This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

FORTH CROSSING BILL

POLICY MEMORANDUM

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INTRODUCTION

1. This document relates to the Forth Crossing Bill introduced in the Scottish Parliament on 16 November 2009. It has been prepared by the Scottish Government to satisfy Rule 9C.3.2(e) of the Parliament’s Standing Orders. The contents are entirely the responsibility of the Scottish Government and have not been endorsed by the Parliament. Explanatory Notes and other accompanying documents are published separately as SP Bill 33–EN.

2. This Memorandum sets out the objectives of the Bill, describes the proposed scheme which the Bill facilitates, documents the existing and potential problems with the Forth Road Bridge, reviews alternative solutions considered by the Scottish Ministers, provides the wider policy context for the proposed scheme, describes the procurement process and documents the extensive consultation undertaken to inform the proposed scheme’s development.

3. The Memorandum also identifies direct and indirect effects of the Bill’s proposals on a range of parties and interests. A bibliography of all publicly available documentation either referred to within this memorandum or produced in support of the proposed scheme is provided in an annex.
Summary

The Forth Road Bridge has been an essential part of the national road infrastructure for over 45 years. It is vital to the economy of Fife, an essential link for the East Coast Corridor and crucial to the connectivity of Fife and beyond.

The Forth Road Bridge now carries six times the traffic volumes it originally carried and the weight of individual heavy vehicles has also increased. The bridge suffers a number of operational shortcomings (including susceptibility to restrictions and closures during strong winds, and a lack of hard shoulders to provide resilience). Additionally, it requires an extensive programme of maintenance which is disruptive and costly.

The main suspension cables of the bridge are showing significant signs of deterioration as a result of corrosion. The rate of deterioration, as assessed at the latest inspection, suggests that restrictions on Heavy Goods Vehicles using the bridge may need to apply from as early as 2017. Though the suspension cables can be repaired the work to replace them would be a very major undertaking and would cause sustained and significant periods of disruption.

In 2007 the Scottish Ministers, recognising the severe economic impact of closure of the bridge or lane restrictions or restrictions to traffic, proposed, after consideration of a range of options, the construction of a new bridge to the west of the Forth Road Bridge.

A technical assessment was undertaken of the capability of the Forth Road Bridge which concluded that, if the deterioration is stabilised, it could support the reduced road loading of public transport (including, in the future, trams), pedestrians and other specified users.

In December 2008 the Scottish Ministers announced that the Forth Road Bridge would operate as part of a public transport corridor alongside the Forth Replacement Crossing, which would carry general permitted traffic. Since that date further detailed work, informed by consultation with the local community, has been undertaken to refine the proposed scheme.

The critical importance of the Forth Replacement Crossing is recognised by its inclusion within the current National Planning Framework for Scotland, which is used to designate certain projects as national developments. Designation is the mechanism for confirming the need for these developments in Scotland’s national interest.

The Bill seeks to obtain authorisation, one, for that which is necessary to ensure that there is an effective replacement of the existing functionality of the Forth Road Bridge in regard to general traffic and, two, for certain works and road designation powers related to the continuing use of the Forth Road Bridge as part of a public transport corridor by means of the provision of bus lanes and access routes. Those two elements (the replacement bridge and the public transport access), in unison, constitute the proposed Managed Crossing Scheme as announced by Ministers to the Parliament in December 2008.

The proposed scheme will provide a continuing and reliable transport link and safeguard the economy, particularly of the east of Scotland.
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Map 1 – Proposed Scheme
OBJECTIVE AND SOLUTION

The Bill

4. The policy objective is to provide, in the light of uncertainties about the future availability of the Forth Road Bridge, a continuing and reliable primary road link between Edinburgh and the Lothians and Fife and beyond in order to safeguard the economy, particularly of the east coast of Scotland.

5. To achieve that objective the Bill seeks the power to construct and operate a new bridge over the Firth of Forth to the west of the Forth Road Bridge. The new crossing will carry general permitted classes of road traffic (such as cars, vans and lorries) thus enabling the Forth Road Bridge to continue to operate on a restricted basis for public transport, pedestrians and other specified users.

6. Additionally the Bill seeks all other necessary powers for the proposed scheme (see Map 1) which comprises:
   - the creation of new roads and upgrading of existing roads and junctions;
   - changes to the designation and responsibility of ownership of existing roads to facilitate the implementation of Intelligent Transport Systems (in particular, Variable Speed Limits); and
   - the compulsory purchase or where appropriate occupation of land necessary to give effect to the proposed scheme.

7. The major works in respect of the proposed scheme are detailed in the Bill in a schedule as principal works. The schedule describes each required works element in relation to:
   - construction of a new crossing;
   - construction of new roads (including connections with existing roads);
   - improvement of existing roads; and
   - construction of new means of access or rights of way.

8. To facilitate the implementation of the works the Bill also provides for the stopping up of lengths of some roads, accesses and other rights of way where they cross or are on the route of the proposed scheme.

9. In addition, the Bill enables the Scottish Ministers to construct miscellaneous works or do other things that are required ancillary to or in consequence of the scheduled works. In the Bill, the works that enable these miscellaneous things to be done are called “the ancillary works” and include for example such things as landscaping or other environmental mitigation, provision of

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1 The proposed bridge and road network of the proposed scheme are shown in bold.
2 see Information Box 1 (paragraph 23).
3 ‘stopping up’ a road is a technical expression for closing the road to traffic and terminating public rights of way over it.
Intelligent Transport Systems\(^4\) and the creation of site compounds. A description of the type of ancillary works is contained within the Bill.

10. All the other powers in the Bill are required in connection with the works. In particular, the Bill grants compulsory purchase powers. This ensures that the Scottish Ministers will be able to acquire the land or rights in land that are required for the works to be constructed and operated.

11. In the absence of seeking statutory compulsory purchase powers there could not be certainty of being able to acquire the necessary land. Even if the owners of all the relevant property interests were prepared to sell, without compulsory purchase powers there would be no way of preventing them from demanding prices in excess of a fair market value, effectively demanding a premium for the proposed scheme. Without compulsory purchase powers there would therefore be no certainty that the proposed scheme could be provided within a reasonable time and budget.

12. The Bill must be read by reference to the documents referred to in it, namely the Parliamentary plans, the Parliamentary sections, the Book of Reference and the Environmental Statement.

13. The Parliamentary plans show the lands to be acquired or otherwise used, the works and facilities to be constructed and (in some cases) the uses to be made of certain areas. The Parliamentary sections provide additional explanation of the proposed scheme by showing illustrative cross-sections and longitudinal sections of scheduled works.

14. The Book of Reference lists the owners, lessees and the occupiers of all lands which may be compulsorily acquired or used or who have interests in any land or water in or over which rights would be acquired or extinguished, or interests in the rights that would be acquired or extinguished. The identification and process of notification of owners, lessees and occupiers is contained within a Heritable Interests Statement which also accompanies the Bill.

15. The Environmental Statement sets out the beneficial and adverse environmental impacts likely to arise from the construction and operation of the proposed scheme and where appropriate sets out proposed mitigation measures designed to prevent, reduce or if necessary offset significant environmental impacts.

16. The Environmental Statement incorporates a Code of Construction Practice (CoCP) which sets out a series of objectives and measures to be applied throughout the construction period by the Contractor to manage and operate the construction works, to maintain satisfactory levels of environmental protection and limit disturbance from construction activities. These measures include arrangements to be taken account of in the management, design and construction of the proposed scheme to control the material impact of construction in so far as it may affect the natural environment and the environment, amenity and safety of local residents, businesses and the public in the vicinity of the construction works. The CoCP also explains how

\(^4\) Intelligent Transport Systems are explained at paragraph 23 and Information Box 1.
the public and other stakeholders will be consulted and informed during construction of the proposed scheme.

17. To enable the proposed scheme to operate effectively, orders, such as traffic regulation orders in respect of the operation of the Intelligent Transport Systems and public transport links, will be required. These orders will be pursued by means of existing legislation.

The Proposed Scheme

18. The proposed scheme which the Bill facilitates is sought is the culmination of a rigorous technical assessment (as set out in paragraphs 51 to 84), informed by extensive engagement and consultation (as detailed in paragraphs 165 to 223).

19. The new bridge will be a cable-stayed structure with three single column towers, windshielding and a single deck carrying a motorway of two general lanes and hard shoulders in each direction. Windshielding on the new bridge will protect the crossing from the effects of wind and provide a more reliable corridor for wind susceptible vehicles. The hard shoulders on the new bridge will ensure that breakdowns, incidents and any maintenance works do not cause the congestion which is currently experienced on the Forth Road Bridge, which has no hard shoulder. They also provide the flexibility to carry public transport should it be required in the future, carry traffic during maintenance activities and carry buses relocated from the Forth Road Bridge during the periods of high winds.

20. South of the new bridge, a dual carriageway, designated as motorway southwards to a new junction onto the A904, will be constructed connecting roads which link to the A90 and thereby to the M9 in the south by making use of the recently completed M9 spur. An enhancement at Junction 1a of the M9 will permit full directional access to and from the M9 to the M9 spur. Providing a west facing slip road will allow greater choices and opportunities to West Lothian, Falkirk and the upper Forth Valley. Eastbound, the revised two lane slip road from the M9 spur will join the lanes provided on the M9 to form a four lane carriageway with hard shoulder. The westbound approach to Junction 1a from Newbridge will be improved by the addition of an auxiliary exit lane from the River Almond bridge.

21. North of the Forth, a motorway dual carriageway will be constructed connecting roads to and from the new bridge with the M90/A90, with junction enhancements at Ferrytoll and road widening between this junction and Admiralty Junction as well as a realignment of a local road to North Queensferry. The improved junctions will protect and promote access to development areas of Fife.

22. The new route between South Queensferry Junction and Admiralty Junction, including the crossing, will be classified under the Bill as a motorway. To preserve certain use rights attaching to the A90 to the east, the section between Scotstoun and the new South Queensferry Junction will be a special road[^5] to match the requirements of the traffic permitted to use the A90

[^5]: The term a special road is used to describe a road which is prescribed for the use of certain classes of traffic.
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to the east. It will nevertheless be constructed to a standard suitable for upgrading, if required, at a later date to a motorway. Once new roads are completed non-motorway traffic on the A90 travelling westwards will need to divert to the local network at the South Queensferry Junction.

23. In preference to increasing the extent of road construction and refurbishment, Intelligent Transport System (ITS) technology will be deployed along the route from the M90 Halbeath Junction over the crossing to the M9. This will improve traffic flow, reduce congestion and improve road safety. ITS can operate on roads under existing legislation through the application of traffic orders made by the Scottish Ministers and therefore the Bill only seeks to acquire the land and undertake the works necessary to provide the physical apparatus for the system. To facilitate the operation of ITS and provide for a single authority to maintain control over the full extent of road linking the M9 to the M90 the Bill provides for the transfer of local authority roads to the Scottish Ministers.

Information Box 1: How does ITS work?

Detailed traffic analysis using a micro-simulation model (one which models the behaviour of individual vehicles within the traffic streams) indicated that congestion being experienced on the A90 and M90 currently is being exacerbated by a series of traffic shocks caused by driver behaviour on the approaches to the closely spaced junctions and where traffic joined the main streams. These problems crystallised, but were not exclusive, at Ferrytoll Interchange for southbound traffic, and Echline Junction for northbound traffic.

ITS displays mandatory and informative instructions to drivers through overhead gantries on the main line and signals on the slip roads. It manages a number of facilities including variable speed limits on the main line and controls the rate at which slip road traffic can access the main line in relation to traffic conditions upstream and downstream of the junction (ramp metering).

Variable mandatory speed limits can help the flow of traffic in various ways. Reducing speeds in advance of a junction coming under pressure can slow the build up of density and the propagation of any resulting shock wave. Lower speeds also give drivers more time to assess manoeuvres they plan to undertake, and make those manoeuvres easier to execute. In this way lane changing on the approach to a junction can be assessed for necessity - problems are often caused by traffic bunching into the outside lane before a junction - and can be made without the need for spontaneous braking from following cars.

24. The proposed scheme provides for the construction of approximately 6.7 km of new road of motorway standard (of which the road over the new bridge comprises 4 km and the new mainline carriageway 4 km). Additionally, upgrades will be made to existing mainline

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6 The A90 to the east currently has restrictions preventing pedestrians and cyclists on that road. The new road between Queensferry Junction and Scotstoun which links with that road will apply, for consistency, similar restrictions.
carriageway. The maximisation of the existing road network consequently means that the proposed scheme will result in less impact on the environment, properties and communities.

25. The proposed scheme will improve the management of traffic, provide greater flexibility for routine maintenance works, permit incidents and accidents to be addressed without the consequential traffic disruption currently experienced and allow traffic to travel more safely and smoothly. The scheme, however, will not provide a step change increase in the capacity of the route: increased travel demand for movement across the Forth will need to be met by improved public transport.

26. The existing Forth Road Bridge will consequently become a dedicated public transport corridor for buses and taxis together with pedestrians, cyclists and motorcycles (of a capacity of less than 50cc). This will be achieved under other, existing legislation. Pedestrians, cyclists and motorcycles (less than 50cc) will not be permitted on the Forth Replacement Crossing due to its motorway designation. Restrictions will be applied to ensure that only authorised classes of vehicles may access the Forth Road Bridge. Those restrictions will only come into force on the opening of the new bridge and will be taken forward under traffic regulation orders at that time. Accordingly, the Bill makes no provision for the restrictions. Though this public transport corridor will be dedicated initially to buses and taxis it does have the potential, if required, to be adapted to carry additionally a tram-based light rapid transit system and to carry other economically sensitive classes of traffic proscribed from the motorway by arrangement and outwith the peak periods as currently occurs.

27. Learner drivers will not have access over the Forth at Queensferry and trips would need to be completed by the attending qualified driver, or by other routes. It is not considered that the estuarial crossing is an essential part of learner drivers’ training experience.

Public Transport Measures

28. Direct dedicated road links for public transport will be provided between the Forth Road Bridge and the upgraded Ferrytoll Junction. South of the Forth Road Bridge the existing slip roads and Echline Junction will be retained for public transport. A new dedicated busway will link the southbound slip road south of the Echline Junction to the existing bus lane eastbound on the A90. For A90 traffic from Edinburgh, a busway off slip will connect to the A8000 by way of a bus priority signal installation. Buses will then approach the Forth Road Bridge by way of the A8000, upgraded to ensure that the buses are not delayed by congestion, and the Echline Junction. The busways will be constructed under powers granted by the Bill.

29. Improvements will be made to the existing park and ride at Ferrytoll as part of the junction upgrading. The capacity for car parking has already been increased to 1,000 spaces, however the facility is also becoming a significant interchange point between local bus services and longer distance routes. As a result of the impact of the work to improve the capacity and operation of the Ferrytoll Junction gyratory system the access arrangements at the park and ride site will need to be altered. Bus and car access will be segregated, and at the same time the bus circulation system will be improved and extended to facilitate bus loading and waiting and passengers moving between services.
30. South of the Forth an opportunity was identified to enable a new park and ride site to be placed on the redundant A90 carriageways at Echline Junction once the proposed scheme is completed in 2016. The potential for this facility has been removed from further consideration in relation to the proposed scheme and may if appropriate be considered at a later stage by the local authorities and SEStran.

31. These provisions and opportunities within the proposed scheme will support and form part of further improvements to rail services, park and ride proposed schemes and a light rapid transport proposed scheme between Fife and Edinburgh. These schemes stand to be developed within the implementation of the Strategic Transport Projects Review decisions which were announced to the Parliament by the Minister for Transport, Infrastructure and Climate Change on 10 December 2008.

### Information Box 2: What impact could modal shift achieve?

As a consequence of public transport support and priority, those travellers who do not need to drive in single or low occupancy cars will be encouraged to transfer to public transport. Those changing to rail will be removed from the road network. Those changing from car to bus will reduce the aggregate volume of vehicles from the road bridges, since a bus can carry up to 50 transferring car occupants. Whilst the total percentage of traffic changing to bus may, initially, be low, what is important to reducing congestion at the crossing and the surrounding road network is the number of transfers undertaken at peak times. In this way, ten new morning peak hour buses from Fife into Edinburgh or other key destinations could, for example, remove 500 cars from the southbound peak hourly flow. While this would be around 1% of the daily southbound flow, it would be around 10% of the critical peak hour southbound morning flow and bring significant congestion relief along the A90.

32. A synopsis of public transport measures being taken forward are listed in Figure 1 below:

#### Figure 1: Public Transport Measures

<table>
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<tr>
<th>Forth Replacement Crossing (FRC) - Bus priority measures</th>
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<tr>
<td>• Dedicated public transport corridor over the existing Forth Road Bridge;</td>
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<td>• Dedicated bus links between Ferrytoll and the existing Forth Road Bridge;</td>
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<tr>
<td>• Dedicated free flow bus only link southbound between Echline Junction and the A90;</td>
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<tr>
<td>• A dedicated northbound bus only link from the A90 to the A8000;</td>
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<tr>
<td>• Bus priority northbound on the A8000 through Ferrymuir and Echline Junctions; and</td>
</tr>
<tr>
<td>• Dedicated use of the wide hard shoulders over the Forth Replacement Crossing during periods of high winds or restrictions on the Forth Road Bridge.</td>
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<tr>
<th>FRC - Park and Ride Access Improvements</th>
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<tr>
<td>• Improved access and operational characteristics to Ferrytoll Park and Ride site; and</td>
</tr>
<tr>
<td>• Priority for buses accessing Ferrytoll Park and Ride through Ferrytoll gyratory</td>
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</tbody>
</table>

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Maintenance

33. The proposed scheme with the existing bridge dedicated to public transport and the new bridge carrying general transport raises issues for the future maintenance, management and operation of the two bridges.

34. There is, however, no pressing operational requirement to make an immediate decision on maintenance, management and operation options since the maintenance operator does not need to be identified until 2013 in order to provide sufficient time prior to completion of the bridge in 2016 to allow for the procurement of services and the exchange of information/knowledge between the constructor and the maintenance authority. The role that the Forth Estuary Transport Authority (FETA), with its considerable bridge management experience, skilled workforce and availability of physical resources, might play in respect of the new bridge will be a consideration within the assessment of options.

THE FORTH ROAD BRIDGE

35. The following chapter provides a review of the issues that have given rise to the need for the proposed scheme.

36. The operational and condition problems of the Forth Road Bridge, including the measurable deterioration in the strength of the main suspension cables, means that the proposed scheme is not elective. The cable deterioration generated uncertainty that the bridge would be available in the future. Repairs or refurbishment of the bridge have been shown by the bridge operator, FETA, to have a severe economic impact particularly on the east of Scotland if the bridge were to be closed or even severely restricted for a period of time. The proposed scheme therefore, as characterised in economic terms, is a distress purchase: it is necessary.

History

37. The Forth Road Bridge was opened in 1964, some 45 years ago, with a design anticipating a life of 120 years supported by a managed programme of maintenance and replacement of worn out components. In its early years it carried around 4 million vehicles per year; traffic count data confirm that it now carries around 24 million a year, equivalent to nearly 66,000 vehicles each day. Traffic projections indicate that this could rise on current planning projections to nearly 34 million a year or 92,000 vehicles each day by 2017.

38. The Forth Road Bridge Joint Board maintained the bridge from its opening to 2002 when it was replaced by the Forth Estuary Transport Authority (FETA), under the Transport

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7 Forth Estuary Transport Authority - Costs and Economic Impact of Main Cable Replacement (news release) - February 2008 - http://www.feta.gov.uk/index.php?option=com_content&task=view&id=186&Itemid=65
8 Forth Replacement Crossing DMRB Stage 3 Scheme Assessment Report – November 2009 – www.forthreplacementcrossing.info
9 FETA is governed by a board which consists of Councillors from City of Edinburgh Council, Fife Council, Perth and Kinross Council and West Lothian Council, and a Chief Executive, Chief Engineer and Bridgemaster, Treasurer, Clerk and Solicitor and Monitoring Officer. http://www.feta.gov.uk/
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(Scotland) Act 2001. Although well maintained throughout its 45 year existence, the bridge now shows signs of deterioration with climatic influences, weather and increased volume (and weight) of traffic all having an effect. Several capital maintenance projects have been undertaken over the years to replace, strengthen and improve elements of the structure in an attempt to mitigate against deterioration, traffic loading, shipping impact and changes in international design regulations. The work undertaken has included the strengthening of viaduct box girders, main towers and wind bracing, hanger replacement and the construction of pier defences. Maintenance of the main suspension cables has also been undertaken, with regular external inspections having been carried out.

Existing and potential problems

39. In 2004, FETA became the first major suspension bridge operator to implement new industry guidelines for internal inspection of parallel wire suspension cables. This inspection revealed serious corrosion resulting in a loss of strength of about 8% and the possibility that Heavy Goods Vehicle (HGV) restrictions might need to be introduced as soon as 2013, with further restrictions within five years to extend the life of the bridge. In order to monitor the rate of deterioration acoustic detection equipment has been installed capable of identifying individual wires breaking.

40. The consequences of this assessment were considered by the Scottish Ministers who commissioned, first, a check of the findings, and subsequently, a study into how the loss of the Forth Road Bridge could be compensated by a replacement crossing. The seriousness of the loss also led to the inclusion of the replacement crossing as a national development within the National Planning Framework 2, which has been subsequently endorsed by the Parliament.

41. Since 2006, acoustic monitoring has detected further new wire breaks within the individual wires that make up each cable and has confirmed that the problem is ongoing. A second inspection carried out in February and March 2008 indicated that the cables had lost about 10% of their strength, but may be deteriorating more slowly than previously feared. The inspection indicated that with the assessed rate of deterioration weight restrictions to maintain a prudent factor of safety might now more likely be considered at a later date, between 2017 and 2021 within an overall window of 2014 to 2021.

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11 When the bridge opened the maximum weight limit of HGV’s was 22 tonnes and this has now risen to 44 tonnes. On a typical day in 2004, 180,000 tonnes crossed the bridge with 50% being derived from vehicles over 7.5 tonnes. Due to the increased volume of traffic, increased weight of HGV’s, and the introduction of high pressure single tyres on HGV’s, which replaced twin wheels on trailer axles, are applying increased stress on the surfacing which also leads to more rapid deterioration of the surfacing.
42. When constructed, the main cables were designed with a factor of safety of 2.5, that is the ultimate breaking load of the wires within the cables was 2.5 times the loading for which they were designed. This factor of safety was set at this level so that a range of unquantifiables associated with the design, material properties, construction, maintenance and operation would not compromise the safety of the structure. It is not possible to determine precisely at what point the bridge would be compromised, but engineers would wish to keep the factor of safety of the cables above 2.0 in the short term, representing a reduction in strength of around 19% from their condition as constructed, and would wish to see the factor of safety restored to 2.5. This could only be done by replacing or augmenting the cables or by reducing the load carried. However, as 86% of the loading in the cables is due to the weight of the structure itself, this only leaves 14% of the total load, made up mainly of traffic loading, that can be reduced.

43. A dehumidification system is currently being installed on the main cables and due to be completed by the end of 2009, which aims to slow or prevent further corrosion by reducing the relative humidity within the cables to less than 40%. A third inspection will be carried out in 2011/12 or 2012/13 depending on the rate of drying of the cables, to provide the first indication of the effectiveness of dehumidification on the rate of cable deterioration.

44. However, success in reducing moisture in the cable, in itself, may not be sufficient to allay fears about the condition of the cables, and a programme of monitoring the cable condition will need to continue into the foreseeable future.

45. Studies have shown that replacement of the main cables is technically possible at a cost of £122 million for the engineering works. It should be noted that this is a cost at year 2007 and does not include optimism bias. These works would cause sustained and significant disruption to traffic over a period of 7 to 9 years with notional travel time delay costs of the order of £650,000 per day, if a carriageway were to be closed on the bridge on a weekday. A detailed assessment has been independently carried out for Transport Scotland which has confirmed the figures as being indicative of the costs of carrying out the work.

46. Without an alternative crossing in place FETA has indicated, from an assessment of existing businesses, that economic output is likely to fall by around £1 billion, a drop in turnover in excess of £1.3 billion and a loss of around 3,200 jobs, some of which may be permanent. The

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17 Forth Estuary Transport Authority Augmentation - Replacement of Main Cable - June 2007 – Chapter 6 - http://www.feta.gov.uk/
19 Transport Scotland is the national transport agency for Scotland. It is an agency of the Scottish Government and is accountable to the Scottish Parliament and the public through the Scottish Ministers.
economic effects would impact widely, but be most strongly felt in Fife\textsuperscript{20} with some parts having 20-40\% of residents working in Edinburgh\textsuperscript{21}.

47. In addition to this most recent concern, the bridge suffers a number of operational problems and a wider range of maintenance problems. The bridge carries a high volume of traffic on dual, two lanes of carriageway. There are no hardshoulders so that if an incident or accident occurs, or when one carriageway needs to be closed for the extensive programme of ongoing maintenance, then substantial congestion and delays occur, with the associated economic cost and increase in generated carbon. It is not possible to install comprehensive windshielding which results in the need to close the bridge in strong wind conditions, and to prohibit wind susceptible vehicles during intermediate conditions. In the financial year 2007-2008 restrictions applied for a total of 207 hours and the bridge was closed to all traffic for nearly 18 hours\textsuperscript{22}. The existing bridge is also susceptible to spontaneous incidents, and the bridge has been closed for security on several occasions over the last few years as a consequence of unauthorised individuals climbing the suspension cable.

48. Maintenance obligations can be divided into those which are a result principally of the weight and wear from heavy vehicles, and those which arise independently from the traffic loading applied. In the former are included the routine surfacing replacement which currently is required on an 8-9 year cycle, deterioration of the stringer beam “half joints” which support the orthotropic deck, deterioration of the main trusses, the adequacy of the parapets for collision loading, and the wear of the main expansion joints, for which a potentially disruptive £13 million replacement contract due to be awarded in 2009 was deferred until the availability of the Forth Replacement Crossing. There are significant maintenance obligations that will need to be met, even in the absence of demanding loading conditions, and these include the strengthening of the suspended span truss, replacement of the viaduct bearings and pier repairs, the routine repainting of the trusses, and the need for investigation of the main cable anchorages.

Conclusion

49. In conclusion, it is clear that the Forth Road Bridge cannot be guaranteed to continue to provide the levels of service needed to support social and economic traffic on the important transport corridor across the Forth into the future.

CONSIDERATION OF ALTERNATIVES

50. A study investigating the feasibility and location of a new crossing across the Forth was undertaken in the early 1990s to provide additional vehicular cross-Forth capacity. Known as

\textsuperscript{20} Forth Estuary Transport Authority - Costs and Economic Impact of Main Cable Replacement - February 2008
http://www.feta.gov.uk/index.php?option=com_content\&task=view\&id=186\&Itemid=65


\textsuperscript{22} FETA annual reports cover April to March of each year and include information about bridge closures and diversions. In year 2006-2007, vehicles were diverted over a total period of 253 hours and the bridge was also closed to all traffic for 6 hrs 55 mins during the evening of 31/12/06-01/01/07 due to extremely high winds. In 2007-2008 diversions occurred over 207 hours with total closure applying for 18 hrs. To August 2009 diversions occurred over nearly 129 hours. The bridge was also closed to all traffic for 2 hrs 25 mins on 23/03/08 due to an overturned vehicle carrying flammable liquids.
Setting Forth, the study findings generated much information about potential options for the provision of an additional crossing, but were not implemented.

**Forth Replacement Crossing Study**

51. In 2006 the Scottish Ministers commissioned the *Strategic Transport Projects Review* (STPR)\(^{23}\) to identify nationally strategic interventions to be implemented beyond 2012 and which supported the objectives of the National Transport Strategy. The emergence of the evidence from the first inspection of the cables of the Forth Road Bridge at this time necessitated an early piece of work for the STPR which was the Forth Replacement Crossing Study (FRCS). This work aimed to identify the form, function and location of any potential replacement to the existing Forth Road Bridge. The study methodology followed closely the Scottish Transport Appraisal Guidance (STAG)\(^{24}\).

52. A number of reports describing the work undertaken in the Forth Replacement Crossing Study were published in 2007\(^{25}\). The reports are as follows:

  Report assessing the existing and forecast future conditions of the transport network within the corridors of Forth Road and rail bridges.

  Report identifying the level of performance expected from the road network and identifying gaps and shortfalls to be addressed.

  Report identifying options for potential replacement crossing.

  Assessment of options using the Scottish Transport Appraisal Guidance.

  Report drawing together the key findings from Reports 1-4 including publication of a separate Non-Technical Summary report.

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http://www.transportscotland.gov.uk/reports/publications-and-guidance/road/j10194c-00.htm

\(^{24}\) Scottish Transport Appraisal Guide (STAG) published September 2003
http://www.transportscotland.gov.uk/stag/home

This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

53. The FRCS set out an analysis of current and future conditions on the transport network within the Forth area and having identified eight transport planning objectives for the study\textsuperscript{26}, a number of potential options were generated\textsuperscript{27} and subjected to an initial sifting process\textsuperscript{28}. From this sifting the provision of a replacement crossing was considered in five cross-Forth corridors\textsuperscript{29}.

54. Appraisals of the options concluded that the following proposals, in three of the five cross-Forth corridors, should be taken forward for further development:

- West of Rosyth – tunnel (twin bore tunnel).
- East of Rosyth/West of South Queensferry – bridge (either suspension bridge or a cable-stayed bridge) or tunnel (twin bore tunnel).
- East of South Queensferry – tunnel (twin bore tunnel and immersed tube tunnel).

55. The technical implementability, or challenges which would be anticipated in constructing each option were considered in detail and identified a greater number of technical risks and concerns for the three tunnel options:

- the ground conditions of the Forth impact on the size of tunnel boring machine which may be used for twin bore tunnels and means that the provision of a continuous hard shoulder would not be available within the tunnel;
- any incorporation of multi-modal options would require a third tunnel;
- assessments indicated that a twin bore tunnel is likely to generate approximately 4 million tonnes of spoil which would require disposal;
- substantial, intrusive, ventilation shafts would need to be on both sides of the Forth and these would need to be located within the unique setting of the Forth;
- there are restrictions on the types of goods that can be transported in tunnels that impact on their operational effectiveness;
- in respect of time-frame estimates indicated the construction of twin bored tunnels could take 7.5 years; and
- at a higher cost (up to £2 billion) than a bridge and with greater cost uncertainty (since ground conditions can only ever be fully understood as the tunnel progresses).

\textsuperscript{26} Forth Replacement Crossing Study Report 5 Chapter 3.4 - 

\textsuperscript{27} Forth Replacement Crossing Study Report 3 Chapter 3 - 

\textsuperscript{28} Forth Replacement Crossing Study Report 5 Chapter 4.3 - 

\textsuperscript{29} Map Indicating Possible Corridor Options - 
http://www.transportscotland.gov.uk/files/images/Projects/ForthReplacement/MAP_five_crossing_corridors.jpg
56. Consideration of the construction of an immersed tube tunnel whilst presenting some advantages over bored tunnels also indicated a number of particular challenges. Unlike other tunnelling techniques this approach requires prefabrication of sections followed by the floating of the sections in line before lowering them into place. There is therefore greater certainty of approach especially since a tube can avoid technically challenging geology on the crossing. There are, however, additional environmental constraints placed on this method. Locating the tube within a trench would require significant dredging and disturbance of sediments, as well as the requirement to create large cofferdams\(^{30}\). Engineering challenges in transitioning from the tube to a tunnel so as to link with the shore line and ultimately the road network made the option less attractive than a bridge.

57. Though a suitable location for casting the immersed tube tunnel could be sourced locally it would require substantial modification which impacts on cost and delivery time.

58. In terms of operational effectiveness, the immersed tube tunnel would also be placed under the same operating constraints as would apply to a conventional bored tunnel. Though less costly to construct than bored tunnels the immersed tube tunnel option proved more costly than those with a bridge.

59. The analysis of the two bridge options concluded that there were considerable advantages of a cable-stayed bridge over a suspension bridge. These advantages included:

- the individual replacement of cables with minimal disruptions to road users;
- no requirement for dehumidification of cables;
- the design minimises the area requiring painting and maximises ease of maintenance access;
- cheaper to construct;
- delivered 6 months earlier; and
- use of cable-stayed techniques would avoid the need for complex foundations on the landfalls.

60. The FRCS assembled all the available appraisal together and recommended\(^{31}\) that a cable-stayed bridge located east of Rosyth and west of South Queensferry be taken forward, on the basis of being the best overall performing option assessed, as the proposed scheme.

**Ministerial announcement 2007**

61. The findings of the FRCS culminating in the selection of a cable-stayed bridge were the basis for the decision of the Scottish Government, announced by the Cabinet Secretary for Finance and Sustainable Growth on 19 December 2007\(^{32}\):

\(^{30}\) A cofferdam (or coffer) is a temporary water-tight enclosure built in water and pumped dry so as to allow construction to be undertaken.

This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

“This....the Government has come to the view that the Forth Replacement Crossing should be a cable-stayed bridge with multi-modal capacity on a route slightly to the west of the existing Road Bridge.”

62. The Cabinet Secretary also announced that the replacement crossing was about more than just the crossing itself and stressed the importance of the road connections both to the south, where a link to the M9 would allow greater choices and opportunities to West Lothian, and to the north where the construction of improved junctions in Fife would protect and promote access to the development areas such as Rosyth.

63. The inclusion of multi-modal capacity (including public transport) would also provide opportunities for those who travel into and around Edinburgh and offer improved opportunities for links more widely between Fife, Edinburgh and the Lothians.

64. The Cabinet Secretary acknowledged on the 19 December 2007 that further development to progress and refine the chosen option would take place in the forthcoming year:

“Having taken the decision to build a bridge, work can now move forward on the legislative and procurement options for delivery: further announcements on the details of the bridge as well as the authorisation and procurement processes will be made during 2008.”

Road route options

65. Following the Parliamentary announcement, nine route options for the connecting roads were identified to link into the Forth Replacement Crossing: three road corridors to the north of the Firth of Forth, providing connections to the A90/M90 and six to the south of the Firth of Forth, providing a connection to the A90, M9 Spur and M9.

66. The route corridor options assessed were:

Northern Route Corridor Options

- North Corridor Option 1 – An online upgrade of the existing A90/M90 route corridor between Ferrytoll Junction and Halbeath Interchange.

- North Corridor Option 2 – An offline proposed scheme providing a new mainline carriageway between the proposed replacement bridge and Halbeath Interchange.

- North Corridor Option 3 – A combined option requiring the online upgrade of the A90 between Ferrytoll Junction and Admiralty Junction with a new section of offline carriageway being provided between Admiralty Junction and Halbeath Interchange.

Southern Route Corridor Options

- South Corridor Option 1 – A short offline section of new carriageway connecting the proposed replacement bridge to the A90 south of Echline Junction.

• South Corridor Option 2 – A new offline carriageway connecting the proposed replacement bridge to the M9 north of Winchburgh.
• South Corridor Option 3 – A new offline carriageway connecting the proposed replacement bridge to the M9 Spur northeast of M9 Junction 1a.
• South Corridor Option 4 - A new offline carriageway connecting the proposed replacement bridge to the M9 northwest of Winchburgh.
• South Corridor Option 5 – A new offline carriageway connecting the proposed replacement bridge to the M9 northwest of Winchburgh and to the M9 Spur northeast of M9 Junction 1a.
• South Corridor Option 6 - Similar to South Corridor Option 4 but with the alignment located slightly further west.

67. An initial assessment and sifting retained the three corridors to the north but reduced to three, the corridors to the south. The rejected options (South Corridor options 3, 4 and 5) were removed from further consideration on the basis that they did not fully meet the proposed scheme objectives:

• South Corridor Option 3: Residential property impacts, junction connectivity, design standards and safety.
• South Corridor Option 4: Presence of collapsed mine workings, cost and reduced economic benefits.
• South Corridor Option 5: Environmental impacts, presence of collapsed mine workings, cost and reduced economic benefits.

68. An assessment was undertaken as to whether combinations of corridor options, providing direct vehicular access from both the A90 and M9, would prove beneficial. The following combinations of feasible corridor options were considered:

• South Corridor Options 1 and 2.
• South Corridor Options 1 and 4.
• South Corridor Options 1 and 6.

69. As a consequence of the assessment South Corridor Option 1 and 4 and Option 1 and 6 were not progressed for further consideration due to the presence of collapsed mine workings, costs being substantially higher than the base South Corridor Option 1 and because they did not

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34 Forth Replacement Crossing Route Corridor Options Review, March 2009 – Chapter 1.2 http://www.transportscotland.gov.uk/reports/publications-and-guidance/road/j10724b-00.htm
provide a significantly greater level of service for traffic (e.g. M9 west traffic). South Corridor Options 1 and 2 in combination became known as Option 4a.

70. Following the initial assessment and sifting, the remaining route corridors were further assessed in greater detail in relation to engineering, environmental, transportation and cost considerations. This more detailed assessment led to the removal of one route corridor in the north (Option 3) and two route corridors in the south (Options 3 and 4a).

71. The remaining two options in the north (Option 1 and Option 2) and two options in the south (Option 1 and Option 2) were developed further and assessed in relation to the proposed scheme objectives and the engineering, environmental, sustainability, traffic and economic advantages/disadvantages associated with each. The assessment identified the preferred corridors as North Corridor Option 1 (upgrade of the existing A90/M90 route corridor between Ferrytoll Junction and Halbeath Interchange) and South Corridor Option 1 (new carriageway connecting the replacement bridge to the A90 south of Echline Junction).

72. In both instances, the selected north and south options had the engineering, cost, environmental and sustainability benefits associated with the maximisation of the use of existing infrastructure.

73. Following completion of the assessment a sensitivity check was undertaken on a further additional corridor option to the south of the Firth of Forth. This option which provided direct links to both the M9, and by way of a spur to the A90, required the closure of the recently completed M9 Spur, the removal of the Scotstoun Junction and the removal of the M9 Junction 1a. A new all movements junction would be required on the M9 northeast of Winchburgh providing direct access to the proposed replacement bridge. The option was ultimately discounted on the grounds of its greater environmental impact and its higher cost.

**Future Role of the Forth Road Bridge**

74. As mentioned previously, further information on the condition of the cables of the Forth Road Bridge emerged during 2008 as a consequence of the second internal inspection. The technical feasibility of replacing the cables was also confirmed by a report published early in the year by FETA.\(^{35}\)

75. Accordingly, a technical assessment\(^{36}\) of the capability of the Forth Road Bridge to retain some of the cross-Forth traffic and work alongside the Forth Replacement Crossing found that with the new bridge being designed to carry general permitted traffic and all heavy goods vehicles, a range of options for rail based light rapid transit public transport together with reduced road loadings could be considered for the existing Forth Road Bridge.\(^{37}\) The assessment noted that load reduction would mitigate the loss of cable strength that had already

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\(^{37}\) A tram, for instance, would reduce the road loading by being more controllable than HGVs (i.e. the timing of their passage would be regular whereas the number of HGVs can fluctuate).
occurred and extend the period before cable replacement or augmentation became necessary and that if the current dehumidification proposed scheme being undertaken by FETA is a success that work could be further deferred.

76. The technical assessment of the capability of the Forth Road Bridge concluded that it could support future public transport requirements and accommodate non-motorised users (pedestrians and cyclists). The opportunity to use the Forth Road Bridge in this way has allowed the development of an operationally flexible, narrower, replacement bridge of high quality at a significantly reduced cost.

Managed Crossing Scheme

77. The proposed scheme which takes into account the combined output from the DMRB Stage 2 Corridor Report\(^\text{38}\) and the assessment of the potential use for the Forth Road Bridge became known as the proposed Managed Crossing Scheme\(^\text{39}\). The key considerations arising from the scheme were that:

- Project planning work should be progressed to give further detailed consideration to the form and function of the junctions required and the extent of the road infrastructure improvements provided within the preferred corridors; and
- The Forth Road Bridge could be capable of adaptation for multi-modal use, including future tram-based light rapid transport, and it was determined that this would be taken forward as a planning assumption.

78. The proposed Managed Crossing Scheme therefore sought to provide approach roads to the new bridge, improve the existing junctions at Admiralty and Ferrytoll to protect and promote the developing area of Rosyth and to provide good quality connections for local communities. A new junction would be provided at South Queensferry, and Junction 1a on the M9 enhanced to facilitate new access to the bridge from West Lothian. The enhanced junction on the M9 would provide access not only to West Lothian but also the upper Forth Valley which is a significant betterment and offers the possibility to address HGV movement issues in south Fife by providing an alternative route.

Bridge design

79. In the light of the proposed Managed Crossing Scheme, bridge options were reconsidered and reviewed by Architecture + Design Scotland (A+DS). As it had been determined that the Forth Road Bridge could be modified for multi-modal use the replacement bridge design was adapted so as to comprise:

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DMRB stands for Design Manual for Roads and Bridges.

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- dual two lane carriageway with hard shoulder in each direction;
- wide hard shoulders to enable future hard shoulder running in times of maintenance or incidents, or for bus running in times of high winds on the Forth Road Bridge; and
- sufficient width of bridge deck to enable the rearrangement of the functions to provide a multi-modal corridor and dual two lane carriageway without hard shoulders. (This requirement was included to mitigate the small risk of the Forth Road Bridge proving unsuitable for multi-modal use due to future unforeseen circumstances).

80. A range of bridge deck and tower options were developed and considered against aesthetic, technical ease of construction and cost criteria. Two types of deck were considered:

- a single deck combined with either ‘H’ or ‘A’ or diamond shaped supporting towers
- a twin road corridor deck with a central mono-tower from which the cables would extend into a central corridor.

81. The latter option supported by A+DS was recommended to Ministers. In light of the fact that all the options were similar in terms of cost, the factors contributing to the recommendation were:

- a distinct and instantly recognisable structure;
- simplicity of construction within the shortest time period; and
- aesthetically, the most pleasing design complementary to the setting of the existing road and rail bridge.

Ministerial announcement 2008

82. On 10 December 2008 the Minister for Transport, Infrastructure and Climate Change announced details of the proposed Managed Crossing Scheme to the Parliament:

“Updated findings from the Forth Estuary Transport Authority have allowed us to consider the future of the existing bridge. We have concluded that it can be retained, alongside the new bridge, as a dedicated public-transport crossing as part of a managed crossing strategy. Sustainable public transport will be given priority on a dedicated public transport corridor across the existing bridge, with the option in the future to convert the existing bridge for light rapid transit, trams or guided buses. The existing bridge will continue to provide access for pedestrians and cyclists.”

Further developments

83. As a result of public exhibitions held in January 2009, subsequent dialogue with community councils and local authorities and ongoing engineering and technical studies a number of proposed scheme amendments were introduced and reported in June 2009\textsuperscript{41}. The key design changes were:

South Queensferry

- the South Queensferry Junction was moved further west to connect directly to the A904 Builyeon road at the western edge of South Queensferry;
- the embankment on the main carriageway to the south of the town was lowered;
- the junction between the A904 Builyeon Road and the B924 Bo’ness Road was changed from a roundabout to a T-junction;
- new north and south-bound slip roads to and from the A90 dedicated for use by public transport were added to the design; and
- the potential for park and ride facilities at Echline were removed from further consideration in relation to the proposed scheme (these may, if appropriate, be considered at a later stage by the local authorities and SEStran).

North Queensferry

- the northbound slip road onto the A90 has been redesigned to lead directly off the new roundabout at Ferrytoll and separated from Castlandhill Road; and
- the B981 from North Queensferry was redesigned to pass to the west of the Dunfermline Waste Water Treatment Works to connect directly to Ferrytoll Road.

84. Opportunities to further refine the design (within the land within the limits of deviation) exist as the contractor will be responsible for completing the detailed design. The final design may differ from the illustrative proposals that form the basis of the assessments reported in the Environmental Statement. The Bill, however, places a duty on the Scottish Ministers to do everything that is reasonably practicable to ensure that the environmental impact of any design changes is no worse than the residual impact identified in the Environmental Statement.

POLICIES AND GUIDING PRINCIPLES

85. A number of policies and guiding principles have been developed that have shaped how the proposed scheme will be managed and implemented and many of these have been reflected in the Bill.

86. The policy framework and the proposed scheme’s compliance with set objectives are described below. In overview, the objectives of the proposed scheme resonate with transport and

\textsuperscript{41} Forth Replacement Crossing: Public Information Exhibitions: Feedback & Outcomes Report - June 2009-

**Scotland’s National Transport Strategy 2006**

87. The strategic outcomes as set out in the National Transport Strategy are to:

- improve journey times and connections – to tackle congestion and the lack of integration and connections in transport which impact on our high level objectives for economic growth, social inclusion, integration and safety;
- reduce emissions – to tackle the issues of climate change, air quality and health improvement which impact on our high level objective for protecting the environment and improving health; and
- improve quality, accessibility and affordability – to give people a choice of public transport, where availability means better quality transport services and value for money or an alternative to the car.

88. The completion of the proposed scheme will ensure the provision of a reliable crossing, address carbon-producing congestion through the extension of hard shoulder provision and the implementation of ITS and provide a public transport corridor with the opportunity for further enhancement through the implementation of a tram-based light rapid transport system.

**National Planning Framework for Scotland 2 - 2008**

89. The proposed scheme is supported by National Planning Policy. Scotland’s National Planning Framework (NPF) is a non-statutory document published by the Scottish Government initially in 2004 and updated in June 2009 (NPF2). The NPF looks at Scotland from a spatial perspective and identifies key strategic infrastructure needs in order to guide development into the right places in Scotland to 2030.

90. The NPF2, scrutinised and debated by the Parliament in early 2009, identifies the current Forth Road Bridge as an essential part of the national road infrastructure and that loss of the road crossing would have very significant adverse economic impacts, both nationally and regionally. The NPF 2 designates the replacement crossing as a national development. That designation is the mechanism for establishing the need for the development in Scotland’s national interest.

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43 The National Transport Strategy is the product of consensus achieved through wide consultation with business, transport and wider interests, and the general public.


The SEStran Regional Transport Strategy

91. Following its establishment as a statutory partnership in 2006, the purpose of the South East of Scotland Transport Partnership (SEStran) is to develop and deliver a long term Regional Transport Strategy and take forward strategic transport improvements that support and improve the economy, environment and quality of life across south east Scotland.

92. The SEStran Regional Transport Strategy 2008-2023\textsuperscript{46} sets out a clear framework for the future direction of investment in, and management of, transport in the SEStran area. The strategy supports a sustainable solution to the problem of the deteriorating condition of the Forth Road Bridge and welcomes the commitment to a new crossing.

93. The strategy also highlights the opportunities presented by the new crossing:

“The additional crossing at Queensferry creates significant opportunities for the development of public transport in the area, both cross-Forth and in the bridgehead areas. SEStran will seek to use these opportunities to maximise public transport use in the corridor, in terms of bus, HOVs\textsuperscript{47}, guided bus and light rail networks.”

94. It should be stressed that the purpose of the Bill is to provide a new secure crossing across the Forth. Other means and mechanisms will be needed to take forward some of the public transport initiatives proposed in the SEStran strategy.

Local Transport Strategies

95. The Forth Estuary Transport Authority (FETA) Local Transport Strategy 2005\textsuperscript{48} recognises within its preface the need for an additional bridge:

“The new multi modal bridge will make a significant contribution to providing better facilities for public transport services including provision for the extension of the Edinburgh tram into Fife, being able to cope with increasing weights for goods vehicles as well as providing much needed flexibility to manage the maintenance of the existing bridge and minimise impacts of road works and diversions on cross-Forth travellers.”

96. The FETA Local Transport Strategy written in advance of the proposed Managed Crossing Scheme promotes the existing Forth Road Bridge as a dedicated public transport crossing, enabling buses and taxis (as high occupancy vehicles) to use specific pathways across the Forth. The strategy also provides for continued cross-Forth access for pedestrians and cyclists on the existing Forth Road Bridge. Multi-modal transport under the proposed scheme will therefore be supplied or allowed for by using both the existing and the new bridge in combination.

\textsuperscript{46} SEStran Regional Transport Strategy – Page 57 – Paras 5.5.3 - 5.5.5

\textsuperscript{47} HOV – High Occupancy Vehicles i.e. vehicles carrying two or more persons

\textsuperscript{48} FETA Local Transport Strategy http://www.feta.gov.uk/download/local_transport_strategy.pdf
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

97. **Fife Council Local Transport Strategy** (Aug 2006) advises that any “new crossing should integrate with the principles of efficient movement of numbers of people and therefore should favour high occupancy vehicles.” That strategy was also written in advance of the proposed Managed Crossing Scheme which, through its promotion of the existing Forth Road Bridge as a public transport corridor, enables buses (as high occupancy vehicles) to use dedicated pathways across the Forth.

98. **The City of Edinburgh Local Transport Strategy 2007-2011** recognises a number of major connectivity concerns including the need to maintain the regional connection across the Forth. The strategy also highlights a desire for a new crossing to allow for future tram use and “in a two crossing scenario both [bridges] should prioritise buses and high occupancy vehicles”. Under the proposed Managed Crossing Scheme bus priority will be provided by means of the existing bridge and dedicated pathways to and from the A90. The proposed scheme also allows for future provision of a tram-based light rail system across the Forth.

99. In summary, each of the local strategies recognises the importance of the crossing, the role of the existing bridge and need for consideration of complementary public transport measures. The broad thrust of these needs has been reflected within the proposed scheme which is designed to have the flexibility to support the development and implementation of these strategies as appropriate.

**Strategic Transport Project Review 2008**

100. The **Strategic Transport Projects Review 2008** (STPR) identifies a series of investment priorities for the strategic transport network which will benefit the whole of Scotland and deliver on priorities set out in the government’s Economic Strategy, the National Transport Strategy, the National Planning Framework and the Climate Change (Scotland) Act 2009. It identifies improvements to meet challenges from 2012 and beyond.

101. The STPR undertaken using an objective led, evidence based approach to appraise potential means of addressing transport issues is compatible with STAG methodology. This approach ensures that the Government’s priorities of a Wealthier and Fairer, Healthier, Safer and Stronger, Smarter and Greener Scotland are met and that investment is targeted on those interventions that most effectively support improving Scotland’s sustainable economic development.

102. The STPR was announced by the Minister for Transport, Infrastructure and Climate Change on 10 December 2008 at which he referred to the inclusion of the Forth Replacement Crossing as one of 29 major work package recommendations. Additionally, the Minister

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49 Fife Council Local Transport Strategy – Aug 2006  
http://www.fife.gov.uk/publications/index.cfm?fuseaction=publication.pop&pubid=EE533295-E7FE-C7EA-06337C13CDD4D75D  
53 Scottish Government Strategic Objectives - http://www.scotland.gov.uk/About/scotPerforms/objectives
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

confirmed the Government’s commitment to progress the crossing and a range of rail based interventions which directly and indirectly would benefit cross-Forth travel.

103. It is not intended that SPTR projects should be promoted by a common authorisation process. Even in relation to SPTR work package no 8 (strategic park and ride proposed schemes) individual elements will be the subject of individual local planning applications in the normal way. Similarly, there is not a requirement to depart from this principle to agglomerate those STPR measures around the Forth Estuary into a single process or import them into this Bill. To do so is not necessary and, given the differing stages of preparation of the various measures, could delay significantly the introduction and passage of the Bill for, and the delivery of, the replacement crossing.

Climate Change and Carbon/CO₂

104. The Scottish Government has a duty under the Climate Change (Scotland) Act 2009 to consider its proposals in relation to the output of carbon generated. Carbon considerations arise from the embodied carbon during construction and the change in carbon generated from the use of the road network.

105. The approach to scoping and development of the project has been influenced by the desire to minimise embodied carbon. This has led to the development of a proposed scheme which makes maximum use of existing infrastructure, reduces the scale of new construction and applies best practice during design and construction. As part of the sustainability appraisal, a carbon calculator has been used to assess the project’s carbon footprint. The embodied carbon assessment is not yet complete, but initial calculations indicate that it is likely to be in the order of 121,000 tCO₂. Final values are reported in the Sustainability Appraisal and Carbon Management Report.  

106. In relation to the operation of the asset, maximum use will be made of new technology to increase the efficiency of the network and reduce emissions related to congestion. Carbon emission from scheme operation, based on the outcome of traffic and air quality models, is reported in the Environmental Statement. In keeping with the majority of the detailed assessments reported in the Environmental Statement, the baseline against which the scheme effects are assessed is that of the network operating as normal, i.e. the substantial repairs, including Main Cable Replacement likely to be required for the Forth Road Bridge, are not included in the baseline. The increase in calculated CO₂ emissions produced by the proposed scheme against this baseline in 2032 is 20,317 tonnes, which represents 0.16% of total transport sector emissions in Scotland in 2007 (12.4 million tonnes). These figures are derived from strategic modelled traffic data using established Department of Transport methodology.

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56 The calculation of total emissions has been undertaken in accordance with the methodology detailed in the ‘Design Manual for Roads and Bridges Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 HA207/07 Air Quality’. Calculations were based on emission factors derived using the dataset incorporated in the DMRB worksheets (version 1.03c, July 2007). The underlying dataset is provided in the National Atmospheric Emissions Inventory (http://www.naei.org.uk/emissions/index.php).
Although small in an overall Scottish context, this increase does not contribute to the requirement in the Climate Change (Scotland) Act 2009 to reduce emissions by 42% in 2020 (interim target) and 80% by 2050. Therefore the increase in CO₂ as a result of the proposed scheme will require offsetting by greater reductions elsewhere in Scotland.

107. Further assessment was carried out to capture more fully the localised effect of stop start motoring conditions on the congested approaches to the Forth Road Bridge and the localised benefits to be derived from relieving these conditions. Findings from detailed local modelling using an alternative approach to emissions calculations indicate that during the congested morning peak period, increased CO₂ emissions from the additional distance travelled may be mitigated by reduced congestion that the proposed scheme will deliver relative to the baseline (Do-Minimum)

108. Consideration was also given to the environmental implications of Main Cable Replacement works (these are considered in Appendix 5.1 of the Environmental Statement). This includes an indicative assessment of the effect of these works on traffic emissions including CO₂. This detailed local assessment indicates that avoiding the need for cable replacement and the lengthy period of congested conditions associated with that work, would mean that total CO₂ emissions during the congested peak periods for the proposed scheme are likely to be less than the baseline (including cable replacement) over the period 2012 to 2025.

<table>
<thead>
<tr>
<th>Information Box 3: How has operational carbon been assessed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>The impact of scheme operation on carbon levels has been assessed by:</td>
</tr>
<tr>
<td>• Calculating global CO₂ emissions in accordance with DMRB guidance using strategic traffic model data from TMfS; and</td>
</tr>
<tr>
<td>• Calculating local CO₂ emissions using Paramics microsimulation model data.</td>
</tr>
</tbody>
</table>

The comparison of carbon released by traffic during operation of the Forth Replacement Crossing would ideally be made against the situation which would arise if the proposed scheme were not undertaken, and the existing bridge would undergo the major maintenance and repair works needed to reinstate its design integrity. However, the uncertainties regarding the extent and timing of these works are considered too great to facilitate a precise assessment. For this reason, a baseline of normal network operation was assumed for the majority of the detailed assessments reported in the Environmental Statement, with Appendix 5.1 addressing the indicative environmental implications of works on the FRB.

57 Do-Minimum – The base situation where there are no modifications to the existing road network and the new bridge does not exist and also includes the minimum modifications.
59 Paramics simulates the progression of every vehicle as it travels through a modelled network in real-time, and can present its output as a real-time visual display. The software models the interactions between individual vehicles as they travel through the road network, and the interaction between vehicles and the physical characteristics of the modelled road network including for example horizontal curves and gradient impacts.
Because of the complexity of the assessment and the need to assess carefully the effect of congested traffic, Transport Scotland has used two distinct modelling approaches, the Transport Model for Scotland, and the Paramics microsimulation suite. The former, which is a variable demand matrix transportation model, has provided an overview assessment across a wide geographical area of the impacts of traffic reassignment, trip distribution, trip suppression and modal shift in both normal operating circumstances and during periods of construction and repair. The local area Paramics model60 is a fixed demand matrix model and has assessed the detailed characteristics of traffic flow along the A90/M90 and M9 routes and adjacent network of roads, identifying the carbon output from a representative fleet of vehicles, using detailed operational outputs for each vehicle. This approach provides the most advanced modelling assessment and closest representation of circumstances on the networks reviewed that is currently possible.

Land

109. Compulsory purchase or occupation of land is necessary to give effect to the proposed scheme. The Bill seeks authorisation for this. The limits of the land to be acquired or used have been tightly drawn in order to include only that land which may be required to ensure, one, the economic delivery of the project or, two, that property is not functionally severed.

110. The limits therefore are the extent of land necessary to provide maximum assurance to the proposed scheme that the contractor’s final design and associated mitigation can be accommodated. The limits are a function of the extent of the proposed works and associated property boundaries, based on the proposed scheme design necessary for preparation of the Bill and the associated environmental statement, with appropriate allowances for contingencies and working space.

111. The Scottish Ministers own land within the area of the proposed scheme and the intention is to maximise the use of that land rather than seeking compulsory powers over the land of others. That intention, however, is tempered so as to enable the purchase or use of other land if re-siting works or activities will reduce the impact on any neighbouring communities or the local environment.

112. That tempered policy has been applied in respect of the siting of the main construction compound. Though the Scottish Ministers own a substantial parcel of land at Echline Fields, South Queensferry and which has been the subject to a comprehensive impact assessment (as reported in the Environmental Statement) the decision has been taken to seek to acquire land, subject to Parliamentary authority, to the west of the new approach road. The new location is still adjacent to the works, but importantly provides a reduced impact on the local community.

60 The Local Area Paramics Model provides a detailed model of the forecast traffic levels travelling along the M90/A90 corridor, and better reflects the local traffic movements travelling adjacent to and across the M90/A90 than the strategic national model TMfS.
113. Powers of permanent compulsory purchase will be available for 5 years from the date of Royal Assent. If the powers are not exercised within that period they lapse.

114. Where temporary possession is to be taken, that possession will be time-limited and must conclude no later than one year after the completion of the work. The limitation ensures that the land owner can be assured of the temporary nature of the acquisition.

Sustainability

115. The Scottish Government’s commitment to the principles of sustainability is reflected within its overarching purpose. A Sustainability Development Policy has been developed for the Forth Replacement Crossing. The proposed scheme has been developed with regard to Government sustainability policies and commitments and the approach to sustainability will be assessed in a formal way through the CEEQUAL proposed scheme.

116. Sustainability will be considered in the procurement process. During pre-qualification assessment, following the publication of the Contract Notice, Transport Scotland will have undertaken checks of how interested contractors have addressed sustainability issues in the works that they have undertaken. Secondly, within the bidding competition Transport Scotland will, if feasible include a calculation of the project’s global embodied carbon impact level, within the quality assessment of tenders. Commitment to sustainability will be carried on into the construction phase through collaboration with contractors.

Job Creation and Skills Transfer

117. Having regard to the international nature of the market for contractors that are capable to lead a major bridge project, it is probable that some of the key expertise and major investment, planning and management of the construction of the main crossing will come from overseas. In these circumstances, it is important, however, that an environment is created which does not discriminate against the participation of any class of supplier (including domestic firms) as consortia members, subcontractors or suppliers, or against local or British workers. It is also desirable that, within the constraints of EU rules, a legacy of skills transfer to Scottish engineers and workers is created. Transport Scotland seeks to achieve this through the careful consideration of contract terms to ensure that discriminatory barriers are not inadvertently created.

118. Transport Scotland will work with Scottish agencies responsible for training, to ensure that there is as great a supply as possible of skilled engineers and workers available at the start, and throughout the substantial life of the project. Consideration has been given by the Scottish Government and a range of other public sector clients on how proportional and relevant

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61 "To focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish through increasing sustainable economic growth." Moving Scotland Forward: The Government’s Programme for Scotland  
http://www.scotland.gov.uk/Publications/2008/09/01093322/0
62 Forth Replacement Crossing Sustainable Development Policy – January 2009 -  
63 The Civil Engineering Environmental Quality Assessment - http://www.ceequal.com/
requirements can be included within contract terms to secure training and employment opportunities and community benefits.

Education

119. The sheer scale, scope and form of the project provide an opportunity to showcase and promote engineering and science in Scotland both to internal and external audiences. The Scottish Government will seek to exploit the educational opportunities by establishing through the project, links with schools, technical colleges, training bodies and industry organisations. The principal contractor will also be obliged under the terms of the contract to provide suitable facilities in South Queensferry to permit visits by interested groups.

Diversity

120. There is a range of equality legislation protecting people from discrimination on the grounds of race, disability, gender, age, sexual orientation and religion or belief. In addition there are three public sector equality duties that require public authorities to take proactive steps to eliminate discrimination and harassment and to promote equality of opportunity with regard to race, disability and gender. Where a contractor is carrying out a public function on behalf of a public authority, legal liability for the duties in relation to that function remains with the public authority which contracts out the function.

121. Transport Scotland will address the issue through contracts which will ensure that the contractor (and any subcontractors procured by the contractor) shall not unlawfully discriminate within the meaning and scope of any applicable labour laws including, but not limited to, the provisions of the Employment Rights Act 1996, the Race Relations Act 1976, the Equal Pay Act 1970, the Sex Discrimination Act 1975, the Sex Discrimination Act 1986, the Disability Discrimination Act 1995, the Working Time Regulations 1998, the National Minimum Wage Act 1998, the Employment Equality (Age) Regulations 2006, the Part-Time Workers (Prevention of Less Favourable Treatment) Regulations 2000, the Fixed-Term Employees (Prevention of Less Favourable Treatment) Regulations 2002, the Employment Equality (Sexual Orientation) Regulations 2003, the Employment Equality (Religion or Belief) Regulations 2003 and the regulations made under such acts or regulations or any other act or otherwise.

PROCUREMENT PROCESS AND PROGRAMME

122. The consideration of procurement options for the proposed scheme in the light of the prevailing public accounting regime and the subsequent decision to procure the proposed scheme through a conventional design and build contract is discussed below. Matters relating to the costs of the proposed scheme are included within the Financial Memorandum accompanying the Bill.

Public Accounting

123. The treatment of a capital asset has been traditionally determined under current UK Generally Accepted Accounting Principles (UK GAAP). This has been a risk based approach to
accounting that has meant many capital assets procured under PFI/PPP arrangements have been classified as off balance sheet for the public sector as the balance of the commercial risk in the capital asset lies with the private sector company.

124. The UK Government has now adopted the International Financial Reporting Standards (IFRS) which has the consequence that almost all infrastructure projects — including private finance initiative and public-private partnership proposed schemes — will come on balance sheet.

125. Under IFRS, the budgetary consequence of using PPP or any such form of procurement is that the capital cost is recognised in the year construction is completed - which for the purposes of the Forth Replacement Crossing would be 2016. The consequence of this would be that a capital obligation of around £2.15 billion would fall in 2016/17. That budget impact is higher than would arise with conventional procurement where the expenditure is capitalised as incurred throughout the construction period.

126. There is a conflict between IFRS and the rules that govern national accounts within the European Community. To resolve this difficulty, HM Treasury will continue to control departmental budgets on a basis that is similar to the accounting principles previously applied under UK-GAAP.

Value for Money

127. In accordance with the Scottish Government Value for Money Assessment Guidance a number of procurement options were considered and these are discussed at paragraph 128. The Scottish Government defines Value for Money (VfM) as the “optimum combination of whole-life costs and quality (or fitness for purpose) of the goods or service to meet the users’ requirements” but is not necessarily based on lowest costs as VfM includes both quantitative and qualitative assessment.

Consideration of procurement options

128. The options assessed were:

Option A: The capital procurement of the bridge and connecting roads by the Scottish Government with the subsequent management and operation of the bridge and roads through separate contracts periodically tendered over the life of the crossing as is the case currently with the trunk road network. This option would be on-balance sheet as the Scottish Government would have total control of the asset

Option B: A contract awarded to a Non-Profit Distributing (NPD) or Public Private Partnership (PPP) for the construction and 30 year operating term of the crossing with

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64 PFI/PPP – Public Finance Initiative/Public-Private Partnership
65 Scottish Government Value For Money Assessment Guidance - http://www.scotland.gov.uk/Topics/Government/Finance/spfm/procure#a4
66 A NPD is a body whose return is capped by virtue of there being no ordinary share capital surplus profits over return are usually recycled through a trust for further investment rather than being distributed to shareholders.
subsequent management being procured by the Scottish Government under periodic contracts. Under this option the operator would earn revenue from fixed annual payments subject to deductions for failure to meet agreed performance and availability standards. These payments meet the costs of constructing, financing, operating and maintaining the asset. At the end of the period (30 years) the bridge would revert to the Scottish Government.

Options C: The operator finances the construction of the crossing and its operation and maintenance from an annual unitary charge comprising shadow tolls and additional annual payments for 80 years. At the end of the 80 year lease period, which is in effect a lease, the operator takes responsibility for the asset and could then charge economic (or revenue maximising) tolls. As the operator retains the asset at the end of the period, unlike the situation in Options A and B, this option may be considered as being off-balance sheet under IFRS, provided the unitary charges do not meet the entire construction and whole life costs of the crossing.

Option D: In this option the operator earns revenue from user tolls supplemented by an annual subsidy paid as an 80 year lease payment. The level of tolls would be regulated and hence the operator would have no commercial freedom to set and vary the tolls from time to time. If the asset transfers to the Scottish Government at the end of the 80 year period then it is likely that it will be accounted for on balance sheet as a finance lease, provided that the subsidy payments are of sufficient value to constitute a realistic lease. Alternatively, the asset could be retained by the operator at the end of the period in which case the contract would form an operating lease and the asset would be accounted for as being off balance sheet.

Table 1: Summary of procurement options

<table>
<thead>
<tr>
<th>Procurement Option</th>
<th>Operator revenue</th>
<th>Residual interest</th>
<th>Balance sheet under IFRS</th>
<th>Budget treatment with GAAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option C – Lease plus shadow tolls</td>
<td>Shadow tolls supplemented by annual subsidy through an 80 year lease.</td>
<td>Operator</td>
<td>Off balance sheet</td>
<td>Off balance sheet treatment</td>
</tr>
<tr>
<td>Option D – Regulated tolls plus lease</td>
<td>Regulated tolls supplemented by annual subsidy through an 80 year lease.</td>
<td>Operator or the Scottish Government</td>
<td>Off balance sheet if operator retains residual interest, on balance sheet if</td>
<td>Off balance sheet treatment</td>
</tr>
</tbody>
</table>
129. The promotion of Option A carries the least risk of failing to deliver a contract. Although Option B follows a model which has been used for trunk road projects over the last 12 years, the recent dislocation of the finance market has made the delivery of funding problematical with fewer financial product options and less appetite for the consolidation of senior debt by a lead provider.

130. Option C carries a significant range of new risks associated with the long term financing requirement. This length of finance is untested and the prevailing financial climate mitigates strongly against the development of new products. Should such a loan term be available it would be difficult to price at this time. The feasibility of the option is not assured.

131. There is a limit to the level of toll income that could be raised from users at the new Forth Crossing as increasing tolls cause an accelerating loss of patronage. The tolls which secure the highest income have been assessed as remaining insufficient in themselves to create an off balance sheet classification and Option D would require to be promoted as an operating lease partially supported by user paid tolls.

132. In accordance with the VfM Assessment Guidance financial models were developed to undertake a quantitative analysis of the options. The models applied the methodologies as laid down in the Scottish Government’s Infrastructure Investment Unit’s VfM Assessment Guidance and HM Treasury (as per the latest Green Book). Optimism Bias, risk and taxation issues were all considered within the models. For each option cash flows have been discounted back to 1 April 2010. The Net Present Value (NPV)\(^67\) assessment discounted the cash flows in years 1 to 30 at 3.5% in real terms to April 2010, at 3.0% in years 31-75 and 2.5% subsequently.

133. For Option B, it is assumed that the capital cost and first 30 years of operations and maintenance would be subsumed within the NPD/PPP contract and that the expiry of this contract would be followed by a 50 year period of government funded operations and maintenance. In other words, the private sector finance is only assumed to fund the capital costs and first 30 years of operations. The overall NPV of this option is assumed as the sum of the NPVs of the total Annual Unitary Charge throughout the PPP contract, and the post PPP concession public sector contributions, which would fund the remaining operations and maintenance. In addition, a sum has been assumed in relation to the additional costs that would be borne by Transport Scotland if a PPP structure were to be followed, primarily as a result of the increased time and resources that it is anticipated would be necessary for this form of procurement.

134. In relation to the NPVs of Options C and D private sector finance (over 80 years) is only assumed to fund the capital costs of the main crossing in both of these options, which is then recovered by the operator through lease payments from the Public Sector and tolling revenues

\(^{67}\) Net Present Values (NPV) are the discounted values of either future costs or benefits. The term Net Present Value is used to describe the difference between the present value of a stream of costs and a stream of benefits.
(either shadow tolls (Option C) from the Public Sector or real tolls (Option D) from the users of the crossing). The operating and lifecycle costs of the main crossing are assumed to be funded through public sector contribution (from revenue budgets). An 80 year private sector financing strategy is novel and therefore both options C and D were subject to two analyses using different levels of the Weighted Average Cost of Capital (WACC)\(^{68}\). Value for Money outcomes were therefore produced on the bases of a WACC of 7.6%, which is an estimate of the WACC that applies to 30 year project finance deals and a WACC of 9.0%, which incorporates a premium to reflect the availability and pricing of 80 year finance.

135. A comparison of the NPVs of the various options is provided in Table 2.

**Table 2: Value for Money comparison of Net Present Values**

<table>
<thead>
<tr>
<th>Option</th>
<th>NPV (£000)</th>
<th>VfM Headroom (£000)</th>
<th>VfM Headroom (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option A: Conventional</td>
<td>2,511,676</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Option B: NPD/PPP</td>
<td>2,427,369</td>
<td>84,307</td>
<td>3.36</td>
</tr>
<tr>
<td>Option C1: Operating Lease Model (WACC 7.6%)</td>
<td>3,009,695</td>
<td>(498,018)</td>
<td>(19.83)</td>
</tr>
<tr>
<td>Option C2: Operating Lease Model (WACC 9.0%)</td>
<td>3,314,270</td>
<td>(802,594)</td>
<td>(31.95)</td>
</tr>
<tr>
<td>Option D1: Operating Lease / Regulated Tolling Model (WACC 7.6%)</td>
<td>2,417,394</td>
<td>94,282</td>
<td>3.75</td>
</tr>
<tr>
<td>Option D2: Operating Lease / Regulated Tolling Model (WACC 9.0%)</td>
<td>2,723,516</td>
<td>(211,839)</td>
<td>(8.43)</td>
</tr>
</tbody>
</table>

136. The indicative VfM assessment for the use of Government funding demonstrated Option D1, if deliverable in the lower financing cost scenario, has the potential to provide a slightly better, though broadly comparable, VfM outcome by comparison to Options A and B, primarily due to the role which users of the crossing would have in paying some of the direct costs through toll payments associated with the bridge construction. Tolling would provide a similar VfM benefit to other options if applied. However, user tolling as a means of contributory funding is not the policy of the Scottish Government.

**Summary of procurement options**

137. Options A and B both offer good VfM. Given the broad nature of the assumptions the differential between these options in quantitative terms is not significant. For any of the

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\(^{68}\) Weighted Average Cost of Capital is the cost of acquiring debt computed on the basis of interest rate, tax and return on equity goals. It is usually expressed as a percentage and used as a discount rate to determine present value of specific investments.
assumed cost of funding for Option C, VfM is significantly impacted with a negative differential in a range of -19.83% to -31.95%.

Choice of procurement option

138. Options A and B offer potential to deliver good VfM. There are other factors such as familiarity with process and risk which are major determinants in the timing and effectiveness of the procurement process. Straightforward construction contracts (Option A), such as the design and build form deployed for Scottish trunk roads since 1990, involve the preparation of a design meeting the specification derived from the statutory consents and proven materials and processes, and the pricing of that design. Design build finance and operate contracts for PPP or NDP projects (Option B) add to this the complexities of estimating the 30 year operating costs, of securing economic funding and deriving the returns that are likely to accrue from the contract payment mechanism.

139. Both of these options are familiar to the industry and have been successfully deployed by Transport Scotland. However, the availability and cost of funding in the present unsettled financial climate presents a new uncertainty and in that light and because the difference in NPV is only marginal a conventional procurement was recommended. Option A presents the least risk process with the greatest guarantee of provision of the asset within 2016.

Ministerial announcement

140. The Scottish Ministers advised the Scottish Parliament on 10 December 2008 that

“...the Forth replacement crossing will be publicly funded and will be procured through a conventional design and build contract”.

141. This process has started with the publication of a contract notice inviting expressions of interest from competent parties in June 2009 leading to the start of the tendering process for the principal contract (for the crossing and approach roads) in November 2009.

142. Bidders will be invited to submit competitive tenders late in 2010, which will comply with the terms of the Bill. They will take account of comments on the Bill introduced to the Parliament. They will reflect agreed design changes to the proposed scheme which bidders wish to bring forward to both improve value for money and reduce, or at least not increase, the environmental impacts benchmarked in the Environmental Statement. The tenders submitted will be on the basis of lump sums for the designs they have submitted. The risks retained by the Scottish Government will be limited, but will include, in line with government policy, the impact of inflation on input costs over the 5½ year period of the principal contract.

69 Parliamentary statement on Strategic Transport Projects Review – 10 December 2008
Scottish Parliament Official Report, Session 3, Col 13206
http://www.scottish.parliament.uk/business/officialReports/meetingsParliament/or-08/sor1210-02.htm#Col13201
Opportunity costs

143. There are consequences of prioritising investment in the proposed scheme in a climate of constrained capital budgets. Expenditure consequences go beyond the ability of that which Transport Scotland can accommodate, and whilst peak annual expenditure demands of over £500m within the construction period can be funded from within the Scottish Government annual Departmental Expenditure Limits (DEL) Capital budget, which is now anticipated to vary between £2.6 billion and £2.9 billion each year over the years of construction, other investment priorities will inevitably be delayed. In light of this, contributory sources of funding have been explored with the European Union and HM Treasury.

European funding

144. The project is of a type which is eligible for grant funding from the EU Trans European Network Transport (TEN-T) programme. Applications have to be supported and submitted by the sovereign governments. For 2008/09 an application to fund the feasibility study element of the project was put forward on behalf of the Scottish Government by the Department for Transport as one of their two submitted projects. The project was not selected for support. A further application has been made for advisory costs for the year 2009/10. Although grants may be provided to cover up to 50% of the study phase costs and 10% of the delivery costs, in practice grants for advisory studies are normally restricted to around 1.5 million Euros per project, from an annual budget of 80 million Euros. The value of any grant, therefore, lies more in raising the international profile of the project than in efficiently securing additional funding.

Scottish Parliament Resolution

145. The reality of the funding situation and the consequences of the chosen funding method was noted in January 2009 by a resolution of the Scottish Parliament:

“That the Parliament notes the Scottish Government’s choice of conventional capital funding for the construction of the Forth Replacement Crossing and welcomes the fact that Scotland’s biggest infrastructure project for a generation will be delivered without the need for tolls, and call on the Scottish and UK governments to work together to ensure that the new crossing is delivered at the earliest possible opportunity.”

Treasury support

146. The Scottish Ministers have engaged with Treasury Ministers and the Secretary of State for Scotland to secure budget re-profiling to accommodate normal investment for other projects during the construction of the proposed scheme. As yet, no new money has been offered. Discussions between Westminster and the Scottish Government will continue in order to explore funding mechanisms. There is however broad agreement that the proposed scheme as announced to the Scottish Parliament must proceed.

70 Scottish Parliament Motion S3M-3214 - http://www.scottish.parliament.uk/business/officialReports/meetingsParliament/or-09/sor0115-02.htm#Col14142
Economic assessment

147. An economic assessment has been undertaken which evaluated the contribution that the Forth Replacement Crossing would have on economic welfare through consideration of the transport costs and economic benefits associated with the project. The assessment was undertaken in accordance with the Scottish Transport Appraisal Guidance and considered the monetised costs and benefits of the options for the Forth Replacement Crossing, including its construction and maintenance over a 60 year period, and compared these to the monetised costs that would result if the new crossing and associated infrastructure were not provided. In the exercise, costs were discounted to 2002 prices in line with the recommended practice for transport proposed schemes.

148. In the Forth Replacement Crossing Study\(^\text{71}\) (June 2007) the assessment of costs and benefits included a comparison of the travel times and distances travelled by users across the proposed road network with times and distances that might occur if the Forth Road Bridge were closed beyond 2019. That assumption of closure reflected the then uncertainty over the future reliability of the Forth Road Bridge as a route capable of accommodating traffic.

149. Under that assumption all of the proposed crossing options (which included tunnels and bridges at various locations) had monetised benefits greater than their costs. The cable stayed bridge was assessed as having the greatest discounted monetised benefits (£4.6bn – the net value of the benefits less the value of the costs) and the most favourable benefit to cost ratio (4.31). The other options fell within the range £2.6 billion to £4.5 billion for discounted monetised benefits and a benefit to cost ratio range of 2.23 to 3.83.

150. In 2008 FETA reported its technical feasibility study into the possibility of replacing or augmenting the main suspension cables. That study provided a greater degree of confidence that the Forth Road Bridge could be repaired and strengthened, although prognosis for the Forth Road Bridge is still uncertain. The study however also identified that in the absence of a replacement bridge that there would be significant traffic disruption in order to undertake those necessary repairs with a significant adverse impact on the economies of Fife and the Lothians and the national economy of Scotland.

151. More recent economic assessment has been undertaken in light of the FETA’s feasibility study with the calculation of transport costs and benefits including a comparison of the construction and maintenance costs and the travel times and distances travelled by general users under a proposed scheme which involved a slender more refined bridge and road network together with public transport use of the Forth Road Bridge. Rather than comparing the performance of the proposed Managed Crossing Scheme with the performance of a network with the Forth Road Bridge closed, as was undertaken in the Forth Replacement Crossing Study\(^\text{72}\), the proposed Managed Crossing Scheme was compared with the maintenance costs and travel times and distances that might occur if the Forth Road Bridge remained the sole crossing and continued to be used, albeit with traffic flow interrupted by significant restrictions to

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carriageway availability to allow for replacement of the main cables and associated major refurbishment works, and additional restrictions to carriageway availability to allow for other routine and cyclical repairs on the bridge over the 60 year economic evaluation period.

152. The latest economic assessment shows that the proposed scheme (which has a reduced cost) will still generate a benefit in excess of cost. The Transport Economic Efficiency (TEE) benefits relate to the performance of the managed crossing proposed scheme and are expressed as cumulative components of benefits and costs.

153. The basic Benefit to Cost Ratio (BCR) which arises from the difference in transport economic efficiency that would result from provision and use of the proposed scheme compared to continued use of the Forth Road Bridge, including taking account of the impact on traffic that would result if the cable replacement works were undertaken on the bridge, is forecast to be 1.34.

154. In addition to the basic benefits calculated, additional benefits are likely to arise due to delays to traffic during construction of the proposed scheme; delays to traffic during periodic maintenance of the existing bridge and improved traffic flow arising from the provision and operation of the ITS. The benefits from these additional factors were calculated and added to the basic benefits as an indication of the likely additional benefits of the proposed scheme, over and above the basic benefits of day to day operation. The indicative BCR, taking the additional benefits and costs into account, rises to 1.67. This BCR is presented as an additional sensitivity to the Traffic Economic Efficiency results in line with the STAG guidance.

155. In addition to the costs and benefits associated with transport efficiency, there are further Wider Economic Benefits (WEBs) associated with agglomeration benefits, such as providing firms better access to markets and factors of production, and additional benefits relating to competition. In line with STAG guidance, the results from the WEBs calculations are presented as an additional sensitivity to the Traffic Economic Efficiency results.

156. The Wider Economic Benefit associated with the proposed scheme has been calculated to be approximately £200 million. When added to the other proposed scheme benefits, the BCR_{WEBs} increases to 2.03.

Packaging of contract

157. At the extremes of a contract strategy, it would be possible either to secure the whole project with a single contract or to disaggregate the works into a series of contracts: for the main crossing; roadworks north of the Forth; south of the Forth and at M9 Junction 1a; and ITS. The proposed scheme will not be capable of functioning at its highest efficiency until the last of these several workstreams is complete. The overall timetable for the construction phase will be dictated by the duration of the main crossing works, at up to 5½ years, although each of the various roadworks elements could be undertaken within 2 to 3 year periods. The co-ordination of the works will be crucial to ensure the effective management of interfaces (for example, that

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73 STAG Guidance Part 2, Section 9, paragraph 9.3.6 - [http://www.transportscotland.gov.uk/reports/publications-and-guidance/corporate/j9760-00.htm](http://www.transportscotland.gov.uk/reports/publications-and-guidance/corporate/j9760-00.htm)
The determining factor in choosing the most efficient delivery strategy is whether competition can be secured for the major activity of constructing the main crossing of the Forth. In turn that will depend on the attractiveness of proposals to world class contractors capable of undertaking or leading the delivery of the main crossing. Following an Industry Day event on 17 March 2009, hosted by the Minister for Transport, Infrastructure and Climate Change, Transport Scotland conducted bilateral discussions with world class bridge contractors and consortia. On balance, they expressed a preference for the bundling of approach roads and the main crossing, to avoid inter-contract interfaces between the main crossing and the approach roads.

There are no technical reasons which would compromise the construction separately of Junction 1a on the M9 or the installation of ITS north of Admiralty Junction indeed a number of freestanding contracts would allow the project to be open to a wider selection of contractors.

Three contracts are proposed:

- the principal contract for the new crossing and approach roads north and south of the Firth, along with the ITS to be installed over these sections
- a concurrent contract to improve Junction 1a on the M9 and the installation of ITS from Newbridge to South Queensferry
- a contract to install ITS between Halbeath and Admiralty Junctions on the M90 in Fife.

The proposed contract for the principal works will be based on the “Federation Internationale des Ingenieurs-Conseils Engineering” (FIDIC) conditions for an EPC/Turnkey contract. The terms of the contract will be augmented by specific drafting to create a contract with an equivalent rigour to those of the current Transport Scotland model, but which will be both familiar to domestic contractors and more familiar to international bidders.

Transport Scotland has considerable experience in administering design and build contracts for trunk roads infrastructure. Experience over the last two decades has indicated an average increase in cost between tender and outturn prices limited to around 4%. In the case of the proposed scheme, because of the long duration of the Principal Contract the Scottish Ministers will also carry some risk in relation to price inflation through a price fluctuation clause in the contract.

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Procurement process

163. The proposed contracts for the principal works and for Junction 1a on the M9 will be procured using the competitive dialogue process in accordance with the Public Contract (Scotland) Regulations 2006. This process follows a number of defined stages:

- pre-qualification – selection of a number of participants with the relevant experience and capability to undertake the scope of work;
- competitive dialogue – selected participants invited to participate in dialogue. For a design and build contract the participant develops a conceptual design to meet the requirements of the contract;
- submission of final tender – selected participants submit both a technical and financial submission; and
- tender evaluation and contract award – quality and financial evaluation of the participants’ submissions, selection of the most economically advantageous tender (which takes account of both price and quality) and contract award.

Programme

164. The programme for the proposed scheme anticipates the opening of the new crossing during 2016. The major milestones to enable this programme to be achieved are:

- Invitation to participate in dialogue – principal contract – November 2009
- Invitation to participate in dialogue – Junction 1a – Autumn 2010
- Invitation to tender – ITS Fife – Winter 2010
- Submission of final tenders – principal contract – December 2010
- Contract Award – principal contract – April 2011
- Contract Award – Junction 1a and ITS Fife – Spring 2011
- Contract works commence on site – Summer 2011
- Proposed scheme completion and opening for use – Late 2016

CONSULTATION AND ENGAGEMENT

165. Consultation and engagement has been central to the development of the Forth Replacement Crossing scheme. Activities began in 2006 to inform the Forth Replacement Crossing Study (FRCS) and consultation and engagement continued with a wide range of interested parties and affected communities throughout 2008 and 2009. The statutory consultation process commenced with the publication of the Forth Crossing Bill in November 2009.
166. This chapter summarises the approach taken to consultation and engagement on the project, the activities which were undertaken and the key outcomes. Full details are provided in the Consultation & Engagement Report, published in November 2009\(^\text{77}\).

**Approach to consultation and engagement**

167. Transport Scotland set out its commitment and approach to encouraging public involvement in the development of the crossing in the guide *Engaging with Communities*\(^\text{78}\), which was developed for the project and published in September 2008.

168. This sets out a proactive approach to engagement and consultation and a process which is designed to ensure that:

- arrangements for participation are inclusive, open and transparent
- a wide range of participants are encouraged to get involved at the appropriate time
- information is provided at key stages to allow for the fullest possible consideration at that stage
- communication takes place using a range of methods in a range of locations
- all representations are fully considered and feedback provided

169. A range of communication methods and channels were used during the consultation and engagement process to ensure that information was widely available, accessible and all those who wished to participate in the process were able to do so.

**Definition of Consultation and Engagement**

170. The programme of consultation and engagement for the Forth Replacement Crossing was developed and carried out in accordance with Scottish Government Best Practice as contained in Planning Advice Note PAN 81 *Community Engagement – Planning with People*\(^\text{79}\).

171. This suggests the following definitions for consultation and engagement:

**Consultation** – the dynamic process of dialogue between individuals or groups, based on a genuine exchange of views and, normally, with the objective of influencing decisions, policies or programmes of action.

**Engagement** - the establishment of effective relationships with individuals or groups to encourage substantive deliberation.

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\(^\text{77}\) Consultation and Engagement Report – November 2009 – [www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info)


172. The guidelines highlight that consultation and engagement cannot guarantee that decisions or outcomes desired by the public can be adopted in every circumstance. The guidance notes that the needs of developing essential infrastructure must be balanced with competing and, in some cases, conflicting interests.

STRANDS OF CONSULTATION

173. Consultation and engagement took place through four separate but complementary programmes of activity:

- Consultation with Communities, Interested Parties and the General Public
- Consultation for the Environmental Impact Assessment
- Consultation for Engineering & Design
- Consultation with Landowners

174. Consultation, communication and engagement activities were programmed to take place at specific stages in the project’s development to communicate new findings and/or information; to communicate important decisions and, where appropriate, to present and seek feedback on options under development.

175. These key milestones are shown in the diagram 1 below. Engineering Consultation meetings are not depicted in this diagram, as they took place on an ongoing basis as required.
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

Diagram 1: Consultation and Engagement: Key Milestones

Winter 06/Autumn 07

Consultation on Forth Replacement Crossing Study with:
- Local authorities and Regional Transport Partnerships (paragraph 177)
- Environmental groups for SEA (paragraph 178)
- General public on report of SEA (paragraph 178)
- General public via public information exhibitions (paragraph 179)

Winter 07/08

Parliamentary announcement on Cable-Stayed Bridge. Detailed project development commences including surveys for Environmental Impact Assessment (EIA).

Spring/Summer 08

- Community Consultation – introductory briefings (paragraph 186)
- Landowner Consultation – landowner identification & GI meetings (paragraphs 215 and 216)
- EIA Consultation – environmental stakeholder group (paragraph 201)
- EIA Consultation – consultation letters on baseline information (paragraph 202)
- EIA Consultation – consultation meetings commence (paragraph 203)

Winter 08/09

Parliamentary Announcement on Managed Crossing Strategy. Detailed project development continues. Detailed EIA commences.

- EIA Consultation – letters regarding pedestrians, community effects etc (paragraph 202)
- EIA Consultation – letters on managed crossing scheme proposals (paragraph 202)
- Community – Managed Crossing briefings (paragraph 186)
- Community – public information exhibitions (paragraph 188)
- Landowner Consultation – ongoing design and accommodation works meetings (paragraph 211-221)
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

**Spring 09**

Design refinements to road connections and junctions.

- Community Consultation – briefings on road & junction amendments (paragraph 186)

**Summer 09**

Stage 3 design – road connections and junction locations finalised. Development of mitigation, landscaping and Code of Construction Practice commences.

- Community Consultation – landscaping, mitigation and construction briefings (paragraph 186)
- Community Consultation – Information displays (paragraph 190)
- EIA Consultation – consultation with mandatory consultees (paragraph 205)
- Community & EIA Consultation – Code of Construction Practice (paragraphs 208-210)
- Landowner Consultation – Ground Investigation (paragraph 215)

**Autumn/Winter 09**

Stage 3 design – landscaping and mitigation finalised. Finalise Code of Construction Practice.

- Community Consultation – community council and residents meetings (paragraph 186)

**Forth Crossing Parliamentary Bill introduced.**

- Statutory Consultation – Public Exhibitions to support Parliamentary Bill (paragraph 221)
Consultation for the Forth Replacement Crossing Study

176. Consultation to inform the Forth Replacement Crossing Study (FRCS) began in 2006 as a fast-tracked element of Transport Scotland’s Strategic Transport Projects Review.

177. This included consultation with Local Authorities on the issues informing the FRCS. This was conducted through discussion with a reference group comprising all seven Regional Transport Partnerships and COSLA (Convention of Scottish Local Authorities) beginning in November 2006. The results of this were used to confirm the scope of the study.

178. A Strategic Environmental Assessment was completed for the FRCS, the preparation of which included consulting with the statutory environmental bodies, Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) and Historic Scotland, in July and August 2007. The Environmental Report which presented the findings of the SEA was published and was subject to a public consultation between September and December 2007.

179. Consultation with the general public was carried out in August 2007 by staging a series of public information exhibitions over 21 days in 12 locations which were deemed to have an interest in the selection of a crossing corridor and crossing type. Some 4,465 people registered their attendance at the exhibitions and 756 feedback forms were received from the consultation. Feedback was analysed and a report published in November 2007.

180. In summary, the feedback showed that the majority of people were in favour of a replacement crossing, with less than half of one per cent (0.5%) expressing the opinion that no replacement crossing should be built. Of those in favour of a crossing 48% favoured a tunnel, 27% favoured a bridge and 25% did not express a preference for a specific type of crossing.

181. Having assessed all the factors and findings of the FRCS study the Scottish Government concluded for the reasons explained in the announcement to the Parliament on 19 December 2007 that the replacement crossing should be a cable-stayed bridge slightly to the west of the existing Forth Road Bridge.

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83 See paragraph 61
Consultation with Communities, Interested Parties and the General Public

182. A planned and sustained programme of engagement and consultation was undertaken from December 2007 onwards to ensure that information about the Forth Replacement Crossing and its development was communicated proactively and in a clear and timely fashion to local communities, community organisations and the general public.

183. This included:

- communications activities to inform the public about the scheme proposals and
- consultation activities to facilitate dialogue and feedback

184. Information was provided using a full range of communication methods which included:

- Electronic newsletters (ezines84) – more than 15 editions issued (to October 2009) on an approximately two-month basis to a database of more than 3,000 subscribers (figure as at October 2009)
- Printed newsletters – 5 editions issued (to August 2009) on an approximately quarterly basis to a database of just under 800 subscribers (figure as at October 2009)
- Information leaflets, guides and reports – published on a variety of subjects throughout the period, including consultation, environmental surveys and ground investigations, compensation and construction
- Community information points – set up in 14 libraries and / or community centres85 in the locale of the new crossing to distribute newsletters, leaflets and reports as they were published
- Website – www.forthreplacementcrossing.info – a dedicated project website which was regularly updated with new information, publications and news
- Media coverage – media coverage in local, national, online and broadcast media generated and / or supported by issuing press releases (more than 20 to October 2009), statements and conducting media briefings and interviews.

185. Consultation was facilitated through a variety of means, including:

Meetings and briefings

186. More than 40 separate meetings and briefings have been held since the start of 2008 with community councils, community groups, residents and residents groups, business and industry groups and elected representatives.

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84 Ezine – An electronic newsletter distributed by email.
85 Dalgety Bay, Dunfermline, Inverkeithing, Rosyth, Crossgates (closed August 2009), North Queensferry, South Queensferry, Balerno, Linlithgow, East Calder, Broxburn, Currie, Ratho and Kirkliston.
187. Transport Scotland sought and arranged meetings at the following key stages in the development of the project:

- Spring – Summer 2008 – Introductory Briefings
- January 2009 – Managed Crossing Strategy Briefings
- Spring 2009 – Consultation on amendments to road layout and junctions
- May - July 2009 – Landscaping, mitigation and construction briefings
- October 2009 – Concluding community council and residents meetings

Public information exhibitions

188. Staged in 12 locations over 11 days in January 2009 to facilitate consultation with the public and gain feedback on the developing proposals for the scheme. The exhibitions were manned by full teams of project officials and expert consultants from various disciplines who were available to answer questions. Feedback was specifically sought on four key areas:

- Accessibility – for example, local accesses, junctions, pedestrian and cycle paths
- Environment – for example, noise concerns, landscape and views, recreational areas, suggested areas for mitigation such as planting
- Public transport – for example, bus services, park and ride
- Construction issues – for example, concerns regarding noise, dust and construction vehicle access

General comments on the proposed scheme as a whole were also facilitated through the feedback form.

189. Some 212 responses to the consultation were received and a report published entitled *Public Information Exhibitions: Feedback and Outcomes Report*. This details the feedback received and the amendments which were introduced to the scheme as a result. Changes to the scheme were communicated to the public through the project newsletter, ezine and website in April 2009.

Community Information Displays

190. Staged in libraries and / or other public locations in seven communities affected by the crossing to communicate and make available:

- plans of the proposed scheme incorporating the landscaping and mitigation proposals

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86 Dunfermline, Edinburgh centre, Edinburgh west, Inverkeithing, Kirkcaldy, Kirkliston, Linlithgow, Livingston, North Queensferry, Rosyth, South Queensferry, Winchburgh.
88 South Queensferry, North Queensferry, Kirkliston, Rosyth, Inverkeithing, Dunfermline and Newton.
• information on the construction compounds and Code of Construction Practice (CoCP)
• information on compulsory purchase, compensation and the parliamentary process

Correspondence, email and telephone enquiries
191. Ongoing dialogue and discussion with interested parties via a telephone enquiry line, email and written correspondence. Since January 2008, there have been approximately 500 written enquiries, each of which has received a response.

Engineering Consultation
192. Consultation has been undertaken with relevant organisations since the commencement of the project in 2008 to inform development of route corridor options and the design of the proposed scheme. This covered a range of engineering design parameters, including:

• development of the strategy for the managed crossing scheme
• road design
• drainage design
• Statutory Undertakers’ apparatus
• design of the main crossing
• land based structures
• ground investigation works and geotechnical design
• traffic modelling and appraisal
• construction and traffic management
• maintenance
• Intelligent Transport Systems.

193. Organisations consulted include (but not limited to):

• Local Authorities
• Civil Aviation Authority, British Airports Authority and Network Rail
• Utilities providers such as British Telecom, Scottish Water and Scottish Power
• Emergency services
• Architecture + Design Scotland
• Forth Estuary Transport Authority
• Businesses such as Babcock and Forth Ports plc.
194. In addition to meetings and briefings, ongoing communication between relevant organisations and the project team has been undertaken through correspondence and discussions by telephone. This has enabled input to be provided throughout the development process to inform the design of the scheme.

195. Further details on the nature of the discussions on each of these topic areas and the full list of organisations consulted are included in the Consultation & Engagement Report.

**Environmental Impact Assessment Consultation**

196. Consultation has taken place throughout the project’s development to inform the Environmental Impact Assessment (EIA) and feed into decisions on the design of the scheme. Full details of the Consultation and Scoping for the EIA can be found in Chapter 6 of the Forth Replacement Crossing Environmental Statement.

**Approach to Consultation**


198. The EIA also follows the guidelines set out in the Design Manual for Roads and Bridges (DMRB) Volume 11 and refers to such advisory documents as the Scottish Government’s Planning Advice Note 58 - Environmental Impact Assessment.

199. The main aims of the EIA consultation were to:

- ensure that statutory consultees, other bodies with a particular interest in the environment, and members of the public were informed of the proposals and provided with an opportunity to comment
- collate baseline information regarding existing environmental conditions
- obtain input to the identification of potential impacts and the development of appropriate mitigation
- inform the scope of the EIA.

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Consultation Stages and Methods

200. More than 160 consultees were identified through the stakeholder identification process and consulted during the key stages of the EIA.

Environmental Stakeholder Group

201. An environmental stakeholder group was set up in March 2008, convening on an approximately monthly basis. The objective of the group was to enable key consultees to be kept up to date with project progress, to provide a forum for informing the developing design and environmental assessment, and to ensure consistency of advice both within and between organisations. This group was formalised as the Environmental Reference Group (ERG) in March 2009.

Consultation Letters

202. Consultation was carried out via correspondence with a range of relevant stakeholders on the following key issues:

- March 2008 – Consultation on the proposed scheme requesting baseline information and inviting comments on the proposals
- November 2008 – Consultation on pedestrians, cyclists, equestrians and community effects. Meetings were also held with access officers from the three local authorities at this time.
- December 2008 – Consultation on the latest proposals for the scheme, accompanied with up-to-date maps.

Consultation Meetings

203. Consultation meetings were ongoing throughout the EIA process and were held either one-to-one with organisations or jointly, where several organisations held similar interests. The meetings were technical meetings looking at specific issues relevant to the EIA.

204. More than 60 consultation meetings took place with environmental interest groups and mandatory consultees to inform the EIA. Where recommendations were made by consultees to include elements of work, such as additional surveys, in the EIA, these were discussed in detail with the project team and implemented where appropriate.

Standing Orders Rule 9C.1.7 consultation

205. In accordance with Rules 9C.1.7 and 8 of the Standing Orders of the Scottish Parliament, the ERG (the membership of which included all mandatory consultees) were consulted on the following matters and provided with the environmental consultation material and invited to comment on:

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This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

- the nature and purpose of the proposed development
- the affected land
- the likely effects of the development on the environment (during both construction and operation)
- the need for appropriate assessment under The Conservation (Natural Habitats, &c.) Regulations 1994
- mitigation
- the scoping of the Environmental Statement prior to its production.

206. The ERG was supplied with environmental consultation material on 10 July 2009 and requested to respond by 10 August 2009. They were advised of the opportunity to lodge a statement with the Scottish Parliament under Rule 9C.8 of the Standing Orders. Feedback on the environmental consultation material was also solicited at two workshops held on 15 July\(^{93}\) and 23 July\(^{94}\) 2009 which provided more detail on mitigation and residual impacts and a further opportunity to comment on information provided. The City of Edinburgh Council provided a response on 11 August 2009. None of the other ERG members provided a written response which reflects the ongoing close liaison and consultation with ERG members throughout the process of developing the Environmental Statement. Details of all environmental issues raised throughout the consultation process are documented within the Environmental Statement.\(^{95}\) The ERG held a final meeting on 28 October prior to the Bill’s introduction.

Public Information Exhibitions and Community Information Displays

207. The public information exhibitions (January 2009) and community information displays (August 2009) as described in paragraphs 180 and 186 were also a key feature of the EIA consultation.

Consultation on the Code of Construction Practice

208. Consultation was carried out to inform the development of a Code of Construction Practice (CoCP) in July and August 2009. Consultation was undertaken with local authorities, community councils, the emergency services and environmental bodies.

209. Comments were requested on the measures set out to:

- control and limit environmental impacts during construction
- define minimum standards of construction practice
- inform and consult affected communities about how the effects of the works will be mitigated and the timetable of the works.

\(^{93}\) Attended by the Scottish Environment Protection Agency, Marine Scotland, Historic Scotland and Fife Council.  
\(^{94}\) Attended by Scottish Natural Heritage, Fife Council, City of Edinburgh Council and West Lothian Council.  
\(^{95}\) See Appendix 6.3 of the Environmental Statement.
210. Transport Scotland considered the comments received in response to the consultation in finalising the CoCP. Responses were provided to the consultees advising them how their comments were considered in the CoCP submitted to the Parliament with the Forth Crossing Bill.

Consultation with Landowners

211. Consultations with landowners have been ongoing since early 2008 and initially focussed on gathering information to inform the development of the scheme. Following the selection of the preferred corridor in late 2008, continuing consultation aided the development of the scheme proposals.

212. The term landowners is used in the section to cover owners of land and property required for the scheme, plus occupiers and tenants of that land or property.

213. The main strands of consultation were as follows:

- landowner identification
- arranging of site access for survey works, including environmental surveys and ground investigation
- consultation regarding the design of the proposed scheme.

Landowner Identification

214. Landowner identification\(^\text{96}\) commenced early in 2008 and involved door-to-door enquiries, written enquiries and meetings with landowners and agents. Those landowners willing to be interviewed were asked to identify their property interests and to provide any further information available, including:

- details of the owners and occupiers of land
- points of contact for any correspondence, including details of any agents
- the extent of ownership information relating to any other land which was occupied either under lease or through informal agreement
- information regarding any rights held by others over land, such as servitudes
- information relating to the type of land use, such as the nature of farming activities.

Consultation and Liaison for Ground Investigations

215. Ground investigations were undertaken in 2008 and 2009. Meetings were held and correspondence exchanged with landowners to discuss and agree:

\(^{96}\) Further detail on landowner identification is located within the Heritable Interests Statement accompanying the Bill.
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

- access routes
- working arrangements
- reinstatement works
- compensation.

**Consultation on the Design**

216. Following the selection of the preferred corridor for the connecting roads in late 2008, land plans showing the approximate extent of the route corridor were prepared. Individual plans were distributed to potentially affected landowners in December 2008. This marked the start of a programme of one-to-one meetings and dialogue with potentially affected landowners and occupiers.

217. Letters were sent to landowners, occupiers and businesses which were considered unlikely to be directly affected by the proposals as a result of the changes to the scheme.

218. Matters discussed during consultations with landowners included:

- a review of land ownership details
- the ongoing design of the scheme
- environmental issues
- land requirements
- accommodation works to be provided as part of the scheme.

219. Consultations have been held to discuss accommodation works with landowners. The matters discussed include:

- fencing requirements, including those relating to stock-proofing
- boundary treatments such as hedges
- gates
- maintaining field drainage systems
- compensation arrangements.

220. Consultations regarding accommodation works are continuing to agree the measures to be provided as part of the scheme.
221. Information regarding the compensation process has been made available to landowners by Transport Scotland in the *Guidance on the Parliamentary Process, Compulsory Purchase Process and Compensation* brochure.\(^{97}\)

**Consultation under the Parliament’s Standing Orders**

222. Statutory consultation for the FRC commenced in November 2009. The Parliamentary Bill introduced on 16 November 2009 was supported by a series of public information exhibitions in communities affected by the scheme and central Edinburgh to make the final proposals and supporting Bill documentation widely available to the public.

**Summary of Outcomes of Consultation**

223. Feedback obtained through the four strands of consultation and engagement has shaped a number of aspects of the scheme on varying levels. Full details of the outcomes of the consultation and engagement activities undertaken for the FRC are detailed in the *Consultation & Engagement Report*\(^{99}\), the *Feedback & Outcomes Report*\(^{100}\) and Appendix\(^{101}\) and in Chapter 6 of the *Environmental Statement*.

224. In summary, the main features of the scheme which have been shaped and amended through consultation include:

- the location of the South Queensferry Junction, which was moved further west to connect directly to the A904 at the western edge of South Queensferry
- the elevation of South Queensferry Junction which was lowered to the same level as the existing A904 with the main carriageway passing below to reduce visual impacts
- the elevation of the embankment which was lowered on the main carriageway to the South of South Queensferry
- the inclusion of north and southbound public transport slip roads onto the A90 at South Queensferry were added to the design to give access to and from the Forth Road Bridge and the A90
- revision of the Ferrytoll Junction and realignment of the B981 from North Queensferry
- removal of Park and Ride facilities at South Queensferry

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\(^{98}\) North Queensferry, South Queensferry and Kirkliston.


• various amendments to the mitigation and landscaping provided at Dundas Home Farm
• the assessment and identification of an alternative location for the main construction compound to the west of the new approach roads in response to local concerns regarding the impact of the compound on neighbouring residential areas.

EFFECTS ON EQUAL OPPORTUNITIES, HUMAN RIGHTS, ISLAND COMMUNITIES, LOCAL GOVERNMENT, SUSTAINABLE DEVELOPMENT ETC.

Equal opportunities

225. The provisions of the Bill do not discriminate on the basis of gender, race, marital status, religion, disability, age or sexual orientation.

226. In line with Transport Scotland’s ‘Roads for All’ Good Practice Guide\(^\text{102}\), all pedestrian and cycling routes have been subject to consultation with local access groups. As pedestrian access will be prohibited on the new bridge the project is developing an emergency evacuation protocol.

227. The road design and improvements suggested in the north would not sever any communities or result in the loss of community facilities. The redesign of the link roads between North Queensferry and Admiralty Junction ensures continuous connection during and after the construction period. The national cycling routes No1 and No76 which pass through Ferrytoll will be re-routed and preserved.

228. In the south the suggested route seeks to minimise the impact on all paths, including core paths. Access to the countryside around South Queensferry will be consolidated to the south by the redesign of the A8000 Bridge to provide wide verges, to the west by the provision of dedicated facilities on the A904 within the roundabout over the bridge approach road and the provision of a footpath and cycleway on the Saltire road over the narrow section to the east of the new bridge. The very substantial reduction of traffic flows on the A904 to the south of South Queensferry will improve the environment of that road for walking and cycling. The loss of the unclassified road link to the south west from the A904 will be compensated by the continued availability of the road into which it connects and the improved facilities westwards to its junction along the A904. The proposed scheme will not result in the loss of community facilities and no open public space will be lost. Some severance is predicted between South Queensferry and the housing at Linn Mill although this will not be significant.

229. Pedestrian ambience crossing the Forth Road Bridge will be improved with the removal of the high volumes of general traffic from the carriageways of the bridge, and pedestrian access to the south end of the bridge will be improved.

Human rights

230. It is considered that the provisions of the Bill are compatible with the European Convention on Human Rights (ECHR) Article 1 of Protocol 1 which states that “Every natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest” and Article 8 which provides that “Everyone has the right to respect for his private and family life, his home and his correspondence” and through these to Article 6 so as to ensure that “everyone is entitled to a fair and public hearing within a reasonable time by an independent and impartial tribunal established by law”. The Parliamentary process to which the Bill will be subject enforces that right to be heard by permitting those whose interests are affected an opportunity to present their case before an independent and impartial party.

231. The Bill proposes that compensation will be available to those whose land and rights in land are affected, permanently and temporarily, and those who will be affected by statutory nuisance from the use of the works under the same terms as are applied to the provision of new roads and bridges constructed under the powers of the Roads (Scotland) Act 1984 or the New Roads and Street Works Act 1991.

Island communities

232. The Bill has no effect on island communities.

Impact on local government

233. Surveys and studies on noise and air quality have taken place as part of the Environmental Impact Assessment to inform the project. Monitoring of noise and air quality will take place during construction. Local authorities will continue to be responsible for monitoring air quality as part of their ongoing responsibilities.

234. Local authorities will be responsible for managing, maintaining and monitoring the new and improved roads constructed and (in the case of new roads) transferred to them in accordance with the Bill in line with their responsibilities set out in Section 1 of the Roads (Scotland) Act 1984. These roads include:

- A8000 at South Queensferry
- A904 Builyeon Road at South Queensferry
- B924 Bo’ness Road at South Queensferry
- U221 Builyeon Road at South Queensferry
- B981 at Rosyth/Inverkeithing
- The grade separated roundabout at South Queensferry Junction
- B980 Castlandhill Road at Rosyth
- Ferry Toll Road at Rosyth
- B981 Hope Street at Inverkeithing.
235. The A90 between the Forth Road Bridge and Admiralty Junction will become a trunk road, with responsibility for this road transferring from Fife Council to the Scottish Ministers. Ferrytoll roundabout, which is currently maintained by Fife Council will be replaced under the proposed scheme, with the new gyratory system being a trunk road maintained by the Scottish Ministers.

236. The A90 from the boundary of the FETA’s control at South Queensferry to the east of the bridges over the railways at Dalmeny will become a trunk road, with responsibility for this road and the slip roads at Echline Junction transferring from The City of Edinburgh Council to the Scottish Ministers. Similarly, the M9 Kirkliston Spur from Scotstoun Junction at the A90 to Kirkliston will also become a trunk road.

237. The financial implication for local authorities is discussed in the Financial Memorandum.

Impact on small businesses

238. There will be impacts on farms and business, particularly as a consequence of the compulsory acquisition or use of land and where possible appropriate mitigation has been identified in the Environmental Statement. In addition, financial compensation will be available in line with normal procedures, for land required as part of the proposed scheme, severance, injurious affection and disturbance, and provision for compensation is included in the Bill.

239. Throughout the development of the proposed scheme, there has been consultation with land owners and business and farming representative organisations.

240. The Bill will also have wider unquantified socio-economic impacts. Improved transport connections and journey time reliability are expected to have significant economic benefits for the local and national economics. The effects on individual businesses will vary depending on the type of business activities. Some local businesses may benefit as a result of improved accessibility. However, for businesses that rely on passing trade, a reduction in traffic levels on some local roads may have an adverse effect. An assessment of wider economic impacts due to the proposed scheme is described in the Economic Assessment section of this Memorandum.

Impact on sustainable development

241. The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life for future generations.

242. The Scottish Government is committed to building a sustainable future and has published its Economic Strategy\(^ {103} \) aimed at creating a more successful country with opportunities for all of Scotland to flourish. To deliver this strategy the Scottish Government has identified five

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Strategic Objectives which map a Scotland that is wealthier and fairer, smarter, healthier, safer and stronger, and greener.

243. Scotland signed up to the UK shared framework for Sustainable Development and this framework sets out five key principles for delivering sustainable development:

- living within environmental limits
- ensuring a strong healthy and just society
- achieving a sustainable economy
- promoting good governance
- using sound science responsibly.

244. These five principles form the basis of all sustainable development policy in the UK.

245. The *Forth Replacement Crossing’s Sustainable Development Policy*\(^\text{104}\) has been developed alongside these five key principles to underpin Scotland’s National sustainable development policy.

246. This policy will help to deliver not only the Project Objectives\(^\text{105}\) for the Forth Replacement Crossing but also the Scottish Government’s ‘New Purpose and Strategic Objectives’\(^\text{106}\).

247. Sustainability has and will continue to form a core thread throughout all the activities of the project team and stages in the project life cycle:

- project design and appraisal
- preparation of contract documents, and hence tenderers’ designs (dependent on procurement method)
- tender evaluation
- construction
- maintenance
- operation (and decommissioning).

248. In order to assist with testing the sustainability of the various stages in the project a sustainability framework that underpins the policy has been produced. This framework consists


\(^{106}\) Scottish Government’s Strategic Objectives - [http://www.scotland.gov.uk/About/scotPerforms/objectives](http://www.scotland.gov.uk/About/scotPerforms/objectives)
of a matrix of sustainability objectives (currently 17) with associated targets (currently 40) and indicators. For example, an aim is to reduce the number of unplanned closures compared to that of the existing bridge, and also improve the reliability of journey times.

249. The project is working towards the Civil Engineering Environmental Assessment and Award Proposed scheme (CEEQUAL) for the proposed scheme. CEEQUAL\(^{107}\) is an assessment and awards proposed scheme for improving sustainability in civil engineering and public realm projects.

**Impact on the Environment**

250. The associated Environmental Statement provides a comprehensive assessment of the likely impact of the project and the measures that are to be deployed to seek to mitigate that impact.

251. The envisaged construction programme takes cognisance of environmental constraints, including those relating to the internationally designated sites in the vicinity of the proposed scheme and the Code of Construction Practice contained with the Environmental Statement sets out clearly the conduct of operations during the construction phase.

This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

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- **Forth Replacement Crossing Study: Report 1: Assess Existing, and Forecast Future, Conditions of the Transport Network within the Vicinity of the Forth Road and Rail Bridges** – February 2007
  

  Assessment of existing and forecasted future conditions of the transport network within the corridors of Forth Road and Rail Bridges.

- **Forth Replacement Crossing Study: Report 2: Gaps and Shortfalls** – February 2007
  

  Report identifying the level of performance expected from the road network and identifying gaps and shortfalls to be addressed.

- **Forth Replacement Crossing Study: Report 3: Option Generation and Sifting** – February 2007
  

  Report identifying options for potential replacement crossing.

  

  Assessment of options using the Scottish Transport Appraisal Guidance (STAG).

  

  Report drawing together the key findings of reports 1 to 4.

  

  Non technical summary of the Final Report, summarising the findings of all the work undertaken during the course of the study.

- **Immersed Tube Tunnel Report and Appendix** – June 2007
  

  Paper explaining the pros and cons surrounding an immersed tube tunnel in Corridor C.
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

- **Information Note on Wind Shielding** – July 2007

  Note giving information about the types of wind shielding available and examples of where wind shielding is used on other bridges.

- **Information Note on HGV restrictions** – July 2007

  Note using Transport Model for Scotland (TMfS) to illustrate the likely diversion routes associated with closure of the forth Road Bridge to HGVs in 2013.

- **Forth Replacement Crossing Study Public Information Events Feedback Report** - August 2007

  Report outlining details of the feedback received at the August 2007 Public Information Exhibitions.

- **Forth Replacement Crossing Study: Strategic Environmental Assessment Environmental Report** – September 2007

  Environmental Report Report on the Strategic Environmental Assessment (SEA) for the Forth Replacement Crossing Study.

- **Comparison Paper on International Bridges and Tunnels** – November 2007

  Paper highlighting similarities and differences of comparable bridge and tunnel designs from around the world with those proposed as part of the forth Replacement Crossing Study.

**Transport Scotland Documents**

- **Scottish Transport Appraisal Guidance** – September 2003
  [http://www.transportscotland.gov.uk/stag/home](http://www.transportscotland.gov.uk/stag/home)

  Provides a framework to assess evidence based transport problems and opportunities, and promotes analysis that can be applied in all transport appraisal contexts.
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

- **Transport Scotland Roads for All** – December 2006

  A disability action plan for Scotland’s trunk road network.

- **Strategic Transport Projects Review (STPR)** – December 2008
  [http://www.transportscotland.gov.uk/stpr](http://www.transportscotland.gov.uk/stpr)

  This report summaries the process and outcomes of the STPR and presents summaries of the 29 interventions identified.

**Forth Replacement Crossing Documents**

- **Environmental Surveys & Ground Investigations - Information for Landowners** – March 2008

  Information leaflet about environmental surveys and ground investigations for the Forth Replacement Crossing.

- **Forth Replacement Crossing: Engaging with Communities** – August 2008

  Document outlining how the public and stakeholders can get information and provide feedback on the Forth Replacement Crossing.

- **Forth Replacement Crossing Sustainable Development Policy** – January 2009

  The Forth Replacement Crossing’s Sustainable Development policy has been developed to harmonise with five key principles that underpin Scotland’s National sustainable development policy.

- **Forth Replacement Crossing: Route Corridor Options Review** – April 2009

  This report details the assessment work on nine mainline connecting road corridors identified: three in the northern and six in southern study areas. It recommended two northern and two southern corridor options be taken forward for further assessment. Engineering, environmental and cost considerations are given as justification for sifting out routes.
This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

- **Forth Replacement Crossing: DMRB Stage 2 Corridor Report: Volume 1 (Main Report)** – April 2009

  The first volume of the Design Manual for Roads and Bridges Stage 2 Corridor Report for the Forth Replacement Crossing, including the main report and appendices.

- **Forth Replacement Crossing: Main Crossing (Bridge) Scheme Assessment Report Development of Options** – April 2009

  Report on the assessment of options for the outline design of the replacement crossing.

- **Forth Replacement Crossing: Forth Road Bridge: Feasibility of Multi-Modal Corridor** – April 2009

  Report on the feasibility of utilising the existing Forth Road Bridge for non motorised and public transport/light road traffic, including for a potential future guided bus/tram/light rail facility.

- **Forth Replacement Crossing: Main Crossing (Bridge) Scheme Assessment Report Development of D2M Alternatives** – April 2009

  Report on the assessment of options for a narrower replacement crossing to carry a dual carriageway road with hard shoulders.

- **Forth Replacement Crossing: Managed Crossing Scheme: Scheme Definition Report** – April 2009

  Summarises the development work carried out during 2008.


  This report documents the feedback received at public exhibition events held in January 2009, explains how this has been, or is being, taken into account and describes the outcomes of the consultation.

- **Forth Replacement Crossing: Public Information Exhibitions: Feedback & Outcomes Report - Appendix** – November 2009
  [www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info)

  This appendix gives responses to all feedback comments from the January 2009 exhibitions.

  This guide provides information and advice about the statutory procedures that the Scottish Ministers and Transport Scotland propose to follow for the compulsory purchase process for the Forth Replacement Crossing project.

• **Consultation and Engagement Report** – November 2009  
  [www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info)

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  A report setting out defined objectives and sustainable design measures with the aim of delivering a more sustainable scheme.

• **Forth Replacement Crossing DMRB Stage 3 Scheme Assessment Report** – November 2009  
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**Scottish Government Documents**

• **Scottish Government’s Planning Advice Note 58** – October 1998  

  Advice to planning authorities and developers on the Environmental Impact Assessment.

• **Scotland’s National Transport Strategy** – December 2006  

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• **Scottish Government Planning Advice Note PAN 81: Community Engagement - Planning with People** – March 2007  

  Advice to planning authorities and developers on how communities should be properly engaged in the planning process.
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- **Scottish Government’s Strategic Objectives** – May 2007  
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- **National Planning Framework 2** – December 2008  

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**Scottish Parliament Documents**

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This document relates to the Forth Crossing Bill (SP Bill 33) as introduced in the Scottish Parliament on 16 November 2009

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POLICY MEMORANDUM