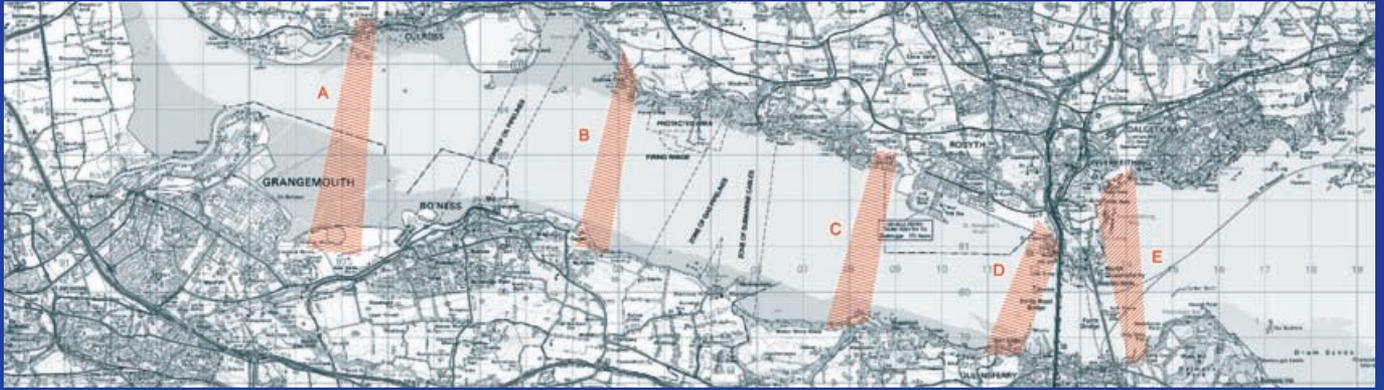




# An introduction to the Forth Replacement Crossing



**FORTHREPLACEMENTCROSSING**  
[www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info)



## Introduction

The Forth Bridges are one of the most famous images of Scotland - two distinctive and impressive engineering structures, spanning the Firth of Forth and recognised the world over.

The Forth Road Bridge is the main route across the Forth for thousands of businesses and commuters. It is an economic lifeline for Fife, Edinburgh and the east coast of Scotland and vital to the wealth of Scotland as a whole.

Alternatives to car travel - such as Park and Ride and increased rail services - are in place and more will be developed in the future to stem reliance on the car. But maintaining crucial links connecting the east coast economic corridor is vital. That is why work to build a replacement crossing which will be fit for the future is underway.

This leaflet, the accompanying exhibitions and detailed reports explain why a Forth Replacement Crossing is needed and how it is being developed.

## The Forth Road Bridge

When the Forth Road Bridge opened in 1964 it was one of the world's most impressive feats of engineering and the longest suspension bridge anywhere outside the USA.

At that time, around 2 million vehicles used the crossing to travel north over the Firth of Forth every year. In 2006, this figure was closer to 12 million - growing more than five-fold in 40 years - far higher than the national average traffic growth. With 66,000 vehicles per day, the Forth Road Bridge carries 70% of the traffic that crosses the Forth.

Despite constant maintenance and investment throughout its lifetime, the bridge is now showing signs of deterioration, mainly as a result of the increasing weight and number of vehicles but also due to weather and climate.

The Forth Road Bridge is managed and maintained by the Forth Estuary Transport Authority (FETA) which has done considerable work to assess the condition and strength of the bridge. FETA has announced that maintenance works will become more common in the future. In particular the bridge's main cables are corroding and although this process can potentially be slowed by using a de-humidification system the results of this will not be known for some time.

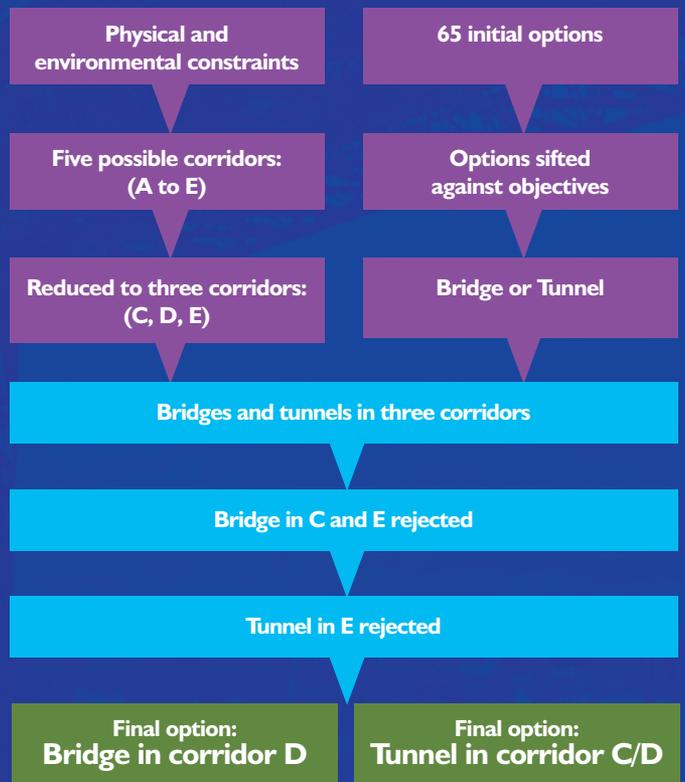
Options for repairing the bridge include completely replacing cables, adding new cable above existing cable or adding new cable alongside existing cable.

Carrying out these works while the bridge remains open to traffic would take between 5½ and 7 years and could mean contraflows for 56 weeks and partial closures for 48 weeks over a four-year period. It could even mean the bridge would be closed completely for 50 weekends.

## Developing the new crossing

In 2006 and 2007 Transport Scotland and a group of leading transport consultants have been exploring options for a new Forth crossing. This process has worked down from an original list of 65 options to the final short-list of two - a bridge or a tunnel to the West of the existing Forth Road Bridge.

Over time the options have been sifted as follows:



This process is explained in more detail at the exhibition and in the detailed reports which can be found on the project website – [www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info)



Artist's impression of cable stay bridge.

## Option I: Bridge

The first of the two final options from the study is a new bridge in corridor D to the west of the existing Forth Road Bridge.

Engineers have recommended a cable stayed bridge, although a suspension bridge similar to the existing Forth Road Bridge has not been ruled out.

Bridge design has advanced significantly since the Forth Road Bridge was built and any new bridge would feature the latest technology, such as a built-in dehumidification system, to ensure it is fit for the long term.

### Key facts:

- 2.2 km long
- Southern access linking with M9 approximately 1 km west of M9 Junction 1a
- Northern access linking with A90/M90 in the vicinity of Ferrytoll Junction

#### Cable Stay option:

- 5 ½ years to construct
- Cost estimate £1.5 billion at 2006 prices
- Benefit to cost ratio 4.31

#### Suspension option:

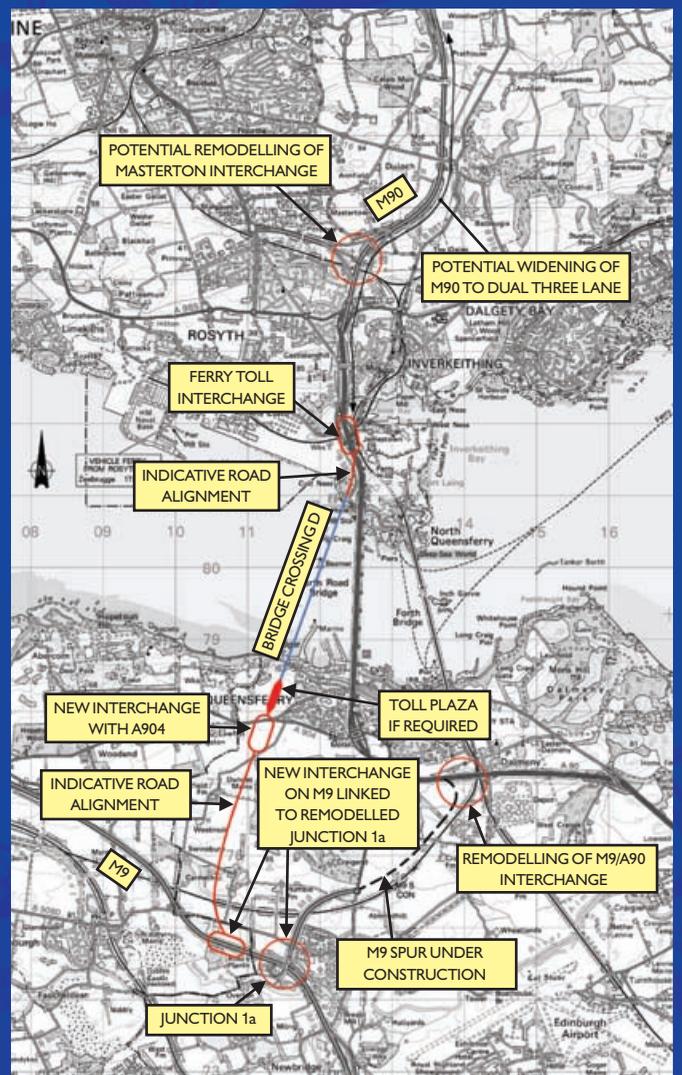
- 6 years to construct
- Cost estimate £1.7 billion at 2006 prices
- Benefit to cost ratio 3.83

### Key benefits:

- Does not directly affect the special protected environmental sites
- Is the cheapest of all the options
- Can be built quicker – around two years less than tunnel options
- Has the highest benefit to cost ratio
- Can include more lanes than a tunnel and therefore feature bus lanes / high occupancy vehicle lanes etc
- Can be used by cyclists and pedestrians
- Fewer risks during construction

### Key drawbacks:

- Could have some indirect impact on the special protected environmental sites
- Construction is likely to fit round breeding and wintering bird seasons
- Northern part of bridge passes through a site of special scientific interest
- Would incur some loss of woodland
- Greater visual impact on the landscape than tunnels



## Option 2: Tunnel

The second option under consideration is a tunnel, again to the west of the existing Forth Road Bridge.

The precise line of the tunnel has not been fixed, as it will be influenced by the ground conditions that are found when more detailed survey work is carried out. It is anticipated that the tunnel would lie within corridors C and D.

Engineers have suggested that the most appropriate way to build a tunnel in this area would be to use a tunnel boring machine, although immersed tube tunnel techniques are also possible.



### Key facts – Corridor C Tunnel:

- Twin bore tunnel (one tunnel in each direction)
- 8.5 km long
- Northern entrance linking with M90 at Junction 2
- Southern entrance linking to M9 near Craigton Quarry
- 7 ½ years to construct
- Cost estimate £2.3 billion at 2006 prices
- Benefit to cost ratio 2.23

### Key facts – Corridor D Tunnel:

- Twin bore tunnel (one tunnel in each direction)
- 7.3 km long
- Northern entrance linking with Admiralty Road
- Southern entrance linking with M9 North of Humber Reservoir
- 7 ½ years to construct
- Cost estimate £2.2 billion at 2006 prices
- Benefit to cost ratio 2.68

### Key facts – Immersed Tube Tunnel:

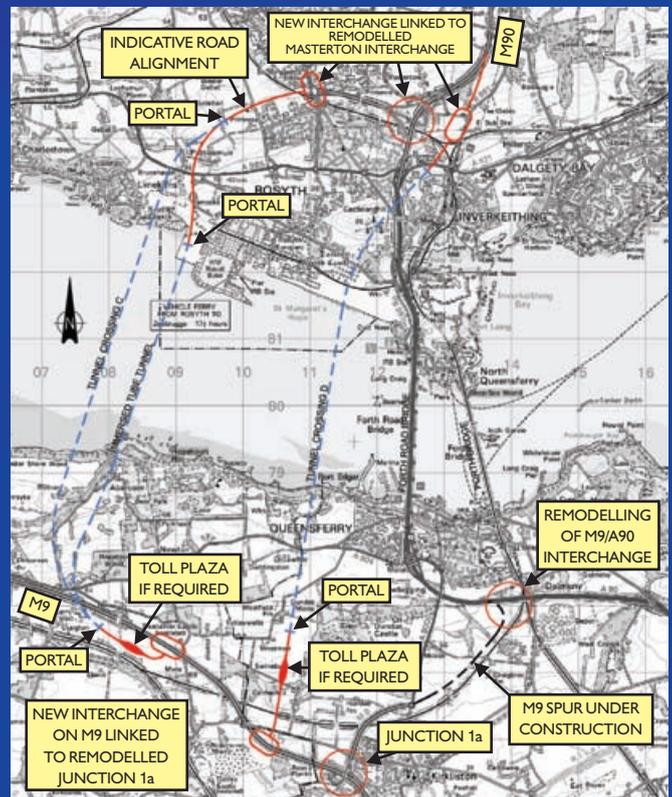
- Twin carriageway tunnel
- 6.15 km long of which 2.2 – 2.3 km is immersed tube
- Northern entrance links with M90 at Junction 2 via A823 (M)
- Southern entrance linking with M9 near Craigton quarry
- 5 ½ years to construct
- Cost estimate £2.1 billion
- Benefit to cost ratio of 2.44

### Key benefits:

- Minimises visual impact on the landscape except for portals, ventilation shafts and road connections
- Avoids impact on special protected areas because the entrance / exists are further inland (Twin Bore Tunnel only)
- Tunnel sections can be constructed in dry dock. Allows fabrication in a controlled environment (Immersed Tube Tunnel only)
- Immersed Tube Tunnel allows more flexible use of carriageway space and greater potential for light rapid transit

### Key drawbacks:

- Tunnel costs around 50% (£800 million) more than the bridge option
- Immersed Tube Tunnel would take a similar time to construct as a bridge - bored tunnel would take around 2 years more



- More significant risks during construction
- Requires extensive trench excavation in river bed resulting in significant environmental impacts on protected areas (Immersed Tube only)
- Impact on Special Protection Area during construction (Immersed Tube only)
- Environmental impacts may result in annual limits on construction and breaks in trench excavation (Immersed Tube only)
- Direct impact on southern shore due to cut and cover section (Immersed Tube only)
- Dolerite rock likely to be present necessitating blasting
- Difficult ground conditions could add to length of tunnel, cost and timescale
- Only two lanes in each direction therefore unable to accommodate bus lane / cyclists / pedestrians (Twin Bore only)
- Requires special management plan for hazardous loads such as petrol

# Protecting the environment

As well as being an area of great beauty, the Firth of Forth is home to a number of very significant environmental features, protected species and flora and fauna. These include:

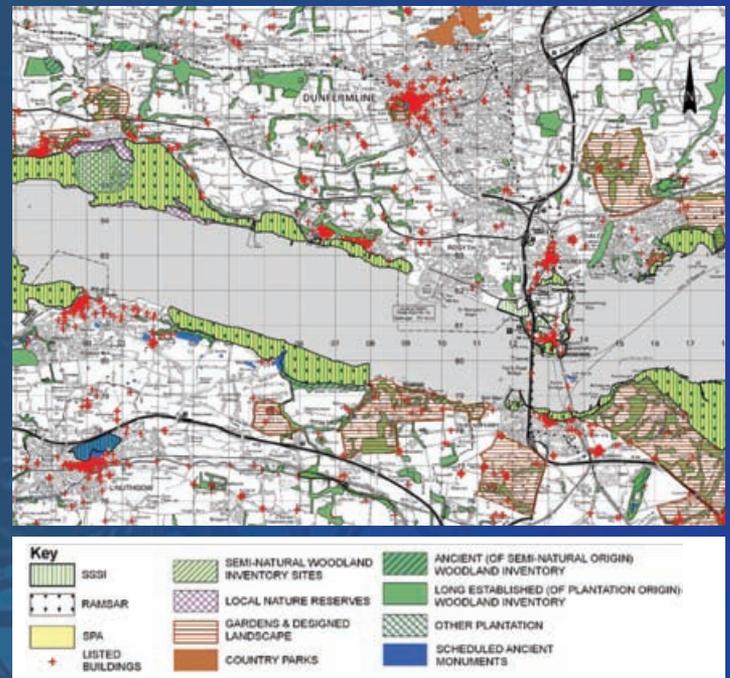
- SPAs – Special Protection Areas which are important habitats for rare and migratory birds
- Ramsar sites – wetlands of international importance
- SACs – Special Areas of Conservation with listed species of flora and fauna
- SSSIs – Sites of Special Scientific Interest due to the presence of wildlife
- SAMs – Scheduled Ancient Monuments
- GDLs – Gardens and Designed Landscapes
- Country parks, local nature reserves and significant historic features
- Listed buildings, archaeological sites and heritage conservation areas
- Various woodlands and specially protected trees
- Areas of Landscape Value
- Greenbelt zones
- Rights of way and other public accesses

The need to protect the environment of the Firth of Forth has been an important part of the study. One of the objectives against which all options have been appraised is: 'Minimise the impact on people, the natural environment and the cultural heritage of the Forth area.'

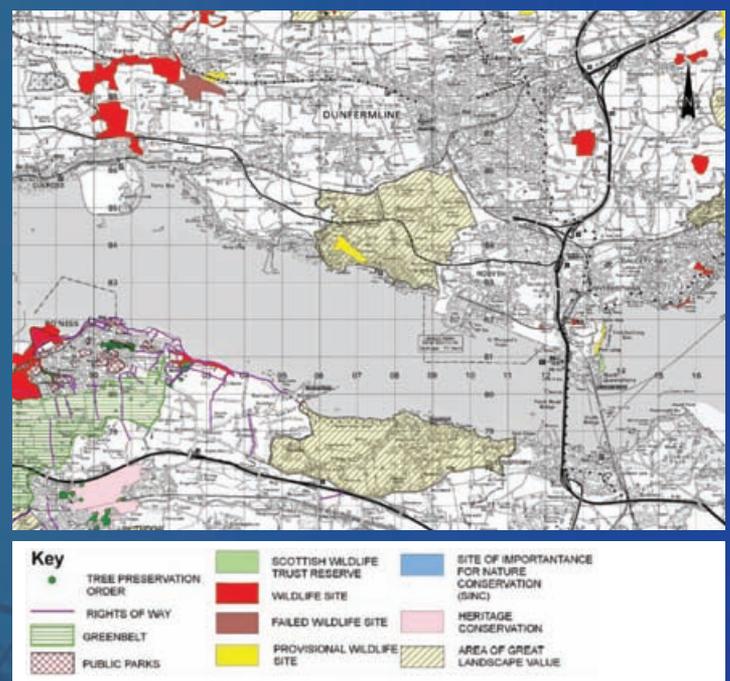
These environmental features, many of which are protected under legislation, will be carefully considered during the design of the crossing working closely with organisations such as Scottish Natural Heritage, Scottish Environment Protection Agency and Historic Scotland.



Map showing National Protected Sites



Map showing Local Protected Sites



## Public information exhibitions

A public information exhibition is being held in various venues in August 2007 to provide further information on the options for the Forth Replacement Crossing.

**Roxburghe Hotel, Charlotte Square, Edinburgh**

20-24 Aug 2007 10am to 8pm

**The Queensferry Hotel, North Queensferry**

20 Aug 2007 2pm to 8pm

21-24 Aug 2007 10am to 8pm

25 Aug 2007 10am to 5pm

**Apex City Quay, Dundee**

27 Aug 2007 10am to 8pm

**Orocco Pier, South Queensferry**

27 Aug 2007 10am to 8pm

**Balgeddie House Hotel, Glenrothes**

28 Aug 2007 10am to 8pm

**Marriott Hotel, Glasgow Road, Edinburgh**

28 Aug 2007 10am to 8pm

**Dean Park Hotel, Kirkcaldy**

29 Aug 2007 10am to 8pm

**Holiday Inn, Queensferry Road, Edinburgh**

29 Aug 2007 10am to 8pm

**Best Western Queens Hotel, Perth**

30 Aug 2007 10am to 8pm

**Best Western Braid Hills, Braid Road, Edinburgh**

30 Aug 2007 10am to 8pm

**BLCC, Halbeath, Dunfermline**

31 Aug 2007 10am to 8pm

**Uphall Community Centre, Uphall**

31 Aug 2007 10am to 8pm



## Feedback

Your comments on the Forth Replacement Crossing proposals are most welcome.

Feedback can be provided on our website – [www.forthreplacementcrossing.info](http://www.forthreplacementcrossing.info) – or using the feedback form which can be posted at the exhibitions or sent to:

Forth Replacement Crossing  
6th Floor  
Buchanan House  
58 Port Dundas Road  
Glasgow  
G4 0HF

The closing date for feedback is Friday 7th September 2007.



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