrates the feasibility of introducing an extension to the Stirling – Alloa rail service and for combining this with a new service between Inverkeithing and Edinburgh. The proposed stations can be built and accommodated within the present train plan provided they are served by the services highlighted in this report.

The proposals are not workable if the Stirling – Alloa line is not reopened unless the freight train paths are completely recast. This would have major repercussions on other parts of the network and may not be acceptable to the freight customers. A passing loop would have to be constructed between Charlestown Junction and Longannet because the single line section is too long to cope with the anticipated growth in traffic.

The passenger service is only viable if the south chord is reopened at Charlestown Junction. The purpose of a service east from Alloa would be to serve Dunfermline and Edinburgh. A new station could be built at Charlestown Junction to avoid trains having to reverse at the present station, adding up to ten minutes to the journey between Alloa and Edinburgh. The costs of signaling alterations for this would be better spent as a proportion of the cost of the chord line and moving the relay room. Journey times will be viewed as critical in any business case considered.

An additional four car unit crossing the Forth Bridge at the peaks will provide over 250 seats. This will cost approximately £4m to provide, plus annual leasing and maintenance charges.

APPENDIX C

Transport Land-Use Integration Assessment

APPENDIX C: APPRAISAL OF TRANSPORT LAND-USE PLANNING INTEGRATION

The appraisal of Transport Land-Use Planning Integration uses the following assessment categories.

✓	Beneficial Impact on Policy
O	Neutral
✘	Adverse Impact on Policy

The tables are arranged as follows:

- Table 1: Structure Plans and Regional Transport Strategy;
- Table 2: Local Plans and Local Transport Strategies; and
- Table 3: Other Transport-related Policies (including the 2004 White Paper).

Table 1: Structure Plans and Regional Transport Strategy

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
Fife Structure Plan								
SS1	Development shall take place within settlements [generally] … Where land for urban development purposes is insufficient in quantity … predicted needs will be contained in settlement expansion areas identified … on the basis of strengthening local communities and the existence or anticipated availability of … public transport facilities.	✓	✓	✓	✓	O	✓	O
T1	Development proposals will be supported in principle where they: • Are accessible to, or able to be made accessible to, the existing or planned public transport network; • Provide adequate cycle facilities where appropriate; … • Are located where road network is or can be made available; …	✓	✓	✓	✓	O	✓	✓
T3	The following routes and land will be safeguarded from development that may prejudice their existing or future transportation use: • The disused railway network including land previously used for sidings; • Proposal ... PT2 (which includes Park & Ride site at Halbeath, and land at existing rail stations for platform extensions and car parking).	O	O	O	✓	O	✓	O
H2	… Local Plans will: • … • give preference to land close to public transport, jobs and services; …	✓	✓	✓	✓	O	✓	O

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
H4	Local Plans policies and proposals which include new housing sites in town centres and/or close to other highly accessible public transport nodes should, where circumstances permit, require and specify higher densities.	✓	O	O	O	O	O	O
S6	Commercial leisure development will be supported where: • … • the proposal is, or can be, served by public transport during the facility's operational times.	✓	✓	✓	✓	O	✓	O
Edinburgh & The Lothians Structure Plan								
HOU4d	Ensure that development can be integrated into effective networks for walking, cycling and public transport consistent with policies TRAN2 and TRAN5	✓	✓	✓	✓	O	✓	✗
TRAN1	Local Plans should safeguard land for the transport proposals identified [in the Structure Plan] and take into account any changes to safeguarding requirements contained in a Local Transport Strategy and/or Regional Transport Strategy. All former rail alignments not already covered by transport proposals and with reasonable prospect of future transport use should be safeguarded in local plans. Safeguardings should protect the potential for a return to rail use, including the construction of stations and accesses, as well as re-use as walkways/cycleways.	✓	✓	✓	✓	✓	✓	✓
TRAN2	Local Plans should select locations for major travel generating developments that are highly accessible by public transport, and preferably also by foot, or will be made so by transport investment which will be delivered in phase with the relevant development. Particular attention should be paid to access from disadvantaged urban areas.	✓	✓	✓	✓	O	✓	✗

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
TRAN3	Local Plans should include parking policies applying car parking standards that specifically relate the maximum permitted level of parking to accessibility by public or other sustainable transport modes.	✓	O	O	✓	✓	O	O
TRAN4	Local Plans should include policies relating density of development to accessibility by public transport, foot and cycle, encouraging higher densities in the most accessible locations.	✓	✓	✓	✓	O	✓	✗

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
TRAN5	Local Plans should include policies to ensure that new development: a) which is likely to generate significant amounts of travel, or to have a material effect on travel on the road or public transport network, is required to be the subject of a transport assessment covering access by all modes of travel and enabling items b – f below to be addressed; b) encourages travel to, from, and where appropriate, within it by public transport, foot and cycle. For large developments this may involve: • the production of a travel plan, including, where appropriate, the setting of mode share targets; • the development of new routes and services; c) contributes to the cost of related transport improvements; d) addresses highway capacity issues that remain after criteria b and c have been met; e) ensures adequate accessibility for people with disabilities; f) gives particular attention to ensuring that it is accessible by public transport, foot and cycle from disadvantaged areas.	✓	✓	✓	✓	✓	✓	✓[1]

[1] But only if public transport options have been exhausted, otherwise ✗.

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
TRAN6	In allocating land for new distribution and warehousing development, or other development likely to generate major freight movements, local plans should ensure that priority is given to locations that are readily accessible to the rail network or suitable port facilities. All such development should be easily accessible by the strategic road network unless good rail or sea access removes a reliance on road freight. Such developments should not be located where they will generate major new lorry movements on all-purpose roads through built-up areas.	O	O	O	O	O	O	✓
SESTRAN Regional Transport Strategy								
	Reduce the number of people commuting in single occupancy vehicles within South East Scotland – especially for journeys to and from Edinburgh; but also for journeys to destinations outwith the SESTRAN area;	✓	✓	✓	✓	✓	✓	✗
	Minimise the overall need for travel, especially by car;	✗	✗	✗	✗	✗	✗	✗
	Maximise public transport provision and achieve public transport integration and intermodality;	✓	✓	✓	✓	✓	✓	✗
	Improve safety for all road and transport users;	✓	✓	✓	✓	✓	✓	✓
	Enhance community life and social inclusion;	✓	✓	✓	O	O	✓	✗
	Maintain existing infrastructure properly in order that it can be fully utilised;	O	O	O	O	O	O	✓
	Enhance movements of freight, especially by rail and other non-road modes;	O	O	O	O	O	O	✓

Table 2: Local Plans and Local Transport Strategies

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus “Right-of-Way” & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
Dunfermline & The Coast Local Plan								
BE3	All new development is expected to make a positive contribution to its immediate environment by: … f) providing safe and convenient access for pedestrians, cyclists and people with impaired mobility, including safe routes to school, and for sustainable modes of travel; …	✓	✓	✓	✓	O	✓	O
PR2	Fife Council will seek to improve the environment of transportation routes, with priority given to the main roads into the north and west of Dunfermline; the A823, the A907 and the A994.	O	✓	O	O	O[2]	O	O
PR3	Fife Council will work through the Fife Partnership to produce and implement a Master Plan for Abbeyview. The priority planning objectives are to: • Regenerate Abbeyview Centre; • Secure redevelopment of the flatted housing stock; • Integrate the regeneration of Abbeyview with the East Dunfermline Expansion.	O	O	✓	O	O	✓	O

[2] Unless junction closures instigated, in which case may be ✗.

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
BIT11	A proposal for a Class 2 office use outwith town, village and neighbourhood centres will only be supported where it: … c) reduces the journey length of visitors to the service provided, reduces the need to travel by private car and does not contribute to unnecessary movements or traffic congestion; …	✓	✓	✓	✓	✓	✓	✓
T5	Development proposals likely to generate a significant amount of traffic will require to be accompanied by Transport Assessments including, where appropriate, Travel Plans and Environmental Impact Assessments.	✓	O	O	O	O	O	O
PR33	Fife Council will improve bus/rail interchange facilities at Inverkeithing Station.	✓	O	O	✓	O	O	O
T7	Fife Council will safeguard land to the west of the A90 Ferrytoll Interchange to facilitate an extended park-and-ride facility.	O	O	O	✓	O	O	O
T8	Fife Council will safeguard land to the east of Rosyth Railway Station to enable the future extension of park-and-ride services.	O	O	O	✓	O	O	O
CLR4	Any proposal for commercial leisure within Class 3 (food and drink) and Class 11 (assembly and leisure) of the Use Classes Order 1997 will only be acceptable where it: … b) is easily accessible by a choice of means of transport and not dependent on access solely or mainly by car; …	O	O	O	O	O	O	O

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
Rural West Edinburgh Local Plan								
H5(a)	All new housing development[3] should harmonise with and reflect the character of its surroundings and should maximise public transport links.	✓	✓	✓	O	O	✓	✗
ED5 & ED6	Proposals for the development and improvement of [Edinburgh Airport and the Royal Highland Showground] will be supported inside the boundary defined [in the Local Plan], where consistent with the Masterplan. Other uses will only be permitted where it can be demonstrated that they have clear and strong functional links to the sites. In addition, proposals should be acceptable in terms of: …. Accessibility by public transport; ….	✓	✓	✓	✓	O	O	O
ED7	Within the overall Campus boundary [of Heriot-Watt University at Riccarton], proposals will be required to be acceptable in terms of: … public transport accessibility; ….	✓	✓	✓	✓	O	O	O

[3] Defined by reference to Schedule 1 in the Local Plan

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
ED11	Proposals for new or improved visitor and tourist facilities will be supported, provided: • they are well-located in relation to the public transport network; • … • the scale of development and anticipated visitor numbers are compatible with local environmental character and the capacity of the road network.	✓	✓	✓	✓	O	✓	O
TRA1	Development proposals with the potential to generate significant levels of personal travel should be located on sites which minimise the need to travel and are easily accessible on foot, by cycle and by existing or planned regular and frequent public transport services. Any such proposals which result in development which is only readily accessible by private car and would have no reasonable prospect of being served by public transport will not be permitted…..	✓	✓	✓	✓	O	✓	O
TRA2	Development will not be permitted where it would: • have an unacceptable impact on the capacity of the existing road network to accommodate traffic unrelated to the development; • have an unacceptable impact on public transport operations in the surrounding area; • have an unacceptable impact in terms of air quality; or • have a significant adverse impact detrimental to road safety, residential amenity and walking/cycling.	✓	✓	✓	✓	✓	✓	✓

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
TRA3	A Transport Assessment will normally be required for significant development proposals in order to: • assess the transport implications for access by non-car modes and proposals to improve access; • assess the effects on the existing road network and travel system and measures to overcome these; and • an analysis of access for people with disabilities and proposals to ensure such access is achieved. … Developments likely to generate a significant amount of travel to work will be required to prepare, implement and maintain a Green Travel Plan.	✓	✓	✓	✓	✓	✓	✓
TRA5	The Council will support traffic management measures which seek to create a safe and attractive environment, particularly in town and village centres and residential areas. Proposals should incorporate high design standards and use good quality materials. The needs of pedestrians, cyclists and people with mobility difficulties, and the impact of proposals on public transport and emergency services should be specifically addressed.	O	O	O	O	O	O	✓
TRA7	… The Council will support proposals to improve the level and quality of public transport facilities and services throughout the Local Plan area. It will also support proposals for new or improved high quality car parking facilities associated with rail stations or linked to high quality bus services, provided these are consistent with the Council's Local Transport Strategy and TRA3.	✓	✓	✓	✓	O	✓	O

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
TRA8	Land is safeguarded for the following [proposals]: • T1 – Tramline 2; • … • T9 – A8000 road improvement scheme; • …	O	O	O	O	O	O	O
TRA9	The Council will seek to minimise the impact of transport proposals on the environment. Careful consideration will be given to the proposed alignment, noise mitigation, siting, and design. Adequate levels of high quality screening and landscaping must be provided.	N/a[4]	✓	N/a[4]	✓	N/a[4]	N/a[4]	✗
R3	Proposals to improve the public environment of shopping centres and groups of shops will be supported, particularly where they provide: … (b) measures to improve access for public transport, cyclists and cycle parking facilities; …	✓	✓	✓	✓	O	✓	✗
R7	Proposals for retail development in locations outwith local centres and frontages … where all the following criteria are met: … (c) the proposal would be, or could be made, easily accessible by regular and frequent public transport services; …	✓	✓	✓	✓	O	✓	✗

[4] No physical works required

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
West Edinburgh Local Plan								
GE9	Planning permission will not be granted for development which would result in the loss of: … c) other areas of open space of recreational, amenity or social value (including allotments). However, in assessing proposals the Council will take into account the function and importance of the open space and the need for, or benefits to be gained from allowing, the development to proposed.	O	✗	O	O	O	O	N/a[5]
H4	Proposals for housing development at Granton Waterfront … must also include provision of or funding for all necessary … transport … infrastructure.	O	✓	O	O	O	O	
H5	Particular attention will be paid in North Edinburgh, Wester Hailes and Broomhouse/North Sighthill to the need … to contribute to the core aims and objectives of the relevant urban regeneration strategies for each area.	✓	✓	✓	✓	O	✓	
H12	Development for whatever purpose … which would result in an unacceptable reduction in amenity for residents in the locality will not be permitted.	O	✗	O	O	O	O	
H16	… Development which will lead to the loss of valuable community facilities will not be permitted unless appropriate alternative provision is made.	O	✗	O	O	O	O	

[5] Outwith Local Plan area

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
ED2	Within existing business and industrial areas, new industrial and business development will be acceptable, provided: … b) there is no unacceptable traffic impact; …	✓	✓	✓	✓	✓	✓	
ED3	…. [Outside Edinburgh Park and Granton Waterfront] new office development will only be acceptable where proposals are of an appropriate scale and character and easily accessible to existing public transport, walking and cycling networks (or proposed networks, where these can be implemented in time to serve the development).	✓	✓	✓	✓	✓	✓	
R3	Support will be given to the development of two local centres to serve planned housing in the Granton Waterfront area…. Both centres should be located to serve efficiently, with minimum car travel, the planned new communities…	✓	✓	O	✓	O	O	
R5	Permission will not be granted for retail development [outwith Corstorphine, Granton Waterfront or approved local centres], unless all of the following requirements are met: … f) there would be no unacceptable impact for the road network or traffic movement; g) the site of the proposal is readily accessible by public transport … or could be made so as part of the development proposal; …	✓	✓	✓	✓	✓	✓	

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
R7	In addition to the requirements of [other Retail Policies], all shopping and major leisure development proposals of 2,500 square metres gross floor space or above will be required to demonstrate: … b) their accessibility by a choice of means of transport … reducing the need to travel, particularly by car; c) how travel patterns in the surrounding area will be affected by the proposal; …	✓	✓	✓	✓	✓	✓	
T1	The Council will expect that new development proposals with the potential to generate a significant amount of personal travel should be in locations accessible by a range of modes of transport, in particular public transport, walking and cycling.	✓	✓	✓	✓	✓	✓	
T3	Developments likely to give rise to a significant amount of travel-to-work will be required to prepare, implement and maintain a Green Travel Plan demonstrating the measures by which travel by car will be dissuaded and travel by alternative, sustainable modes will be ensured or encouraged.	✓	O	O	O	O	O	
T5	Development should be laid out and designed to make use of public transport as attractive as possible, by providing improved access to existing facilities and if necessary the development of new routes and services.	✓	✓	✓	✓	✓	✓	
T7	Development proposals should be designed to make walking and cycling as safe, convenient and attractive as possible …	✓	✗	O	O	O	O	
T9	… Long stay public car parking for commuter use will only be acceptable on sites adjacent to rail halts or public transport nodes.	✓	O	O	✓	O	O	

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
T11	Development proposals at Granton Waterfront areas of regeneration should include provision for a new movement and access network as indicated in the approved Master Plan …	✓	✓	O	O	O	O	
Fife Local Transport Strategy								
	Effective transport access to international, European and national markets.	✓	✓	✓	✓	✓	✓	✓
	High quality strategic access to and from Fife which is reliable, efficient and cost-effective for residents and businesses in Fife.	✓	✓	✓	✓	✓	✓	✓
	A fully integrated transportation network which maximises the efficient use of road space and offers effective alternative modes of travel within Fife and its adjoining areas.	✓	✓	✓	✓	✗	✓	✗
	The provision of secure and continuing revenue and capital funding to address issues of congestion to maintain high quality strategic access to and from Fife.	O	O	O	O	✓	O	O
	An integrated transport strategy that allocates priority [to the various modes].	✓	✓	✓	✓	O	✓	✗
	Travel plans for commuter, education, shopping and leisure journeys as a positive approach to limiting the growth in car use.	✓	O	O	O	O	O	O
	Targets and action plans reducing the level of traffic or traffic growth through appropriate transport charges and reinvestment in alternatives.	✓	✓	✓	✓	✓	✓	✓
	New technology through Intelligent Transport Systems enabling innovative integrated transport policies encouraging the use of more sustainable transport options.	O	✓	O	O	✓	O	O
	Quality Partnerships/Contracts delivering improved transport services …	✓	✓	O	O	O	O	O
	Shorter travel distances generated by new development with less need for new expensive infrastructure to access new developments.	O	✗	O	✗	O	✗	✗

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
	A hierarchy of routes and services for all transport modes for the movement of tourists within and to Fife.	✓	✓	✓	✓	O	✓	✓
	Strategies based on the hierarchy of town centres providing appropriate accessibility for all modes of transport …	✓	✓	✓	✓	O	✓	✓
	Transport provision that contributes to the development of, and access to, existing employment sites and in general to the growth and diversification of the Fife economy.	✓	✓	✓	✓	✓	✓	✓
	Healthy, strong, safe and thriving communities	✓	✓	✓	✓	O	✓	O
	Accessibility for private vehicle users both within and between the main urban centres, with restrained demand for car commuting on congested corridors, ensuring the continued economic vitality of Fife's towns and businesses.	O	O	O	O	O	O	O
	Public transport that is easy to use and goes where and when people need to travel. People having access to useful information and confidence in the service offered. A main public transport network that meets these criteria but with some limitations in rural areas. Flexible local solutions giving people the mobility they need, delivered by non-profit making community transport operators, along with other partners and by innovative public/private initiatives.	✓	✓	✓	✓	O	✓	O
	The use of taxis as an alternative to the private car for short trips, especially where the use of other public transport modes are not a realistic option. Enhanced vehicle fleet in terms of accessibility (for people with mobility problems) and quality.	✓	O	O	O	O	O	O
	Appropriate information on travel choice, easily accessible, and people aware of how the information can be obtained … Transport operators and the Council working together in providing comprehensive information in order to fully promote transport integration.	✓	O	O	O	O	O	O

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
	Fare strategies that promote Social Inclusion and encourage greater use of PT and less use of the private car.	✓	O	O	O	O	O	O
	The efficient operation of bus services in Fife; expanding or at least sustaining the size of the network making bus travel more accessible and affordable.	✓	✓	✓	✓	O	O	O
	More rail travel opportunities for medium and long distance journeys to and from Fife.	✓	O	✓	✓	O	✓	O
	Good strategic and local road access for deliveries both to and within Fife encouraging economic development and inward investment.	O	✓[6]	O	O	O	O	✓
	A sustainable approach to road maintenance that delivers acceptable levels of service, condition and safety.	O	O	O	O	O	O	✓
City of Edinburgh Local Transport Strategy								
TN1	Where there is competition for road space, and/or where the streetscape is being re-designed, preference will be given to meeting the needs of mobility-impaired people, then pedestrians, cyclists and public transport users; thereafter freight and deliveries. Efficient use of the car will be encouraged, for example by prioritising parking for City Car Club cars.	O	✓	O	O	O	O	✗

[6] Applies to Priority Vehicle Lane only

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
RN1	In considering the case for any major road upgrade or new road scheme the Council will adopt a "sequential test". The key test will be that, before implementation of major road upgrades, all viable options for diverting the relevant trips to public transport, encouraging car-sharing, and managing demand have: a) been adopted; and b) do not adequately meet the relevant movement demands.	O	O	O	O	O	O	✓[7]
RN2	The Council will actively favour sustainable transport modes in meeting the movement needs of new development and redevelopment. Any road construction will be undertaken in a way that avoids catering for increases in traffic unrelated to the development.	✓	✓	✓	✓	✓	✓	✗
CF2	The Council will facilitate and encourage the expansion of City Car Clubs, in particular by a presumption in favour of Car Club parking over other forms of on-street parking, so that this does not artificially cap demand for Car Club vehicles.	✓	O	O	✓	O	O	O
P5	Ensure, through both Planning and Lease agreements and on-street parking regulations and charges, that car park tariff structures encourage short stay parking and discourage all day commuter parking.	O	O	O	O	✓	O	O
PT1	The Council will seek the operation of an integrated public transport network for Edinburgh, with different modes complementing each other, and not competing against each other. To this end, the Council will seek to minimise inconvenience to passengers transferring between services at interchange points, and ensure that the benefits of priority are shared by all modes of public transport wherever possible.	✓	✓	✓	✓	O	✓	O

[7] But only if public transport options have been exhausted, otherwise ✗.

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
PT6	The Council will, subject to funding availability, support bus services not provided commercially to ensure a comprehensive and convenient public transport network.	O	✓	✓	O	O	N/a	O
PT7	The Council believes that an increase in off-bus ticketing will reduce boarding delays to bus- and other road-users, and so will encourage operators to expand the range of tickets which can be bought before boarding buses.	✓	O	O	O	O	O	O
PT8	The Council will seek to ensure the delivery of multi-modal, multi-operator public transport tickets at attractive prices. It will work with operators and other SESTRAN local authorities to achieve this.	✓	O	O	O	O	O	O
PT9	Use of bus lanes will continue to be reserved for buses, taxi, cycles and emergency vehicles only.	O	✗	O	O	O	O	✗
PT11	In partnership with the operators, the Council will seek to: • Limit bus service changes to take place on a minimum number of change dates per year to reduce uncertainty for passengers; • Ensure that operators contribute financially to the provision of bus priority measures and other infrastructure …; • Enhance Customer Care Training for all bus drivers to improve the quality of service to passengers … including disability awareness as a matter of course; …	✓	?[8]	O	O	O	O	O
PTP10	Subject to available funding, extend selective vehicle detection and priority at all traffic signals in the city where this would benefit bus services.	O	✓	O	O	O	O	O

[8] Provision of finance for scheme not yet determined

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
PTP11	Subject to available funding and physical constraints, upgrade bus stops in the city in terms of parking control, passenger amenity, security and accessibility …	✓	✓	O	O	O	O	O
PTP15	Seek to expand the range of, and the access to, multi-operator, multi-journey tickets available in the SESTRAN area, through participation in the One-Ticket company.	✓	O	O	O	O	O	O
PTP23	Work with SESTRAN partners to develop and prioritise other rail and tram schemes across the region, and to take advantage of funding opportunities as these arise, to deliver these projects.	O	O	O	O	O	✓	O
PTP25	Explore the potential of demand responsive services to serve situations of low demand, both in terms of time and location …	✓	✓	✓	✓	O	O	O
PTP26	Supplement the existing bus network in terms of frequency and coverage in order to address existing unmet demand and provide better alternatives to car use.	O	✓	✓	O	O	O	O
PTP28	In partnership with the operators, extend bus priority to remaining, appropriate parts of the network.	O	✓	O	O	O	O	O
PTP31	Monitor usage and review the potential for further bus-based park and ride sites, and for expanding those sites already delivered.	O	O	O	✓	O	O	O
PTP32	Seek to achieve integrated timetabling between bus and other public transport modes, including tram.	✓	O	O	O	O	O	O

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
PTP34	In partnership with other SESTRAN local authorities and other appropriate bodies, implement proposals for better regional rail links and services to and through Edinburgh.	O	O	O	O	O	✓	O
TA1	The Council will, in planning agreements with developers for new office, retail and residential developments, seek funds for travel awareness and personalised travel advice projects aimed at reducing the demand for car travel to/from that development.	✓	O	O	O	O	O	O
FETA Local Transport Strategy (Consultative Draft)								
1	FETA will maintain and operate the Forth Road Bridge in the most effective manner. It will endeavour, in partnership with member authorities and the Scottish Executive, to minimise the impact on users of both bridge maintenance programmes and maintenance on the adjoining road network.	✓	✓	✓	✓	✓	✓	✓
2	FETA will liaise with the Scottish Executive, Network Rail, the SRA and rail operators to, where feasible, co-ordinate maintenance of the bridge to minimise the impacts of Cross Forth maintenance programmes.							
3	FETA will liaise with freight operators, the tourist industry and other key business sectors to minimise the impact of bridge maintenance.							
6	… The toll regime should provide a stimulus for sustainable modes, particularly public transport …	O	O	O	O	✓	O	O
10	FETA will work closely with local authorities, bus, rail, ferry and other transport operators to make public transport a more attractive option for a greater proportion of Cross Forth journeys.	✓	✓	✓	✓	✓	✓	✓

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
11	FETA will seek to promote equality of access for disabled people and others with mobility impairments in respect of Cross Forth movements.	✓	O	O	O	O	O	O
15	FETA … will, in association with key stakeholders, develop proposals and a business case for a new multi-modal crossing of the Forth estuary, to include a review of the future role of the existing bridge in promoting sustainable forms of transport.	O	O	O	O	O	O	✓

Table 3: Other Transport-related Policies

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus “Right-of-Way” & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
SPP17								
7	The planning system is a key mechanism for integrating land use and transport through supporting: • A pattern of development and redevelopment that reduces the need to travel, facilitates movement by public transport, encourages and facilitates freight servicing by rail or water, and enables people to access local facilities by walking and cycling; • Provision of high quality public transport access, in order to encourage modal shift away from car use to more sustainable forms of transport, and to fully support those without access to a car; and • Effective management of motorised travel, within a context of sustainable transport objectives.	✓	✓	✓	✓	✓	✓	O
11	… Development plan strategies should aim where appropriate to reduce the need to use strategic routes for short local journeys. Significant travel generating developments should be integrated with existing settlements through local public transport, cycle and footpath networks, and not be dependent for local journeys on the strategic road network.	O	O	O	O	O	O	✗
19	Councils should also promote change [to modal share] by seeking, in conjunction with public transport operators, to improve public transport access to existing car-based developments.	O	✓	✓	✓	O	O	O
34	A framework for delivering better integration of transport and land use planning … will consist of: • … • the use of Travel Plans and planning agreements to promote sustainable transport solutions to development end users.	✓	O	O	O	O	O	O

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
PAN57								
15	Local authorities will wish to consider the following transport actions to maintain and improve the overall attractiveness and vitality of town centres: • … • work with public transport operators to provide high quality access for those who use public transport …; • …	✓	✓	✓	O	O	O	O
26	… Quality of public transport provision has to be high if motorists are to be enticed out of their cars…	✓	O	O	✓	O	O	O
27	Public transport quality is enhanced further when it is supported by measures such as bus priority schemes, … and cycle parking facilities at railway stations …	✓	✓	O	O	O	O	O
28	… Consideration should be given … to the need for and means of achieving regular public transport outside the perceived main work hours so that staff with less regular hours are not forced to use cars for commuting.	✓	✓	✓	✓	O	O	O

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
29	The creation of quality partnerships between local authorities and bus operators shows their commitment to the importance of good public transport. The provision of facilities supporting bus services such as bus priority lanes or real time information systems can help reinforce the council's commitment to locations well served by public transport and enhances the effectiveness of other policies designed to encourage less car use. Through ticketing and integrated timetabling between different parts of a journey by bus, whether operated by a single operator or by several, and by bus and train, with the bus covering local distribution and the train covering longer trunk portions of the trip, will assist in laying an effective foundation for sustainable transport, and should be pursued wherever possible.	✓	✓	✓	✓	✓	✓	✓
32	[Commuter-based Park & Ride] may reduce the amount of travel undertaken by car, but can encourage additional car commuting to the railhead or increase overall travel distances. It is important to ensure that the location of the car park does not deter those walking or cycling to the station, or remove the possibility for high-density housing or office development.	O	O	✓	O[9]	O	O	O
34	Traffic management …. complements locational policies and supports other traffic measures … Such a programme could include proposals for reallocating road space to give priority to one or more of walkers and cyclists, public transport, high occupancy vehicles, freight vehicles, or to control entry and exit by different road users to particular areas …	O	✓	O	O	O	O	✓

[9] Dependent on location – if demand is concentrated in northern bridgehead then ✗.

Transport Land-Use Policy		**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
SPP2								
33	Good, affordable and reliable public transport links are important …	✓	✓	✓	O	O	O	O
35	Wherever new sites are being proposed, they should be accessible by walking, cycling and public transport … Travel plans for individual developments should minimise the use of private cars, a process supported by maximum rather than minimum parking standards.	✓	O	O	O	O	O	O
SPP3								
36	… In planning the expansion of existing settlements or the development of new ones, preference should be given to locations which can be well integrated with existing and proposed public transport, walking and cycling networks …	✓	✓	✓	O	O	O	O
44	… Sustainable transport options should be considered as an integral part of the development process and the aim should be to provide opportunities for non car access before houses are occupied and patterns of travel established.	✓	✓	✓	✓	O	O	O
West Edinburgh Planning Framework								
15	The national interest in West Edinburgh can therefore be defined as being the: • need to improve public transport accessibility to established development sites and reduce congestion; • realisation of opportunities for airport expansion and better surface access; • …	✓	✓	✓	✓	✓	✓	✓

Transport Land-Use Policy			**Making Public Transport More Attractive**	**Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes**	**Feeder Bus Services**	**Park & Choose**	**Demand Management**	**Optimisation of Rail Services**	**Forth Multi-modal Crossing & Road Space Reallocation**
16	… There is a projected shortfall of labour supply in Edinburgh and the Lothians. Overcoming this suggests greater levels of in-migration or in-commuting which raises separate issues for … transport, in Lothian and beyond, in Fife …for example.		✓	✓	✓	✓	✓	✓	✓
18	West Edinburgh generates large travel demands … [Modest short-term improvement in public transport] points to a need for an early and sustained step change in levels of transport investment to contain existing levels of traffic congestion …, safeguard accessibility and provide a long-term sustainable solution to existing transport problems.		✓	✓	✓	✓	✓	✓	✓
23	… Key policy objectives include: • … • no net detrimental impact to the free-flow of traffic on the motorway and trunk road network: possibly achieved through enhancement of the existing road network, but recognising the value of implementing public transport schemes in advance of any enhancement of road access; • …		✓	✓	✓	✓	✓	✓	✓
Table 3	Sighthill/South Gyle	Redevelopment … in association with effective mitigation of transport impact ..	✓	✓	✓	✓	✓	✓	O
	Edinburgh Park	Further intensification subject to effective mitigation of transport impact.							
	The Gyle Centre	Retail development … with enhanced accessibility by public transport …							
28	… New developments will be required to achieve a car driver journey to work mode share 49% or less ...		✓	✓	✓	✓	✓	✓	O

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
Scotland's Transport Future (White Paper 2004)								
4.24	There will be a two-phase review of tolled bridges. The first phase will … assess all existing tolls, including the way in which potential changes to tolls could help achieve our environmental and economic objectives of reducing pollution and congestion. The second phase will include an examination of the broader issues, relating to the management, operation and maintenance of the tolled bridges …	O	O	O	O	✓	O	✓
4.39	There will be improvements in service quality [of rail services] … Some of the key elements we are working to deliver in the next Scottish passenger rail franchise are: • improved punctuality and reliability; • a reduction in overcrowding; • improvements in safety, personal security and physical accessibility for passengers; • improved integration of services with other modes of transport; and • improved journey planning information for passengers.	✓	O	O	✓	O	✓	O
4.41	The … Bus Route development Fund … aims to improve the frequency and quality of bus services.	✓	✓	✓	O	O	O	O
4.43	We want to encourage more high-quality innovative proposals [such as priority lanes, priority at traffic lights and junctions, new and improved interchanges and shelters, and park and ride facilities]	✓	✓	O	✓	O	O	O
4.52	Altering travel behaviour has the potential to reduce road traffic growth … If commuters tried leaving their car at home one day a week and travelling by public transport instead, or working from home, or car sharing we could see a 20% reduction in commuting car traffic.	✓	O	O	✓	O	O	O

Transport Land-Use Policy		Making Public Transport More Attractive	Comprehensive Bus "Right-of-Way" & Priority Vehicle Lanes	Feeder Bus Services	Park & Choose	Demand Management	Optimisation of Rail Services	Forth Multi-modal Crossing & Road Space Reallocation
4.55	… We want to see an increase in the number of organisations developing Green Travel Plans and working in partnership with local transport operators.	✓	O	O	O	O	O	O
4.57	We want people to be aware of their travel options, consider alternatives to using the car and recognise the impact that their journey has on other people and the environment …	✓	O	O	O	O	O	O
4.62	… We can … address unsustainable demand by changing travel patterns to less damaging ones …	✓	✓	✓	✓	✓	✓	O
4.64	We currently support local road user charging implemented by local authorities.	O	O	O	O	✓	O	O

APPENDIX D

Transport Economic Efficiency (TEE) Tables

Q01 TEE table

Economy:Economic Efficiency of the Transport System(TEE)

Consumers	ALL MODES TOTAL	Road	Bus	Rail
User benefits				
Travel Time	438121	134410	147733	155978
Vehicle operating costs	16743	16743	0	0
User charges	12294	-1153	6653	6794
During Construction & Maintenance	0	0	0	0
NET CONSUMER BENEFITS	467158	150000	154386	162772

Business		Personal	Freight	Personal	Freight	Personal	Freight
User benefits							
Travel Time	176580	118202	18336	23747	0	16294	0
Vehicle operating costs	9911	5339	4572	0	0	0	0
User charges	-87	-209	-351	322	0	151	0
During Construction & Maintenance	0	0	0	0	0	0	0
Subtotal	186404	123332	22557	24069	0	16445	0

Private Sector Provider Impacts				
Revenue	35081	0	17541	17541
Operating costs	-13876	0	-13876	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	21205	0	3664	17541

Other business Impacts				
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	207609			

TOTAL	
Present Value of Transport Economic Efficiency Benefits (PVB)	674767

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Public Accounts

Local Government Funding	ALL MODES TOTAL	Road	Bus	Rail
Revenue	-2091	-2091	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	

				0
NET IMPACT	-2091	-2091	0	0
Central Government Funding				
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	36293	0	36293	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
Indirect Tax Revenues	22853	17096	2843	2914
NET IMPACT	59145	17096	39135	2914

TOTAL
TOTAL Present Value of Costs (PVC) 57054

Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
Note: All entries are present values discounted to 2002, in 2002 prices

Analysis of Monetised Costs and Benefits

Non-Exchequer Impacts	
Consumer User Benefits	467158
Business User Benefits	186404
Private Sector Provider Impacts	21205
Other Business Impacts	0
Accident Benefits	Not assessed by TUBA
Net present Value of Benefits (PVB)	674767
Local Government Funding	-2091
Central Government Funding	59145
Net present Value Costs (PVC)	57054
Overall Impact	
Net present Value (NPV)	617713
Benefit to Cost Ratio (BCR)	11.827
Appraisal Period	2006 to 2066

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Q06 Adj TEE table

Economy:Economic Efficiency of the Transport System(TEE)

Consumers	ALL MODES TOTAL	Road	Bus	Rail
User benefits				
Travel Time	577466	225227	170968	181271
Vehicle operating costs	36575	36575	0	0
User charges	27615	-3057	15185	15488
During Construction & Maintenance	0	0	0	0
NET CONSUMER BENEFITS	641656	258744	186153	196759

Business

User benefits	ALL MODES TOTAL	Road Personal	Road Freight	Bus Personal	Bus Freight	Rail Personal	Rail Freight
Travel Time	298485	212054	36928	28761	0	20742	0
Vehicle operating costs	17978	9583	8395	0	0	0	0
User charges	181	-553	-68	584	0	218	0
During Construction & Maintenance	0	0	0	0	0	0	0
Subtotal	316645	221084	45255	29346	0	20960	0

Private Sector Provider Impacts	ALL MODES TOTAL	Road	Bus	Rail
Revenue	127862	0	63931	63931
Operating costs	-191623	0	-191623	0
Investment costs	0	0	0	0
Grant/subsidy	63761	0	63761	0
Subtotal	0	0	-63931	63931
Other business Impacts				
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	316645			

TOTAL

Present Value of Transport Economic Efficiency Benefits (PVB)	958301

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Public Accounts

Local Government Funding	ALL MODES TOTAL	Road	Bus	Rail
Revenue	5091	5091	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	

0

NET IMPACT	5091	5091	0	0

Central Government Funding

Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	74617	0	74617	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	63761	0	63761	0
Indirect Tax Revenues	55132	33541	10686	10905
NET IMPACT	193510	33541	149065	10905

TOTAL

TOTAL Present Value of Costs (PVC)	198601

Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Analysis of Monetised Costs and Benefits

Non-Exchequer Impacts	
Consumer User Benefits	641656
Business User Benefits	316645
Private Sector Provider Impacts	0
Other Business Impacts	0
Accident Benefits	Not assessed by TUBA
Net present Value of Benefits (PVB)	958301
Local Government Funding	5091
Central Government Funding	193510
Net present Value Costs (PVC)	198601
Overall Impact	
Net present Value (NPV)	759700
Benefit to Cost Ratio (BCR)	4.825
Appraisal Period	2006 to 2066

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Q7a Adj TEE table

Economy:Economic Efficiency of the Transport System(TEE)

Consumers	ALL MODES	Road	Bus	Rail
User benefits	TOTAL			
Travel Time	556180	266021	140560	149599
Vehicle operating costs	8460	8460	0	0
User charges	17556	-7777	12544	12789
During Construction & Maintenance	0	0	0	0
NET CONSUMER BENEFITS	582196	266705	153104	162387

Business							
User benefits		Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	307181	222213	42584	24253	0	18131	0
Vehicle operating costs	14837	7702	7134	0	0	0	0
User charges	-2198	-1510	-1235	421	0	126	0
During Construction & Maintenance	0	0	0	0	0	0	0
Subtotal	319819	228405	48484	24674	0	18257	0

Private Sector Provider Impacts				
Revenue	120389	0	60195	60195
Operating costs	-217294	0	-217294	0
Investment costs	0	0	0	0
Grant/subsidy	96905	0	96905	0
Subtotal	0	0	-60194	60195

Other business Impacts				
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	319819			

TOTAL	
Present Value of Transport Economic Efficiency Benefits (PVB)	902015

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Public Accounts	ALL MODES	Road	Bus	Rail
Local Government Funding	TOTAL			
Revenue	-16921	-16921	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	

				0
NET IMPACT	-16921	-16921	0	0
Central Government Funding				
Revenue	0	0	0	0
Operating costs	45888	0	45888	0
Investment costs	510969	0	510969	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	96905	0	96905	0
Indirect Tax Revenues	32066	11784	10036	10245
NET IMPACT	685828	11784	663798	10245

TOTAL
TOTAL Present Value of Costs (PVC) 668907

Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
Note: All entries are present values discounted to 2002, in 2002 prices

Analysis of Monetised Costs and Benefits

Non-Exchequer Impacts	
Consumer User Benefits	582196
Business User Benefits	319819
Private Sector Provider Impacts	0
Other Business Impacts	0
Accident Benefits	Not assessed by TUBA
Net present Value of Benefits (PVB)	902015
Local Government Funding	-16921
Central Government Funding	685828
Net present Value Costs (PVC)	668907
Overall Impact	
Net present Value (NPV)	233108
Benefit to Cost Ratio (BCR)	1.348
Appraisal Period	2006 to 2066

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

QDa TEE table

Economy:Economic Efficiency of the Transport System(TEE)

Consumers	ALL MODES TOTAL	Road	Bus	Rail
User benefits				
Travel Time	816007	516473	144882	154652
Vehicle operating costs	113027	113027	0	0
User charges	-79893	-109319	14568	14857
During Construction & Maintenance	0	0	0	0
NET CONSUMER BENEFITS	849141	520181	159450	169509

Business User benefits		Personal	Freight	Personal	Freight	Personal	Freight
Travel Time	578908	451991	81356	25755	0	19805	0
Vehicle operating costs	34863	19035	15828	0	0	0	0
User charges	-23181	-21748	-2067	491	0	142	0
During Construction & Maintenance	0	0	0	0	0	0	0
Subtotal	590590	449279	95117	26247	0	19947	0

Private Sector Provider Impacts				
Revenue	382377	0	191188	191188
Operating costs	-194627	0	-194627	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	187750	0	-3438	191188

Other business Impacts				
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	778340			

TOTAL

Present Value of Transport Economic Efficiency Benefits (PVB)	1627481

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Public Accounts

Local Government Funding	ALL MODES TOTAL	Road	Bus	Rail
Revenue	-121351	-121351	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	

0

NET IMPACT	-121351	-121351	0	0
Central Government Funding				
Revenue	0	0	0	0
Operating costs	0	0	0	0
Investment costs	74617	0	74617	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
Indirect Tax Revenues	181315	116540	32070	32705
NET IMPACT	255932	116540	106687	32705

TOTAL
TOTAL Present Value of Costs (PVC) 134581

Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.
Note: All entries are present values discounted to 2002, in 2002 prices

Analysis of Monetised Costs and Benefits

Non-Exchequer Impacts	
Consumer User Benefits	849141
Business User Benefits	590590
Private Sector Provider Impacts	187750
Other Business Impacts	0
Accident Benefits	Not assessed by TUBA
Net present Value of Benefits (PVB)	1627481
Local Government Funding	-121351
Central Government Funding	255932
Net present Value Costs (PVC)	134581
Overall Impact	
Net present Value (NPV)	1492900
Benefit to Cost Ratio (BCR)	12.093
Appraisal Period	2006 to 2066

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

QPa TEE table

Economy:Economic Efficiency of the Transport System(TEE)

Consumers	ALL MODES TOTAL	Road	Bus	Rail
User benefits				
Travel Time	906344	575006	160146	171191
Vehicle operating costs	103634	103634	0	0
User charges	-97897	-112437	7198	7341
During Construction & Maintenance	0	0	0	0
NET CONSUMER BENEFITS	912081	566204	167345	178532

Business	ALL MODES TOTAL	Road Personal	Road Freight	Bus Personal	Bus Freight	Rail Personal	Rail Freight
User benefits							
Travel Time	653463	503303	98897	28796	0	22467	0
Vehicle operating costs	39440	20839	18601	0	0	0	0
User charges	-29296	-24290	-5276	221	0	48	0
During Construction & Maintenance	0	0	0	0	0	0	0
Subtotal	663607	499852	112223	29017	0	22515	0

Private Sector Provider Impacts	ALL MODES TOTAL	Road	Bus	Rail
Revenue	417954	0	208977	208977
Operating costs	-217294	0	-217294	0
Investment costs	0	0	0	0
Grant/subsidy	0	0	0	0
Subtotal	200660	0	-8317	208977
Other business Impacts				
Developer contributions	0	0	0	0
NET BUSINESS IMPACT	864267			

TOTAL

Present Value of Transport Economic Efficiency Benefits (PVB)	1776348

Note: Benefits appear as positive numbers, while costs appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Public Accounts

Local Government Funding	ALL MODES TOTAL	Road	Bus	Rail
Revenue	-146461	-146461	0	0
Operating costs	0	0	0	0
Investment costs	0	0	0	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	

				0
NET IMPACT	-146461	-146461	0	0

Central Government Funding

Revenue	0	0	0	0
Operating costs	45888	0	45888	0
Investment costs	580698	0	580698	0
Developer Contributions	0	0	0	0
Grant/Subsidy Payments	0	0	0	0
Indirect Tax Revenues	183178	112398	35041	35738
NET IMPACT	809764	112398	661627	35738

TOTAL

TOTAL Present Value of Costs (PVC)	663303

Note: Costs appear as positive numbers, while revenues and developer contributions appear as negative numbers.

Note: All entries are present values discounted to 2002, in 2002 prices

Analysis of Monetised Costs and Benefits

Non-Exchequer Impacts	
Consumer User Benefits	912081
Business User Benefits	663607
Private Sector Provider Impacts	200660
Other Business Impacts	0
Accident Benefits	Not assessed by TUBA
Net present Value of Benefits (PVB)	1776348
Local Government Funding	-146461
Central Government Funding	809764
Net present Value Costs (PVC)	663303
Overall Impact	
Net present Value (NPV)	1113045
Benefit to Cost Ratio (BCR)	2.678
Appraisal Period	2006 to 2066

Note: There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

APPENDIX E

Explanation of ACCDNT Model

1 ACCDNT model and analysis

1.1 Background

1.1.1 There are three categories of personal injury accident defined in the NESA Manual in Design Manual for Roads and Bridges – fatal, serious and slight (NESA Table 6/4/1).

1.1.2 Each of the injury types has a cost value assigned to them which is constant regardless of link type. These figures are in 1998 prices.

1.1.3 The cost per fatal casualty is £1047240.

1.1.4 The cost per serious casualty is £117670

1.1.5 The cost per slight casualty is £9070

1.1.6 There are also other accident costs which vary by link type. These are insurance administration, property damage and police costs (NESA Table 6/4/1). The costs of damage only accidents also have to be taken into account

1.1.7 Each link type has an average accident rate identified from national figures (NESA Table 6/5/2). These accident rates are forecast to decrease up to 2030 and the accident model uses the predicted reductions outlined in the NESA Manual to take these reductions into account (see paragraph 5.6 of the NESA manual).

1.1.8 Accidents are classified according to the most seriously injured casualty.

1.1.9 The average proportionate accident severity split between fatal, serious and slight casualty accidents is used to determine overall accident costs. These proportionate splits also differ by link type (NESA Table 6/4/2). Severity splits are forecast to decrease in into the future but only until 2010 when rates are currently predicted to stay constant and the accident model takes this into account (see paragraph 5.6 and 5.10 of the NESA manual).

1.1.10 The average number of casualties per accident is also used to determine total accident costs (NESA Table 6/5/5). Casualties per accident is also predicted to decrease until 2010 when rates are currently predicted to stay constant (see paragraph 5.10 of the NESA manual). The rate of the decrease in casualties per accident is given in NESA Table 6/5/2.

1.1.11 The relative cost of accidents in future years are also forecast to decrease year on year until 2010. The accident cost change coefficients can be seen in NESA table 6/5/2. These cost reductions are cancelled out in some respect due to inflation which is applied in the model up to 2030 using the assumed compound annual rates of growth of accident values in NESA Table 6/4/4.

1.2 Model Inputs

1.2.1 The major input to the accident model is the assigned network of interest. It is the total number of vehicle kilometres on the various link types defined on the network that are used to predict the accident statistics.

1.2.2 A further input is the definitions of road types present on the assigned input networks with corresponding accident rates and average costs on these link types for each year of interest. There is also an input file which designates area sectors by jurisdiction code.

1.3 Model Outputs

1.3.1 There are two main outputs from the accident model. The first is the cost in pounds of all the accidents on the network in one particular year. It is usually run with a 'reference case' and a 'do something' scenario for each year of interest and a comparison of the costs between these 2 scenarios is also output by the model. These cost outputs are separable by jurisdiction code. The total cost of accidents on a road network is calculated by multiplying the number of accidents predicted to occur on the network by the cost per accident.

1.3.2 The second major output is the casualty numbers predicted in the 'reference case' and the 'do something' networks. The output data can be segregated by injury severity (fatal, serious and slight) and by area sector.

1.3.3 Accident numbers and costs are forecast by the model in the AM and PM peaks and the interpeak period. These outputs are then annualised to yearly totals using three annualisation factors – one for each time period.

APPENDIX F

Outline Plans for Interchanges

SESTRAN CORRIDOR STUDIES

QUEENSFERRY CROSS FORTH CORRIDOR

CAR PARK COST ESTIMATING
(Draft)

SESTRAN CORRIDOR STUDIES

QUEENSFERRY CROSS FORTH

CAR PARK COST ESTIMATING
(Draft)

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1. CAR PARKING

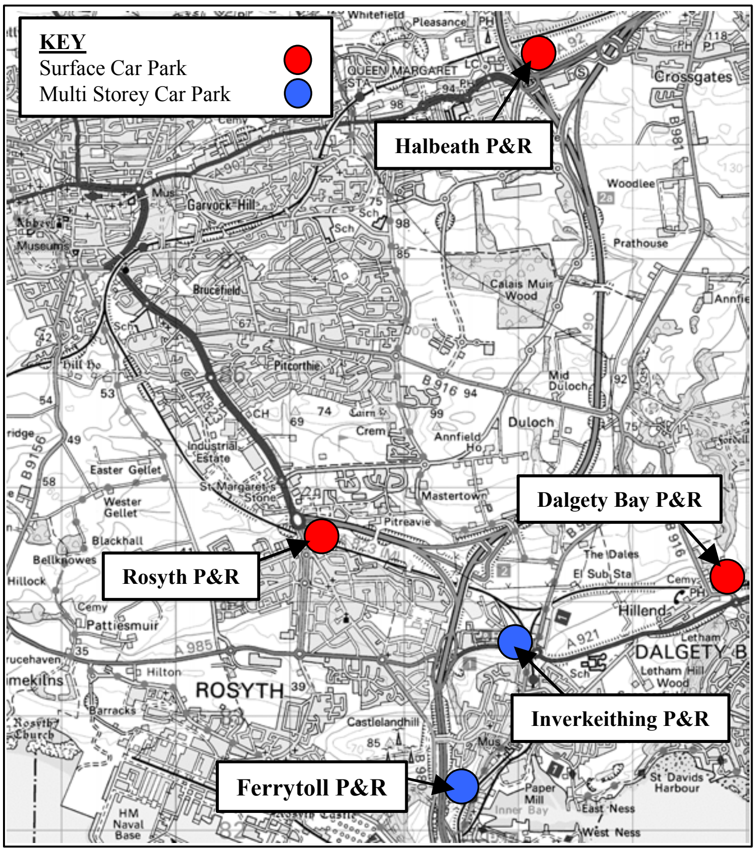
1.1 General

1.1.1 The possible need to provide new or additional car parking spaces at key locations in south Fife was identified at an early stage of the Corridor Study. For the STAG Part 2 appraisal further detail was required and this report sets out the approach taken in estimating costs of providing parking spaces at the sites shown in Figure 1.

1.1.2 Off street parking is normally provided by either surface car parks or purpose built multi story car parks. A brief comparison of both is presented herein, Table 1.1 illustrates the type of construction used in all proposed Park and Ride (P&R) locations.

1.1.3 The geographical placement of all the P&R sites is illustrated in Figure 1.1. This also distinguishes the construction method used.

Figure 1.1 Park and Ride Locations



1.2 Surface Car Parking

1.2.1 Usually inexpensive to construct and are generally preferred by car users however some prefer the protection of a roofed structure, especially during extreme weather.

1.3 Multi storey car park

1.3.1 Multi storey car park permits a more intensive use of space, especially when ground area is constrained. However, construction, operating and maintenance cost are significantly greater than those of surface car parks.

Table 1.1 Construction types used to provide Car Parking

LOCATION	TYPE OF CONSTRUCTION	
	Surface Car Park	Multi Storey Car Park
Dalgety Bay	✔	--
Rosyth	✔	--
Halbeath	✔	--
Inverkeithing	--	✔
Ferrytoll	--	✔

2. DESIGN CONSIDERATIONS

2.1 Size and Layout

General

2.1.1 The minimum practical size of site suitable for multi storey car park is determined by the need to provide ramps between floors and is generally accepted to be 35m². Table 1.2 illustrates the areas and type of each car park involved herein.

Table 1.2 Quantities of major elements for each location

		LOCATION				
		Dalgety Bay	Rosyth	Halbeath	Inverkeithing	Ferrytoll
Surface	m²	630	10000	21000	-	-
Multi Storey	m²	-	-	-	5000	12000
Levels	*nr*	-	-	-	*3*	*2*
Site Area	m²	7800	12600	41500	7200	12490
Paving Block	m²	-	-	460	-	-
Road Length	m	80	920	1500	-	-
Road Width	m	10	4.5	9	-	-
Landscaping area	m	6370	2600	7000	2200	490

2.2 Multi Storey Car Parks

2.2.1 The size of a multi storey is determined by factors such as: -

- Land available
- Number of spaces required, bearing in mind the capital costs involved in terms of expected net revenue.
- The impact of traffic generated by the car park on the external road network.

2.2.2 The static capacity or number of spaces provided is constrained by the following: -

- The generally accepted maximum capacity for an integrated car park, with several aisles accessed directly by ramps should be 1600 spaces and a single search path should not exceed 500 spaces.
- Local planning authorities often impose a limit on building heights on planning and environmental grounds.
- Underground car parks are likely to be significantly more expensive than those above ground.

2.2.3 The dynamic capacity is the in flow or out flow of vehicles from the whole car park. The most important determinant of dynamic capacity is usually the type of entry and exit system employed, including the method of collecting any charges that may be applied. As a rule, the dynamic capacity should be sufficient to permit up to 25% of the static capacity to enter or leave the car park within 15 minutes.

Entry and Exit Controls and Payment Systems

2.2.4 The type of control, if any, to be used on entry and/or exit is often determined by the collecting of charges. In general, entry to a car park should not be permitted unless an appropriate space is available. However, where parking is free or where payment is made on entry or using a pay-and-display system exits need not be controlled.

Floor Levels and Ramp Arrangement

2.2.5 The circulation system within a multi storey car park depends upon the type of structure. Four main types are used which are: -

- Flat deck
- Split level
- Ramped floor
- Warped slab

2.2.6 Consideration must be given to one of the above as the must suitable method for the multi storey sites at Inverkeithing and Ferrytoll.

Ramps

2.2.7 Ramps may be used to distribute traffic between levels (clearway ramps) and they may also act as parking aisles, giving direct access to parking bays. Ramps may either be one or two way although the latter generally require higher design standards due to visibility and clearance to structures. Recommended width for one way aisles is 6m and 6,95m for two way however this may be reduced if the parking bays are angled.

Parking Bays

2.2.8 Parking bay widths will depend on the use made of the parking facility; 2.3m in the minimum, 2.5m is desirable for shoppers and between 3.2m and 3.6m for use by disabled people.

2.2.9 Increased bay width permits easier and quicker manoeuvring into and out of bays without impairing aisle capacity, this also makes getting into and out of the vehicle more convenient. However, the more storage space that can be fitted into the total available space the greater the revenue that will be produced by the extra number of vehicles.

3. MANAGEMENT OF CAR PARKS

3.1 Maintenance

3.1.1 Car parks must be carefully managed if they are to provide a high standard of service to users. Maintenance plans, covering the fabric of the building, running surfaces and equipment must be drawn up so that appropriate budgetary provision can be made. Attention to cleansing, removal of graffiti, repair of defective lights, signs, lifts and ticket machines is essential.

3.2 Financial

3.2.1 Parking policy should be regarded as an integral part of traffic management and not simply as a revenue raising activity. Substantial costs and revenue are often involved and these require careful financial management.

3.2.2 Monitoring of income, occupancy levels and ticket sales is essential as car parks are valuable assets, which should be intensively used.

3.3 Funding

3.3.1 Car parks are usually provided and funded by the following: -

- Local authorities under the powers of the Road Traffic Regulations Act (RTRA) 1984
- The private sector, as a commercial venture
- In conjunction with other developments which the car park serves or
- A private and public sector partnership

4. COST ESTIMATES FOR CAR PARKS IN SOUTH FIFE

4.1 Park and Ride Sites

General

4.1.1 Each site has been estimated with regard to all the major construction phases involved along with final fixings providing electric and mechanical equipment necessary to present a working serviceable car park.

4.1.2 All assumptions which were taken, have been illustrated in the appropriate Appendix as described in Table 4.1.

4.1.3 Table 4.2 presents the cost estimates of each of these phases.

Table 4.1 Appendix numerations

LOCATION	APPENDIX
Dalgety Bay	A
Rosyth	B
Halbeath	C
Inverkeithing	D
Ferrytoll	E

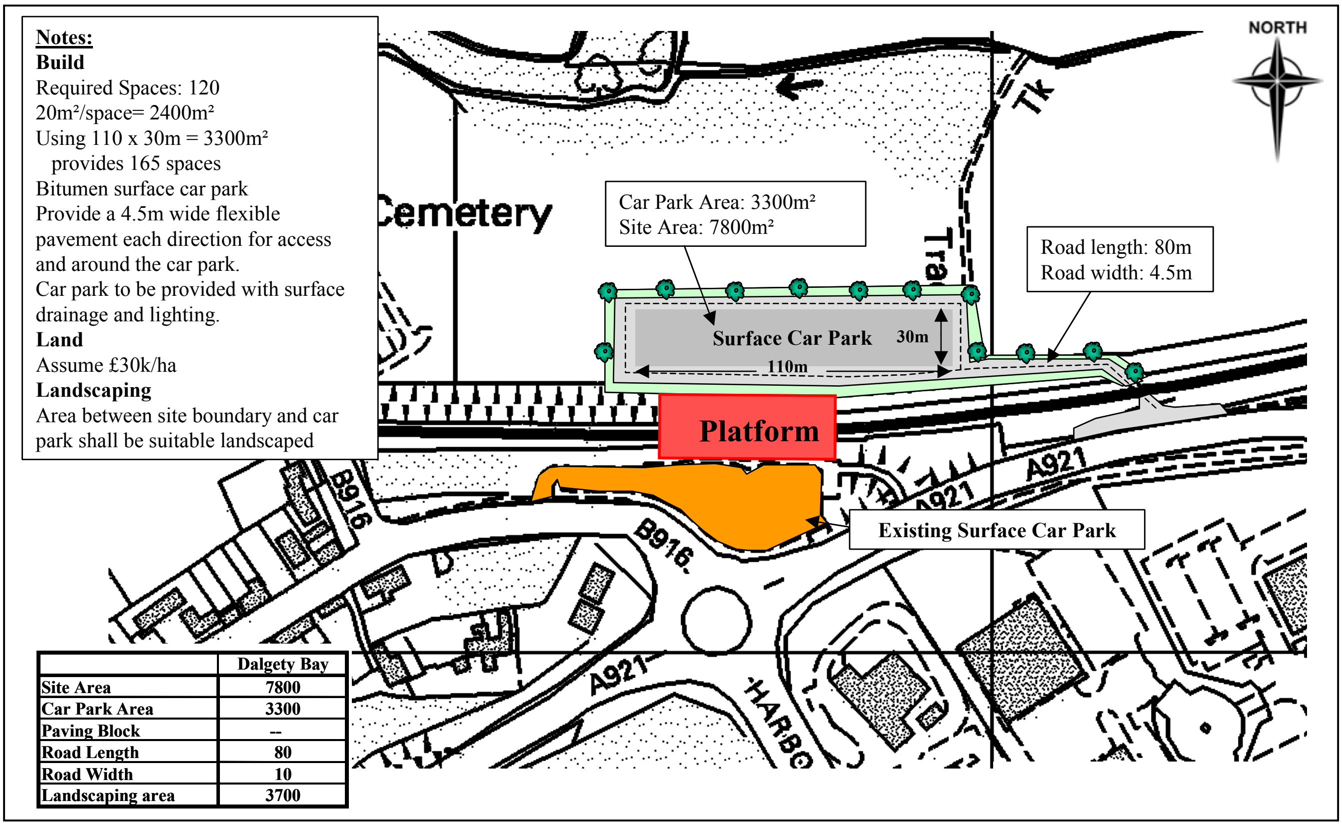
Table 4.2 Estimated Costing

	LOCATION				
	Dalgety Bay	**Rosyth**	**Halbeath**	**Inverkeithing**	**Ferrytoll**
	Estimate Q3/03	Estimate Q3/03	Estimate Q3/03	Estimate Q3/03	Estimate Q3/03
	£K	**£K**	**£K**	**£K**	**£K**
Preliminaries	45	120	332	65	28
Site Clearance	1	1	4	1	0.3
Fencing	4	5	13	4	5
Accommodation Works	1	3	8	1	0.4
Earthworks	60	133	260	244	69
Pavement (including Aggregate TAX)	157	422	1,359	--	--
Drainage (including Aggregate TAX)	35	105	246	111	83
Signs and carriageway marking	5	27	44	--	--
Concrete works	--	--	--	3,777	9,771
Landscaping	6	13	15	5	10
Works by other authorities					
BT	3	7	13	12	3
United Utilities Electricity	--	--	--	--	--
NWWA	2	4	8	7	2
Land acquisition	135	424	135	--	--
Preparation and Supervision	11	28	78	15	7
TOTAL (Excluding Risk Allowance and VAT)	**463**	**1,292**	**2,515**	**4,241**	**7,245**
Risk Items or Contingencies	23	65	252	24	724
Net scheme cost estimate	486	1,357	2,767	4,265	7,969
Optimism Factor	15	41	83	128	239
Gross total scheme cost	**501**	**1,397**	**2,850**	**4,393**	**11,530**
£ Million	**0.5**	**1.4**	**2.9**	**4.4**	**8.2**
Spaces provided (static only)	**165***	**500**	**1000**	**750**§	**1200**

* in addition to existing spaces
§ in addition to existing spaces immediately adjacent to station (see appendix D, Figure D)

APPENDIX A

Figure A Dalgety Bay



Notes:
Build
Required Spaces: 120
20m²/space= 2400m²
Using 110 x 30m = 3300m² provides 165 spaces
Bitumen surface car park
Provide a 4.5m wide flexible pavement each direction for access and around the car park.
Car park to be provided with surface drainage and lighting.
Land
Assume £30k/ha
Landscaping
Area between site boundary and car park shall be suitable landscaped

	Dalgety Bay
Site Area	7800
Car Park Area	3300
Paving Block	--
Road Length	80
Road Width	10
Landscaping area	3700

Table A (a) Dalgety Bay

		Q2/00		Q2/00
FENCING AND SAFETY FENCING		**Rate**	**Quantity**	**Total**
		£/m	**m**	**£**
Standard Post & Rail Fencing		9	380	3,507
Perimeter	380			
Length of Road	80			
SUB-TOTAL				**3,507**
DRAINAGE		**Rate**	**Quantity**	**Total**
		£/m²	**m²**	**£**
Road		7	720	4,968
Car Park		7	3,300	22,770
Drainage Outfalls				
Discharge surface water into river/stream at perimeter				
SUB-TOTAL				**27,738**
SIGNS AND ROAD MARKINGS		**Rate**	**Quantity**	**Total**
		£/m	**m**	**£**
Single Carriageway		29	160	4,715
80m each way	160			
SUB-TOTAL				**4,715**
PAVEMENT		**Rate**	**Quantity**	**Total**
		£/m²	**m²**	**£**
Single Carriageway (4.5m carriageway width)		36	720	26,165
Road	720			
Car Park Area	3,300	36	3,300	119,922
Total	4,020			
SUB-TOTAL				**146,087**
EARTHWORKS		***See Table A (c)***		
LIGHTING		**Rate**	**Quantity**	**Total**
		£	**No**	**£**
Lighting Car Park				
Area	3,300	1,105	66	72,930
Assume	1/50m²			
Road	1 ever 50m	1,105	3	3,315
SUB-TOTAL				**76,245**
SITE CLEARANCE		**Rate**	**Quantity**	**Total**
		£/Ha	**Ha**	**£**
Site Clearance		-	-	509
0.2% of Road Works, Car Park and Drainage				
SUB-TOTAL				**509**
LANDSCAPING		**Rate**	**Quantity**	**Total**
		£/m	**m**	**£**
Landscaping	(Assumed)	-	-	10,000
SUB-TOTAL				**10,000**

Table A (b) Dalgety Bay

NOISE INSULATION			Rate	No. of Properties	Total £
Noise Insulation			2,000	0	0
Assume no properties are effected					
SUB-TOTAL					**0**

WORK BY OTHER AUTHORITIES	Rate	Quantity	Total £k
British Telecom and other telecommunication	-	-	3
United Utilities High voltage electricity			0
United Utilities Low voltage electricity			0
Transco			-
NWWA (Water)			2
Note:			
Work by other authorities has not been recalculated. It has been factored from the projected values using the RCTPI			
Tele communications are assumed to be 5% of the earthworks costs			
NWWA (Water) is assumed to be 3% of the earthworks costs			
SUB-TOTAL			**5**

LAND					Total £
Required land take	Road =	1,200	m²	at £30,000/ha	
Assume £30k per Ha		4,500		30 per m²	135,000
SUB-TOTAL					**135,000**

ADDITIONAL COST ITEMS	Quantity (m3)	Quantity (Tonne) *		Rate	Total £
Aggregate Tax					
Earthworks					
Import Acceptable	0	0	0		0
(Assuming 50% of imported is clay)					
Roadwork's					
Capping	1,206	2,533			
Sub-base	603	1,266			
Pavement (black)	1,375	2,887	6,686	2	10,698
(Assuming 90% of black is aggregate)					
Drainage and general concrete	2,000	4,200	4,200	2	6,720
(Assuming 2000 m3 of aggregate is needed)					
Structures					
Total	5,184	10,886	10,886	2	17,418
* Assume 2.1m3 of aggregate = 1 Tonne					
SUB-TOTAL					**17,418**

ACCOMMODATION WORKS		Total £
Accommodation works	5% of cost	940
SUB-TOTAL		**940**

Table A (c) Dalgety Bay

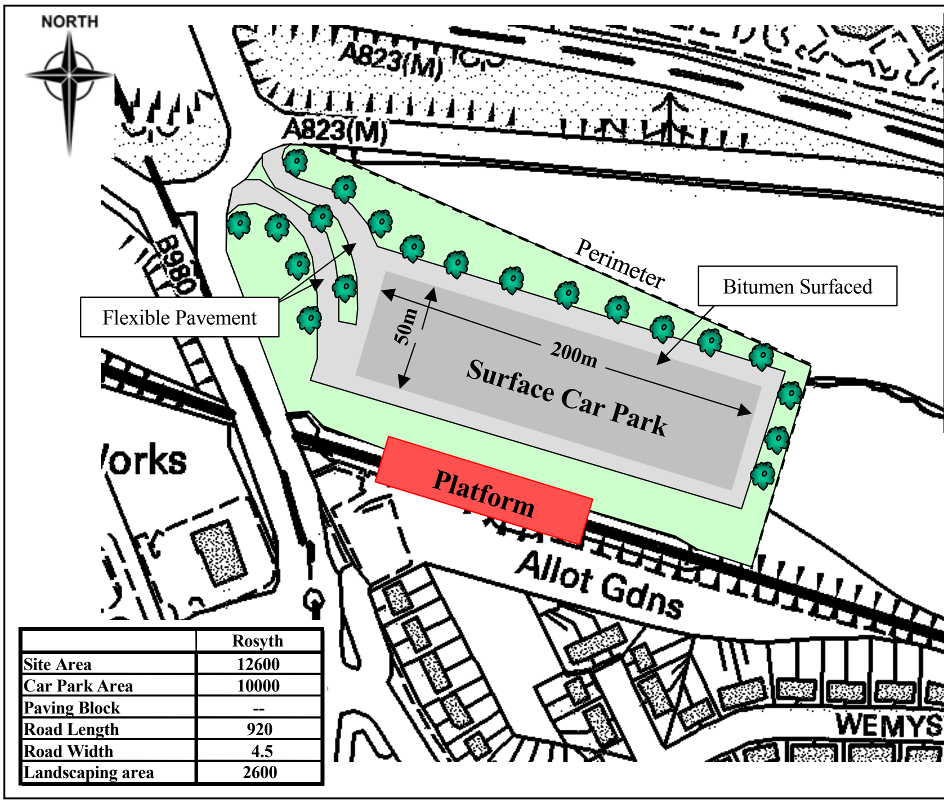
EARTHWORKS

	Q2/00 Rate £/m^3	Quantity m^3	Q2/00 Total £	
Unsuitable material				
Cutting	1	3,600	4,316	Unsuitable Cut + Landscaping Cut + Treated Unsuitable
Disposal off site	10	0	0	
			4,316	
Landfill Tax				
Inert/Inactive Waste	2	0	0	
Topsoil				
Topsoil strip	1	3,240	3,661	
Topsoil fill	4	372	1,484	
Seeding to verges	0	1,240	285	
			5,431	
Suitable Material				
Cutting	1	1,560	1,763	Suitable
Deposition	2	1,560	2,721	Suitable + treated + imported
Compaction	1	1,560	1,428	
			5,912	
Imported Fill	11	0	0	
Landscaping				
Landscaping fill	3	1,240	3,398	Assumed (including 20,000 m3 from floodplain)
Compaction	0	1,240	211	
			3,608	
Extra Over For Excavation of Rock	3	N/A	0	
Treatment of Unsuitable Material (to make suitable)				
Drying out	5	792	3,960	Assumed 22% of Unsuitable
Lime Stabilisation	5	1,318	6,588	Assumed 36.6% of Unsuitable
Surplus topsoil cut to be sold off site	4	1,628	6,512	Topsoil Cut - Topsoil Fill - Topsoil Landscape fill
Capping (for road and car park @ 0.3m thickness) (m2)	9	4,020	36,180	
SUBTOTAL			**59,483**	

NOTE: Assumed no material disposed off site. All unsuitable material to be treated or used as landscaping fill.

APPENDIX B

Figure B *Rosyth*



Notes:

Build

Required Spaces: 500

20m²/space= 10000m²

Using 200 x 50m = 10000m²

Bitumen surface car park

Provide a 4.5m wide flexible pavement each direction for access and around the car park.

Car park to be provided with surface drainage and lighting.

Land

Assume £30k/ha

Landscaping

Area between site boundary and car park shall be suitable landscaped

	Rosyth
Site Area	12600
Car Park Area	10000
Paving Block	--
Road Length	920
Road Width	4.5
Landscaping area	2600

Table B (a) Rosyth

FENCING AND SAFETY FENCING			Q2/00 Rate £/m	Quantity m	Q2/00 Total £
Standard Post & Rail Fencing					
Perimeter	520.00		9.23	520	4,800
Length of Road	460.00				
Required	500.00				
Car space	20.00				
Total	10,000.00				
SUB-TOTAL					**4,800**
DRAINAGE			**Rate £/m²**	**Quantity m²**	**Total £**
Road			6.90	4,140	28,566
Car Park			6.90	10,000	69,000
Drainage Outfalls					
SUB-TOTAL					**97,566**
SIGNS AND ROAD MARKINGS			**Rate £/m**	**Quantity m**	**Total £**
Carriageway			29.47	920.00	27,112
460m x 2		920.00			
SUB-TOTAL					**27,112**
PAVEMENT			**Rate £/m²**	**Quantity m²**	**Total £**
Single Carriageway (4.5m carriageway width)			36.34	920	33,433
Road	920				
Car Park Area	10000		36.34	10,000	363,400
Total	10,920				
SUB-TOTAL					**396,833**
EARTHWORKS			see B (c)		
LIGHTING			**Rate £**	**Quantity No**	**Total £**
Car Park			1,105.00	200.00	221,000
Area	10,000.00				
Assume	1/50m²				
Road			1,105.00	9.20	10,166
Length	460.00				
Assume	1/50m				
SUB-TOTAL					**231,166**
SITE CLEARANCE			**Rate £/Ha**	**Quantity Ha**	**Total £**
Site Clearance			-	-	1355
0.2% of Road Works, Car Park and Drainage					
SUB-TOTAL					**1355**

Table B (b) Rosyth

LANDSCAPING				Rate £/m	Quantity m	Total £
Landscaping				-	-	10,000
Assumed						
SUB-TOTAL						**10,000**

NOISE INSULATION	Rate	No. of Properties	Total £
Noise Insulation	2,000.00	0	0.00
Assume no properties are effected			
SUB-TOTAL			**0.00**

WORK BY OTHER AUTHORITIES	Rate	Quantity	Total £k
British Telecom and other telecommunication	-	-	6.66
United Utilities High voltage electricity			0.00
United Utilities Low voltage electricity			0.00
Transco			-
NWWA (Water)			4.00

Note:
Work by other authorities has not been recalculated. It has been factored from the projected values using the RCTPI
Tele communications are assumed to be 5% of the earthworks costs
NWWA (Water) is assumed to be 3% of the earthworks costs

SUB-TOTAL	**10.66**

LAND					Total £
Required landtake	Car park	10,000.00	m²		
	Road	4,140.00	m²	at £30,000/ha	
		14,140		per m²	424200
Assume £30k per Ha					
SUB-TOTAL					**424200**

ADDITIONAL COST ITEMS	Quantity (m3)	Quantity (Tonne) *		Q2/00 Rate	Q2/00 Total £
Aggregate Tax					
Earthworks					
Import Acceptable	0	0	0		0
(Assuming 50% of imported is clay)					
Roadworks					
Capping	1,638	3440			
Sub-base	1,638	3440			
Pavement (black)	3,735	7843	14722	£1.60	23556
(Assuming 90% of black is aggregate)					
Drainage and general concrete	2,000	4200	4200	£1.60	6720
(Assuming 2000 m3 of aggregate is needed)					
Structures					
Total	9,011	18922	18922	£1.60	30276
* Assume 2.1m3 of aggregate = 1 Tonne					
SUB-TOTAL					**30276**

Table B (c) Rosyth

EARTHWORKS

	Q2/00 Rate £/m³	Quantity m³	Q2/00 Total £	
Unsuitable material				
Cutting	1.20	16,000.00	19,184.00	Unsuitable Cut + Landscaping Cut + Treated Unsuitable
Disposal off site	9.75	0.00	0.00	
			19,184.00	
Landfill Tax				
Inert/Inactive Waste	2.00	0.00	**0.00**	
Topsoil				
Topsoil strip	1.13	5,090.40	5,752.15	
Topsoil fill	3.99	0.00	0.00	
Seeding to verges	0.23	0.00	0.00	
			5,752.15	
Suitable Material				
Cutting	1.13	8,000.00	9,040.00	Suitable
Deposition	1.74	8,000.00	13,952.00	Suitable + treated + imported
Compaction	0.92	8,000.00	7,324.80	
			30,316.80	
Imported Fill	10.90	0	**0.00**	
Landscaping				
Landscaping fill	2.74	276.00	756.24	Assumed (including 20,000 m3 from floodplain)
Compaction	0.17	276.00	46.92	
			803.16	
Extra Over For Excavation of Rock	3.26	N/A	**0.00**	
Treatment of Unsuitable Material (to make suitable)				
Drying out	5.00	3,520.00	17,600.00	Assumed 22% of Unsuitable
Lime Stabilisation	5.00	5,856.00	29,280.00	Assumed **36.6%** of Unsuitable
Surplus topsoil cut to be sold off site	4.00	4,814.40	**19,257.60**	Topsoil Cut - Topsoil Fill - Topsoil Landscape fill
Capping (Roads and Car Park @ 0.15m thickness) (m2)	4.50	10,920	49,140.00	
		SUBTOTAL	**132,818.51**	

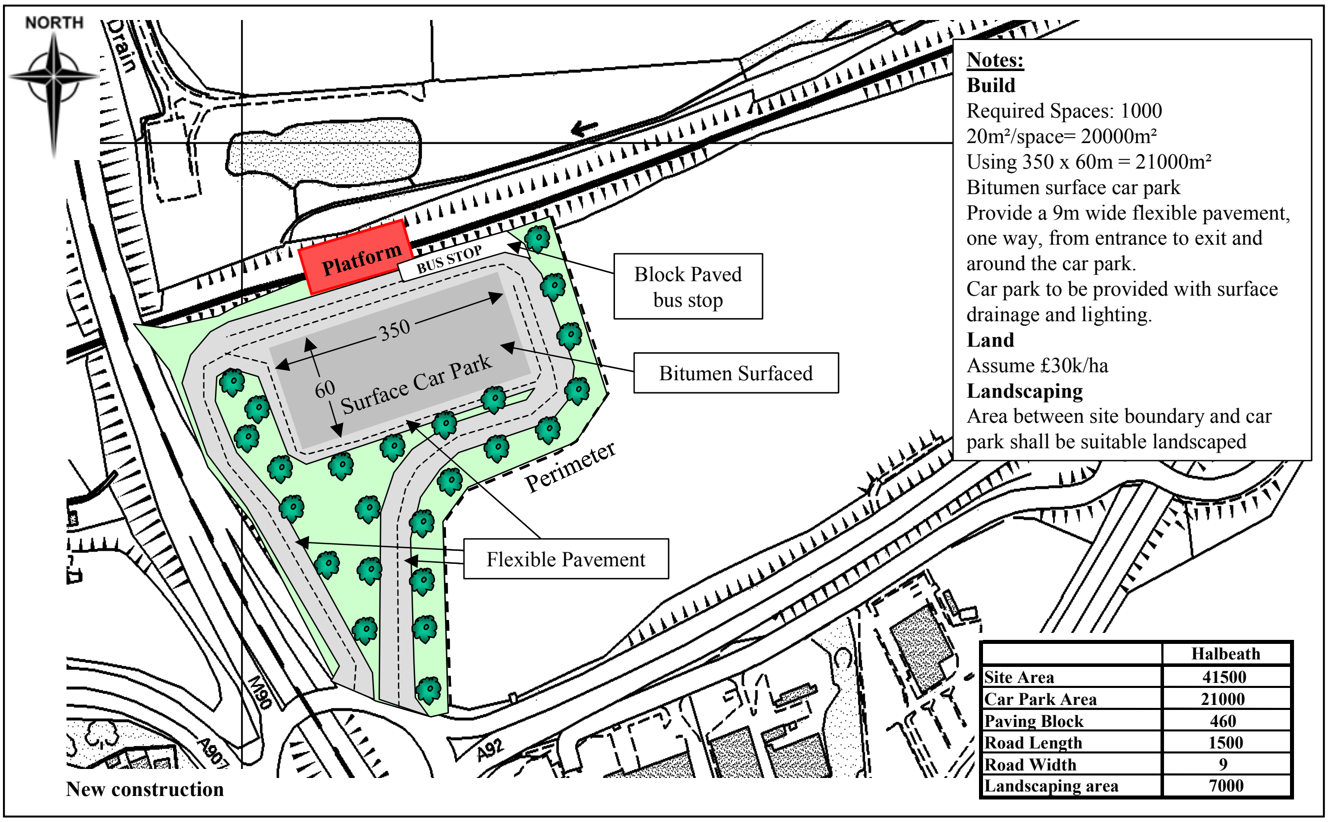
NOTE: Assumed no material disposed off site. All unsuitable material to be treated or used as landscaping fill.

Table B (d) Rosyth

ACCOMMODATION WORKS	Total £	
Accommodation works	2,578	5% of cost
SUB-TOTAL	**2,578**	

APPENDIX C

Figure C Halbeath



Notes:
Build
Required Spaces: 1000
20m²/space= 20000m²
Using 350 x 60m = 21000m²
Bitumen surface car park
Provide a 9m wide flexible pavement, one way, from entrance to exit and around the car park.
Car park to be provided with surface drainage and lighting.
Land
Assume £30k/ha
Landscaping
Area between site boundary and car park shall be suitable landscaped

	Halbeath
Site Area	41500
Car Park Area	21000
Paving Block	460
Road Length	1500
Road Width	9
Landscaping area	7000

Table C (a) *Halbeath*

				Q2/00		Q2/00
FENCING AND SAFETY FENCING				**Rate**	**Quantity**	**Total**
				£/m	**m**	**£**
Standard Post & Rail Fencing				9	1,400	12,922
Perimeter		1,400				
Safety fencing taken into account in Concrete works						
	SUB-TOTAL					**12,922**
DRAINAGE				**Rate**	**Quantity**	**Total**
				£/m²	**m²**	**£**
Road				7	13,500	93,150
	Length	1,500				
	Width	9				
Car Park				7	21,000	144,900
	Length	350				
	Width	60				
Drainage Outfalls						
	Discharge surface water into river/stream at perimeter					
	SUB-TOTAL					**238,050**
SIGNS AND ROAD MARKINGS				**Rate**	**Quantity**	**Total**
				£/m	**m**	**£**
	Carriageway			29	1,500	44,205
	SUB-TOTAL					**44,205**
PAVEMENT				**Rate**	**Quantity**	**Total**
				£/m²	**m²**	**£**
	Single Carriageway (4.5m carriageway width)			36	13,500	490,590
			X2			
	Car Park			36	21,000	763,140
		Car Park Area	21,000			
		Road	13,500			
		Total	34,500			
	Bus Stop			60	450	27,000
		Paving block	£60/m²			
		Length	100			
		Width	5			
	SUB-TOTAL					**1,280,730**
EARTHWORKS						**See A1 d**
LIGHTING				**Rate**	**Quantity**	**Total**
				£	**No**	**£**
	Car Park			1,105	420	464,100
	Area	21,000				
		Assume	1/50m²			
	Road			1,105	30	33,150
	Length	1,500				
		Assume	1/50m			
	SUB-TOTAL					**497,250**

Table C (b) Halbeath

SITE CLEARANCE		Rate £/Ha	Quantity Ha	Total £
Site Clearance		-	-	3,767
	0.2% of Road Works, Car Park and Drainage			
SUB-TOTAL				**3,767**

LANDSCAPING	Rate £/m	Quantity m	Total £
Landscaping	-	-	15,000
Assumed			
SUB-TOTAL			**15,000**

NOISE INSULATION	Rate	No. of Properties	Total £
Noise Insulation	2,000	0	0
Assume no properties are effected			
SUB-TOTAL			**0**

WORK BY OTHER AUTHORITIES	Rate	Quantity	Total £k
British Telecom and other telecommunication	-	-	13
United Utilities High voltage electricity			0
United Utilities Low voltage electricity			0
Transco			-
NWWA (Water)			8
Note:			
Work by other authorities has not been recalculated. It has been factored from the projected values using the RCTPI			
Tele communications are assumed to be 5% of the earthworks costs			
NWWA (Water) is assumed to be 3% of the earthworks costs			
SUB-TOTAL			**21**

LAND					Total £
	Total		m²		
Land is currently acquired		5	Ha	30,000	135,000
SUB-TOTAL					**135,000**

Table C (c) Halbeath

ADDITIONAL COST ITEMS	Quantity (m3)	Quantity (Tonne) *		Q2/00 Rate	Q2/00 Total £
Aggregate Tax					
Earthworks					
Import Acceptable	0	0	0		0
(Assuming 50% of imported is clay)					
Roadwork's					
Capping	5,175	10,868			
Sub-base	5,175	10,868			
Pavement (black)	11,799	24,778	46,513	2	74,421
(Assuming 90% of black is aggregate)					
Drainage and general concrete	2,000	4,200	4,200	2	6,720
(Assuming 2000 m3 of aggregate is needed)					
Total					81,141
* Assume 2.1m3 of aggregate = 1 Tonne					
SUB-TOTAL					**81,141**

ACCOMMODATION WORKS	Total £	
Accommodation works	7,861	5% of cost
SUB-TOTAL		**7,861**

Table C (d)   Halbeath

EARTHWORKS

	Q2/00 Rate £/m³	Quantity m³	Q2/00 Total £	
Unsuitable material				
Cutting	1	13,800	16,546	Unsuitable Cut + Landscaping Cut + Treated Unsuitable
Disposal off site	10	12,420	121,095	Dispose 90%
			137,641	
Landfill Tax				
Inert/Inactive Waste	2	12,420	24,840	
Topsoil				
Topsoil strip	1	41,400	46,782	
Topsoil fill	4	0	0	
Seeding to verges	0	0	0	
			46,782	
Suitable Material				
Cutting	1	3,450	3,899	Suitable
Deposition	2	3,450	6,017	Suitable + treated + imported
Compaction	1	3,450	3,159	
			13,074	
Imported Fill	11	0	0	
Landscaping				
Landscaping fill	3	1,005	2,754	Assumed (including 20,000 m3 from floodplain)
Compaction	0	1,005	171	
			2,925	
Extra Over For Excavation of Rock	3	N/A	0	
Treatment of Unsuitable Material (to make suitable)				
Drying out	5	3,036	15,180	Assumed 22% of Unsuitable
Lime Stabilisation	5	5,051	25,254	Assumed <u>36.6%</u> of Unsuitable
Surplus topsoil cut to be sold off site	4	40,395	161,580	Topsoil Cut - Topsoil Fill - Topsoil Landscape fill
Capping (Roads and Car Parks @ 0.15m thickness) (m^2)	5	34,500	155,250	
SUBTOTAL			**259,366**	

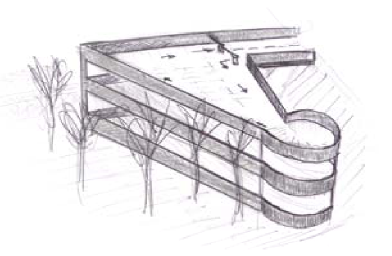
NOTE: Assumed no material disposed off site. All unsuitable material to be treated or used as landscaping fill.

APPENDIX D

Figure D Inverkeithing

	Inverkeithing
Site Area	7200
Car Park Area	5000
Paving Block	--
Road Length	--
Road Width	--
Landscaping area	2200

Isometric sketch



Notes:
Build
Car Park Area: 5000m²
Spaces Provided: 20m²/space = 250
Const type: Concrete multi storey, 3 levels.
Total No. of spaces: 250 x 3 = 750
Access to be provided by rigid pavement onto top level from existing road.
Site Area: 7200m²
Perimeter: 400m
Land
Acquired
Landscaping
Area between site boundary and car park shall be suitable landscaped

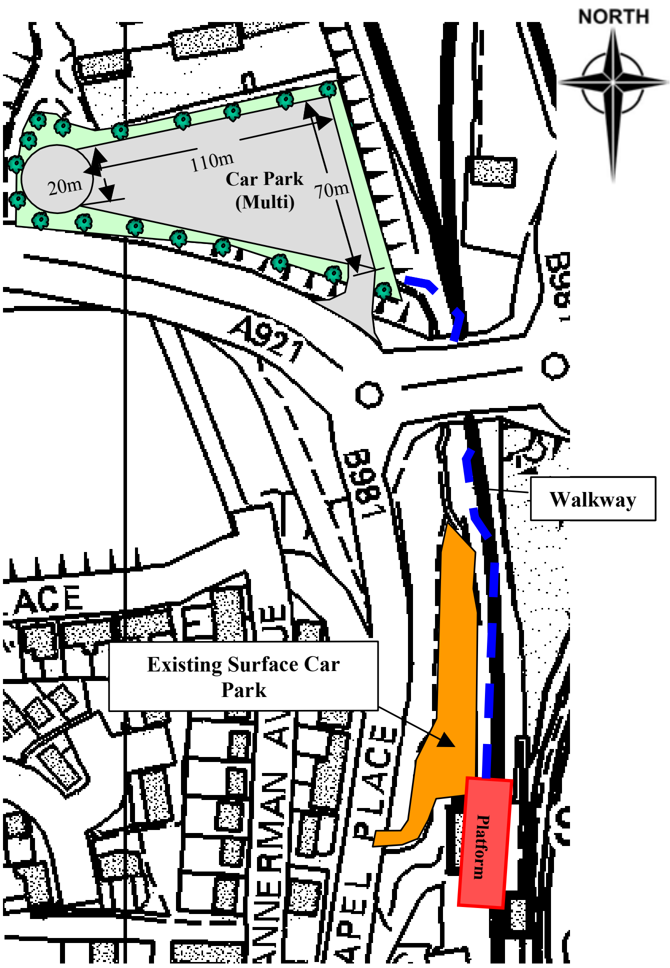


Table D (a) Inverkeithing

FENCING AND SAFETY FENCING			**Q2/00 Rate £/m**	**Quantity m**	**Q2/00 Total £**
Standard Post & Rail Fencing			9.23	400	3,692
Perimeter		400.00			
Safety fencing taken into account in Concrete works					
SUB-TOTAL					**3,692**
DRAINAGE			**Rate £/m²**	**Quantity m²**	**Total £**
Car Park		Total area 15,000.00	6.90	15,000	103,500
SUB-TOTAL					**103,500**
EARTHWORKS			See Table D (c)		
LIGHTING			**Rate £**	**Quantity No**	**Total £**
Lighting			1,105.00	200.00	221,000
Area	5,000.00				
Assume	1/25m²				
No. of Light					
SUB-TOTAL					**221,000**
SITE CLEARANCE			**Rate £/Ha**	**Quantity Ha**	**Total £k**
Site Clearance			-	-	702
	0.2% of Road Works, Car Park and Drainage				
SUB-TOTAL					**702**

CONCRETE WORKS					**Quantity m²**	**Total £**
Foundations						
Piles and Caps		1/grid 8 x 8m grid			78	429,688
Pile	£4k		4000			
Cap (Single)	£1.5k		1500			
Reinforced concrete floors and frame						
Suspended slab; average depth; no coverings or finishes ; per m² of upper floor area up to six storeys						
		=200				
	Area per floor		No. of floors	Total area		
Area		5000	3	15000		3,000,000
Assume						
Lift Shaft and Stairs		2% of Floors and frame				60,000
Walls and Parapets		2% of Floors and frame				60,000
Ramps		5% of Floors and frame				150,000
SUB-TOTAL						3,270,000

Table D (b) Inverkeithing

LANDSCAPING			**Rate**	**Quantity**	**Total**
			£/m	**m**	**£**
	Landscaping		-	-	5,000
	Assumed				
	SUB-TOTAL				**5,000**

WORK BY OTHER AUTHORITIES			**Rate**	**Quantity**	**Total**
					£k
British Telecom and other telecommunication			-	-	12
United Utilities High voltage electricity					0
United Utilities Low voltage electricity					0
Transco					-
NWWA (Water)					7
Note:					
Tele communications are assumed to be 5% of the earthworks costs					
NWWA (Water) is assumed to be 3% of the earthworks costs					
	SUB-TOTAL				**20**

LAND					**Total**
					£
	Verge	2.00			
	Slope (bottom)	2.00			
	Lane	4.50			
	Total	8.50			
	Length	8,500.00			
	Total		m²		
Land is currently acquired			Ha		0

ADDITIONAL COST ITEMS	**Quantity**	**Quantity**		**Rate**	**Total**
	(m³)	(Tonne) *			**£**
Aggregate Tax					
Earthworks					
Import Acceptable	0	0	0		0
Drainage and general concrete	2,000	4200	4200	£1.60	6,720
(Assuming 2000 m3 of aggregate is needed)					
Structures					
Total					0
* Assume 2.1m3 of aggregate = 1 Tonne					
	SUB-TOTAL				**6,720**

ACCOMMODATION WORKS				**Total**
				£
	Accommodation works		5% of cost	542
	SUB-TOTAL			**542**

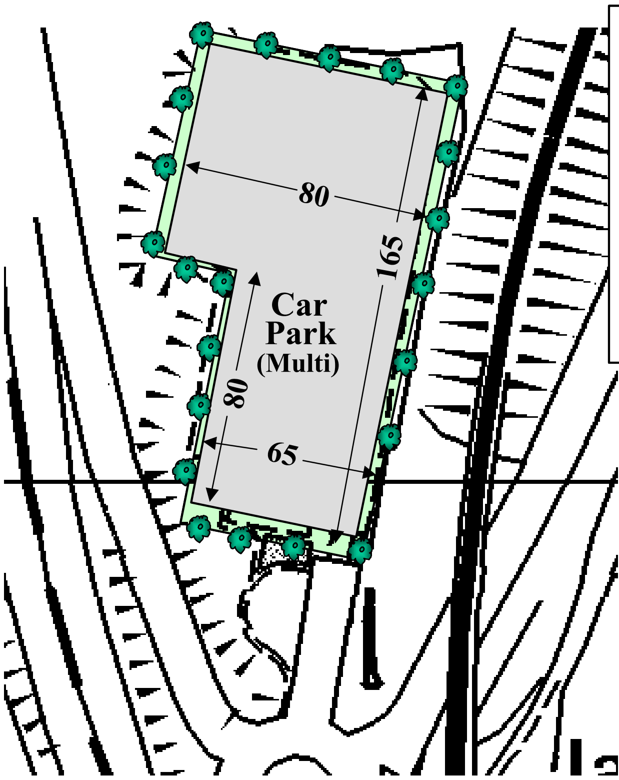
Table D (c) Inverkeithing

EARTHWORKS	Q2/00 Rate £/m^3	Quantity m^3	Q2/00 Total £	
Unsuitable material				
Cutting	1.20	15,728	18,858	Unsuitable Cut + Landscaping Cut + Treated Unsuitable
Disposal off site	9.75	14,155	138,013	Dispose 90%
			156,871	
Landfill Tax				
Inert/Inactive Waste	2.00	14,155	**28,310**	
Topsoil				
Topsoil strip	1.13	2,592	2,929	
Topsoil fill	3.99	0	0	
Seeding to verges	0.23	0	0	
			2,929	
Suitable Material				
Cutting	1.13	3,932	4,443	Suitable
Deposition	1.74	3,932	6,857	Suitable + treated + imported
Compaction	0.92	3,932	3,600	
			14,901	
Imported Fill	10.90	0	**0**	
Landscaping				
Landscaping fill	2.74	660	1,808	Assumed (including 20,000 m3 from floodplain)
Compaction	0.17	660	112	
			1,921	
Extra Over For Excavation of Rock	3.26	N/A	**0**	
Treatment of Unsuitable Material (to make suitable)				
Drying out	5.00	3,460	17,301	Assumed 22% of Unsuitable
Lime Stabilisation	5.00	5,756	28,782	Assumed **36.6%** of Unsuitable
Surplus topsoil cut to be sold off site	4.00	1,932	**7,728**	Topsoil Cut - Topsoil Fill - Topsoil Landscape fill
		SUBTOTAL	**243,287**	

NOTE: Assumed no material disposed off site. All unsuitable material to be treated or used as landscaping fill.

APPENDIX E

Figure E　　Ferrytoll



Notes:

Build

Site Area: 12000m²

Spaces Provided: 20m²/space = 600

Const type: Concrete multi storey, 2 levels. Works to account for lift, stairs and access ramps.

Total No. of spaces: 600 x 2 = 1200

Perimeter: 490m

Land

Acquired

Landscaping

Area between site boundary and car park shall be suitable landscaped

	Ferrytoll
Site Area	12490
Car Park Area	12000
Paving Block	--
Road Length	--
Road Width	--
Landscaping area	490

Table E (a) Ferrytoll

FENCING AND SAFETY FENCING			**Q2/00 Rate £/m**	**Quantity m**	**Q2/00 Total £**
Standard Post & Rail Fencing			9	520	4,800
Perimeter			520		
Safety fencing taken into account in Concrete works					
SUB-TOTAL					**4,800**
DRAINAGE			**Rate £/m^2**	**Quantity m^2**	**Total £**
Car Park			7	12,000	82,800
Drainage Outfalls					
Upgrade existing storm water lines to accommodate new structure					
SUB-TOTAL					**82,800**
EARTHWORKS			See Table E (c)		
LIGHTING			**Rate £**	**Quantity No**	**Total £**
Lighting			1,105	320	353,600
Area (2 floors)	24,000				
Assume	1/75m²				
SUB-TOTAL					**353,600**
SITE CLEARANCE			**Rate £/Ha**	**Quantity Ha**	**Total £**
Site Clearance			-	-	0
0.2% of Road Works, Car Park and Drainage					
SUB-TOTAL					0
CONCRETE WORKS				**Quantity**	**Total**
Foundations	area		nr	**Ha**	**£**
Piles and Caps	13200	1/grid	206	207	1,138,500
Grid	m	area			
Length	8	64			
Width	8				
Pile	£4k	4000			
Cap (Single)	£1.5k	1500			
Reinforced concrete floors and frame				m²	
Suspended slab; average depth; no coverings or finishes ; per m² of upper floor area	up to six storeys				
		=200			
	Area per floor	No. of Floors	Total		
Area	13200x 3		39600		7,920,000
Lift Shaft and Stairs	2% of Floors and frame				105,600
Walls and Parapets	2% of Floors and frame				105,600
Ramps	5% of Floors and frame				264,000
SUB-TOTAL					9,711,300
LANDSCAPING			**Rate £/m**	**Quantity m**	**Total £**
Landscaping			-	-	10,000
Assumed					
SUB-TOTAL					**10,000**

Table E (b) Ferrytoll

WORK BY OTHER AUTHORITIES			**Rate**	**Quantity**	**Total £k**
British Telecom and other telecommunication			-	-	3
United Utilities High voltage electricity					0
United Utilities Low voltage electricity					0
Transco					-
NWWA (Water)					2
Note:					
Work by other authorities has not been recalculated. It has been factored from the projected values using the RCTPI					
Tele communications are assumed to be 5% of the earthworks costs					
NWWA (Water) is assumed to be 3% of the earthworks costs					
SUB-TOTAL					**6**

LAND					**Total £**
	Verge	2.00			
	Slope (bottom)	2.00			
	Lane	4.50			
	total	8.50			
	length	8,500.00			
	Total		m^2		
Land is currently acquired			Ha		0
SUB-TOTAL					**0**

ADDITIONAL COST ITEMS	Quantity (m3)	Quantity (Tonne) *		**Rate**	**Total** £
Aggregate Tax					
Earthworks					
Import Acceptable	0	0	0		0
(Assuming 50% of imported is clay)					
Drainage and general concrete	2,000	4200	4200	2	0
(Assuming 2000 m3 of aggregate is needed)					
Structures					
* Assume 2.1m3 of aggregate = 1 Tonne					
SUB-TOTAL					**0**

ACCOMMODATION WORKS		**Total £**
Accommodation works	5% of cost	
SUB-TOTAL		407

Table E (c) Ferrytoll

EARTHWORKS

	Q2/00 Rate £/m^3	Quantity m^3	Q2/00 Total £	
Unsuitable material				
Cutting	1	5,280	6,331	Unsuitable Cut + Landscaping Cut + Treated Unsuitable
Disposal off site	10	4,752	46,332	Dispose 90%
			52,663	
Landfill Tax				
Inert/Inactive Waste	2	4,752	**9,504**	
Topsoil				
Topsoil strip	1	4,896	5,532	
Topsoil fill	4	0	0	
Seeding to verges	0	0	0	
			5,532	
Suitable Material				
Cutting	1	1,320	1,492	Suitable
Deposition	2	1,320	2,302	Suitable + treated + imported
Compaction	1	1,320	1,209	
			5,002	
Imported Fill	11	0	**0**	
Landscaping				
Landscaping fill	3	72	197	Assumed (including 20,000 m3 from floodplain)
Compaction	0	72	12	
			210	
Extra Over For Excavation of Rock	3	N/A	**0**	
Treatment of Unsuitable Material (to make suitable)				
Drying out	5	1,162	5,808	Assumed 22% of Unsuitable
Lime Stabilisation	5	1,932	9,662	Assumed **36.6%** of Unsuitable
Surplus topsoil cut to be sold off site	4	4,824	**19,296**	Topsoil Cut - Topsoil Fill - Topsoil Landscape fill
SUBTOTAL			**69,085**	

NOTE: Assumed no material disposed off site. All unsuitable material to be treated or used as landscaping fill.

APPENDIX G

Traffic Flows into Central Edinburgh

Inbound flow across outer ECCS cordon in 2006 in cars and pcus

AM flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	SITCoSI Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
		%Change Relative to Ref Case			%Change Relative to Ref Case		
1	Queensferry Rd.	-6.5%	-13.2%	-5.2%	-4.8%	-10.8%	-3.5%
2	Glasgow Rd.	-0.2%	-14.3%	0.3%	-0.7%	-12.4%	0.2%
3	S. Gyle Broadw.	-2.8%	-19.4%	-1.3%	-1.7%	-18.7%	-0.7%
4	Calder Rd.	-0.6%	-8.0%	-0.6%	-0.5%	-7.2%	-0.7%
5	A720 Bab.Offslp	0.0%	-29.4%	-1.7%	0.0%	-29.0%	-1.9%
6	Lanark Rd.	-0.4%	-7.6%	-0.9%	-0.5%	-8.8%	-0.9%
7	Dreghorn Link	-0.2%	-14.8%	-0.9%	-0.1%	-12.6%	-1.8%
8	Biggar Rd.	1.7%	-6.3%	-0.1%	1.6%	-5.6%	-0.1%
9	Burdiehouse Rd.	-2.6%	-26.3%	3.2%	-2.3%	-25.1%	3.0%
10	Lasswade Rd.	4.8%	-11.7%	-9.1%	4.4%	-13.5%	-7.5%
11	Gilmerton Rd.	-2.4%	-0.4%	0.8%	-2.2%	-1.1%	0.9%
12	Old Dalkeith Rd.	-1.1%	-27.1%	-0.3%	-0.9%	-26.6%	-0.4%
13	The Wisp	1.7%	-9.6%	0.2%	0.3%	-4.8%	-0.3%
14	Whitehall Rd.	3.0%	-19.1%	0.7%	2.5%	-38.0%	0.0%
15	New Craighall Rd.	-0.4%	-37.9%	-0.1%	-0.4%	-36.6%	-0.2%
16	A1 - N. of NCH	-0.4%	-19.5%	-0.7%	-0.5%	-19.3%	-0.6%
17	Edinburgh Rd.	1.0%	-11.6%	0.0%	1.3%	-9.5%	0.0%
	From West (S 1-6)	-2.2%	-13.6%	-1.7%	-1.8%	-12.2%	-1.3%
	From South (S 7-11)	-0.2%	-13.6%	-0.3%	-0.1%	-12.8%	-0.3%
	From East (S 12-17)	-0.1%	-21.3%	-0.3%	-0.2%	-20.3%	-0.4%
	TOTALS	**-1.2%**	**-15.5%**	**-1.1%**	**-1.1%**	**-14.4%**	**-0.9%**

OP flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	2.9%	-5.3%	4.7%	2.3%	-4.1%	3.2%
2	Glasgow Rd.	-0.8%	2.1%	-2.7%	-0.6%	2.1%	-1.8%
3	S. Gyle Broadw.	1.2%	4.5%	0.7%	0.9%	4.2%	0.6%
4	Calder Rd.	2.4%	-0.6%	-0.7%	2.1%	-1.1%	-0.5%
5	A720 Bab.Offslp	1.3%	3.5%	2.2%	1.0%	7.2%	-2.2%
6	Lanark Rd.	0.0%	-3.0%	0.1%	0.0%	-2.2%	0.0%
7	Dreghorn Link	0.4%	7.4%	-0.8%	0.5%	7.3%	-0.7%
8	Biggar Rd.	-0.4%	-1.1%	0.9%	-0.3%	-0.7%	0.9%
9	Burdiehouse Rd.	0.2%	-7.5%	0.4%	0.1%	-6.9%	0.5%
10	Lasswade Rd.	2.8%	-11.0%	-0.4%	1.4%	-7.7%	0.0%
11	Gilmerton Rd.	-0.6%	-1.2%	0.6%	-0.4%	-1.0%	0.4%
12	Old Dalkeith Rd.	0.6%	-3.0%	-0.5%	0.0%	-3.4%	-0.9%
13	The Wisp	-0.8%	5.8%	-2.7%	-0.6%	5.6%	-2.0%
14	Whitehall Rd.	-0.7%	4.3%	-3.7%	0.0%	5.4%	-3.4%
15	New Craighall Rd.	0.9%	2.6%	0.6%	0.8%	2.3%	0.7%
16	A1 - N. of NCH	-0.2%	3.4%	-0.8%	-0.5%	2.1%	-0.7%
17	Edinburgh Rd.	-0.2%	-1.4%	0.2%	0.0%	-0.2%	0.0%
	From West (S 1-6)	1.0%	-0.6%	0.3%	0.9%	-0.2%	0.2%
	From South (S 7-11)	0.1%	-1.7%	0.3%	0.0%	-1.5%	0.3%
	From East (S 12-17)	-0.1%	2.4%	-0.7%	-0.2%	1.7%	-0.6%
	TOTALS	**0.6%**	**-0.2%**	**0.1%**	**0.5%**	**0.0%**	**0.0%**

Inbound flow across outer ECCS cordon in 2011 in cars and pcus

AM flows

Screen-line	Description	%Change Relative to Ref Case: SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	%Change Relative to Ref Case: SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	-6.6%	-7.0%	-7.6%	-3.2%	-5.9%	-4.9%
2	Glasgow Rd.	-1.1%	-10.6%	-1.4%	-0.7%	-10.4%	-0.8%
3	S. Gyle Broadw.	-1.2%	-21.2%	-0.3%	-0.6%	-19.2%	0.6%
4	Calder Rd.	-3.2%	-12.5%	-0.2%	-2.5%	-10.8%	-0.3%
5	A720 Bab.Offslp	0.5%	-29.7%	-0.7%	0.6%	-29.6%	-0.6%
6	Lanark Rd.	-2.0%	-7.1%	-2.3%	-2.0%	-7.2%	-2.3%
7	Dreghorn Link	0.8%	-8.5%	-0.5%	0.6%	-7.4%	-0.4%
8	Biggar Rd.	-1.4%	-9.0%	-3.0%	0.9%	-8.0%	-0.1%
9	Burdiehouse Rd.	-3.6%	-27.9%	-3.6%	-3.3%	-26.5%	-3.3%
10	Lasswade Rd.	0.0%	-3.3%	-6.9%	0.3%	-5.2%	-6.3%
11	Gilmerton Rd.	0.1%	1.8%	2.0%	-0.2%	-0.3%	0.9%
12	Old Dalkeith Rd.	-4.5%	-36.0%	1.0%	-4.0%	-34.8%	0.7%
13	The Wisp	-0.3%	-11.1%	0.4%	-0.1%	-5.1%	0.1%
14	Whitehall Rd.	9.4%	-26.4%	10.1%	6.8%	-40.5%	8.0%
15	New Craighall Rd.	-1.5%	-47.9%	-3.1%	-1.4%	-45.8%	-2.4%
16	A1 - N. of NCH	-0.9%	-20.8%	-1.4%	-0.9%	-21.4%	-1.2%
17	Edinburgh Rd.	-1.8%	-9.7%	-2.2%	-1.5%	-4.6%	-1.9%
	From West (S 1-6)	-2.8%	-12.1%	-2.7%	-1.7%	-11.0%	-1.8%
	From South (S 7-11)	-1.3%	-12.4%	-2.4%	-0.6%	-11.9%	-1.6%
	From East (S 12-17)	-1.3%	-25.5%	-0.8%	-1.2%	-24.0%	-0.7%
	TOTALS	**-2.1%**	**-15.7%**	**-2.2%**	**-1.4%**	**-14.7%**	**-1.5%**

OP flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	-3.5%	-8.1%	2.5%	-1.7%	-7.1%	3.4%
2	Glasgow Rd.	-0.1%	2.0%	-2.1%	0.0%	2.5%	-1.7%
3	S. Gyle Broadw.	-1.5%	4.3%	0.7%	-0.1%	4.1%	1.8%
4	Calder Rd.	-0.1%	-2.3%	1.2%	0.3%	-2.3%	1.1%
5	A720 Bab.Offslp	0.3%	-1.2%	2.1%	0.5%	0.5%	1.4%
6	Lanark Rd.	-0.3%	-3.2%	-0.6%	-0.5%	-2.5%	-0.4%
7	Dreghorn Link	-1.9%	3.1%	1.1%	-1.8%	3.3%	0.9%
8	Biggar Rd.	-0.2%	-3.3%	-0.7%	2.1%	-2.1%	1.6%
9	Burdiehouse Rd.	-0.8%	-5.9%	0.6%	-0.6%	-5.4%	0.5%
10	Lasswade Rd.	-0.4%	-11.4%	-0.6%	0.0%	-7.7%	-0.8%
11	Gilmerton Rd.	0.2%	0.2%	-0.1%	0.0%	-0.6%	-0.2%
12	Old Dalkeith Rd.	-0.9%	-4.2%	-1.3%	-0.4%	-3.5%	-0.8%
13	The Wisp	0.0%	-4.0%	-1.1%	0.0%	-1.8%	-1.1%
14	Whitehall Rd.	-4.6%	-7.5%	9.0%	-4.9%	-7.4%	9.3%
15	New Craighall Rd.	-0.7%	-2.0%	2.2%	-0.5%	-2.1%	1.4%
16	A1 - N. of NCH	-0.4%	-1.2%	-0.6%	-0.4%	-1.9%	-0.6%
17	Edinburgh Rd.	0.0%	-5.7%	-0.2%	0.0%	-2.8%	-0.2%
	From West (S 1-6)	-1.2%	-1.9%	0.2%	-0.5%	-1.4%	0.7%
	From South (S 7-11)	-0.6%	-2.3%	0.2%	0.0%	-2.0%	0.6%
	From East (S 12-17)	-0.5%	-2.7%	0.1%	-0.4%	-2.4%	0.0%
	TOTALS	**-0.9%**	**-2.1%**	**0.2%**	**-0.4%**	**-1.8%**	**0.5%**

Inbound flow across outer ECCS cordon in 2016 in cars and pcus

AM flows

Screen-line	Description	%Change Relative to Ref Case: SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	%Change Relative to Ref Case: SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	1.0%	-8.9%	2.9%	0.1%	-7.8%	1.1%
2	Glasgow Rd.	-5.6%	-11.5%	-5.9%	-2.8%	-10.2%	-2.6%
3	S. Gyle Broadw.	-1.6%	-21.1%	0.3%	-0.8%	-19.1%	0.5%
4	Calder Rd.	-0.7%	-12.6%	-1.0%	-1.4%	-11.3%	-1.0%
5	A720 Bab.Offslp	1.3%	-24.2%	0.3%	1.2%	-24.2%	0.3%
6	Lanark Rd.	0.0%	-5.8%	1.1%	-0.1%	-5.5%	0.8%
7	Dreghorn Link	2.7%	-8.4%	3.1%	2.6%	-6.9%	3.7%
8	Biggar Rd.	-2.1%	-8.9%	-3.2%	-0.2%	-8.9%	-0.8%
9	Burdiehouse Rd.	-3.5%	-23.3%	1.7%	-3.3%	-22.4%	1.6%
10	Lasswade Rd.	1.3%	-10.4%	-1.1%	1.2%	-12.3%	-1.0%
11	Gilmerton Rd.	-1.8%	-3.7%	-7.9%	-1.4%	-4.2%	-7.7%
12	Old Dalkeith Rd.	-1.1%	-30.1%	0.0%	-1.1%	-29.2%	0.0%
13	The Wisp	0.1%	-12.0%	-0.3%	-0.1%	-5.0%	0.0%
14	Whitehall Rd.	8.9%	-42.0%	24.4%	7.8%	-49.7%	21.4%
15	New Craighall Rd.	-1.2%	-50.2%	0.0%	-0.8%	-48.3%	0.0%
16	A1 - N. of NCH	-1.2%	-18.1%	-2.1%	-1.2%	-18.1%	-2.0%
17	Edinburgh Rd.	-1.8%	-11.8%	-5.2%	-1.4%	-11.0%	-3.0%
	From West (S 1-6)	-1.6%	-12.3%	-0.8%	-1.0%	-11.0%	-0.4%
	From South (S 7-11)	-1.1%	-12.5%	-1.2%	-0.6%	-12.2%	-0.6%
	From East (S 12-17)	-0.9%	-24.4%	-1.1%	-0.8%	-23.2%	-0.9%
	TOTALS	**-1.3%**	**-15.9%**	-1.0%	**-0.9%**	**-14.8%**	**-0.6%**

OP flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	-0.1%	-4.9%	-0.7%	0.8%	-4.4%	0.2%
2	Glasgow Rd.	-5.4%	0.1%	-2.6%	-4.1%	0.8%	-1.9%
3	S. Gyle Broadw.	-0.8%	2.6%	-1.9%	0.5%	2.6%	-0.6%
4	Calder Rd.	1.3%	1.1%	-0.7%	1.3%	0.9%	0.0%
5	A720 Bab.Offslp	2.8%	2.4%	1.0%	0.5%	3.2%	-2.2%
6	Lanark Rd.	0.1%	-2.1%	-1.0%	0.2%	-1.9%	-1.0%
7	Dreghorn Link	0.4%	5.8%	0.0%	0.7%	6.2%	0.0%
8	Biggar Rd.	0.4%	-3.1%	1.5%	2.5%	-2.3%	3.5%
9	Burdiehouse Rd.	-0.2%	-7.8%	-0.2%	-0.2%	-7.1%	-0.2%
10	Lasswade Rd.	-0.6%	-14.8%	1.6%	-0.7%	-10.7%	1.5%
11	Gilmerton Rd.	0.3%	0.3%	0.6%	0.2%	-0.4%	0.5%
12	Old Dalkeith Rd.	-0.6%	-2.5%	0.1%	-0.3%	-1.4%	-0.3%
13	The Wisp	-0.1%	1.7%	-0.5%	-0.2%	2.4%	-0.4%
14	Whitehall Rd.	3.0%	2.0%	0.5%	2.9%	1.9%	0.0%
15	New Craighall Rd.	0.8%	0.7%	-0.9%	0.4%	0.8%	-0.8%
16	A1 - N. of NCH	-0.8%	1.4%	-0.9%	-1.3%	0.4%	-0.8%
17	Edinburgh Rd.	0.1%	-6.6%	0.6%	0.4%	-3.8%	0.6%
	From West (S 1-6)	-1.5%	-1.0%	-1.4%	-0.7%	-0.6%	-0.8%
	From South (S 7-11)	0.2%	-2.4%	0.5%	0.7%	-2.1%	1.1%
	From East (S 12-17)	-0.2%	0.0%	-0.5%	-0.3%	-0.1%	-0.4%
	TOTALS	**-0.8%**	**-1.0%**	**-0.8%**	**-0.3%**	**-0.8%**	**-0.3%**

Inbound flow across outer ECCS cordon in 2021 in cars and pcus

AM flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	Final Package + ECCS (cars)	Final Package (pcus)	Reference Case + ECCS (pcus)	Final Package + ECCS (pcus)
		%Change Relative to Ref Case			%Change Relative to Ref Case		
1	Queensferry Rd.	-2.3%	-9.6%	1.9%	-1.4%	-8.0%	0.9%
2	Glasgow Rd.	-2.5%	-9.7%	-5.4%	-1.1%	-8.5%	-2.6%
3	S. Gyle Broadw.	-3.1%	-16.2%	-0.3%	-2.2%	-14.9%	0.2%
4	Calder Rd.	0.4%	-13.3%	-1.0%	-0.1%	-12.1%	-0.9%
5	A720 Bab.Offslp	-1.8%	-21.2%	0.1%	-1.4%	-21.1%	0.3%
6	Lanark Rd.	-0.2%	-4.1%	0.5%	-0.1%	-3.9%	0.4%
7	Dreghorn Link	5.4%	-3.4%	5.8%	5.3%	-2.3%	5.0%
8	Biggar Rd.	-3.0%	-8.5%	-3.7%	-1.1%	-8.4%	-1.8%
9	Burdiehouse Rd.	-3.8%	-19.5%	-1.9%	-3.7%	-18.8%	-1.9%
10	Lasswade Rd.	2.2%	-8.5%	-5.3%	2.0%	-9.6%	-5.0%
11	Gilmerton Rd.	-0.5%	-10.6%	-3.2%	-0.4%	-9.5%	-2.4%
12	Old Dalkeith Rd.	-2.3%	-27.5%	-2.1%	-2.2%	-26.7%	-2.2%
13	The Wisp	-0.3%	-16.8%	-1.4%	-0.1%	-8.6%	-0.9%
14	Whitehall Rd.	1.4%	-41.9%	18.9%	0.0%	-50.5%	17.3%
15	New Craighall Rd.	-2.1%	-48.9%	-3.7%	-1.8%	-47.6%	-3.1%
16	A1 - N. of NCH	-1.6%	-15.6%	-2.7%	-1.6%	-16.0%	-2.7%
17	Edinburgh Rd.	-3.0%	-12.4%	-6.5%	-2.0%	-9.5%	-4.3%
	From West (S 1-6)	-1.7%	-11.0%	-1.1%	-1.0%	-9.8%	-0.5%
	From South (S 7-11)	-0.8%	-11.2%	-1.9%	-0.3%	-10.8%	-1.4%
	From East (S 12-17)	-1.7%	-23.3%	-2.4%	-1.6%	-22.4%	-2.2%
	TOTALS	**-1.5%**	**-14.8%**	**-1.6%**	**-1.1%**	**-13.8%**	**-1.2%**

OP flows

Screen-line	Description	SITCoS Package (cars)	Reference Case + ECCS (cars)	SITCoS Package + ECCS (cars)	SITCoS Package (pcus)	Reference Case + ECCS (pcus)	SITCoS Package + ECCS (pcus)
1	Queensferry Rd.	-1.6%	-2.1%	-2.8%	-0.7%	-2.1%	-2.1%
2	Glasgow Rd.	-3.1%	0.7%	-2.6%	-2.0%	1.6%	-2.1%
3	S. Gyle Broadw.	0.7%	0.0%	1.9%	1.5%	0.1%	2.8%
4	Calder Rd.	1.7%	-0.1%	0.3%	1.7%	-0.3%	0.8%
5	A720 Bab.Offslp	0.6%	0.7%	2.4%	-0.9%	0.9%	0.4%
6	Lanark Rd.	0.1%	-2.4%	-0.6%	0.2%	-2.1%	-0.5%
7	Dreghorn Link	-0.2%	2.9%	2.2%	0.0%	3.0%	2.3%
8	Biggar Rd.	-0.4%	-0.4%	-1.0%	1.5%	0.3%	1.2%
9	Burdiehouse Rd.	-0.2%	-6.9%	0.5%	0.0%	-6.3%	0.6%
10	Lasswade Rd.	0.8%	-13.9%	0.9%	0.7%	-9.9%	0.7%
11	Gilmerton Rd.	-1.0%	-0.6%	1.0%	-1.2%	-1.0%	1.0%
12	Old Dalkeith Rd.	-0.4%	-3.3%	-1.0%	0.0%	-1.9%	-0.7%
13	The Wisp	0.4%	-0.6%	-0.2%	0.4%	0.0%	0.2%
14	Whitehall Rd.	2.9%	-3.0%	0.4%	2.6%	-3.4%	0.9%
15	New Craighall Rd.	1.3%	-1.6%	0.9%	1.0%	-1.6%	0.8%
16	A1 - N. of NCH	-0.2%	1.0%	-0.8%	-0.7%	0.2%	-0.8%
17	Edinburgh Rd.	-0.9%	-5.2%	-1.0%	-0.5%	-3.1%	-0.5%
	From West (S 1-6)	-1.0%	-0.7%	-1.2%	-0.3%	-0.3%	-0.8%
	From South (S 7-11)	-0.4%	-2.1%	0.6%	0.2%	-1.8%	1.2%
	From East (S 12-17)	0.1%	-1.0%	-0.5%	-0.1%	-1.0%	-0.3%
	TOTALS	**-0.6%**	**-1.0%**	**-0.7%**	**-0.2%**	**-0.8%**	**-0.3%**