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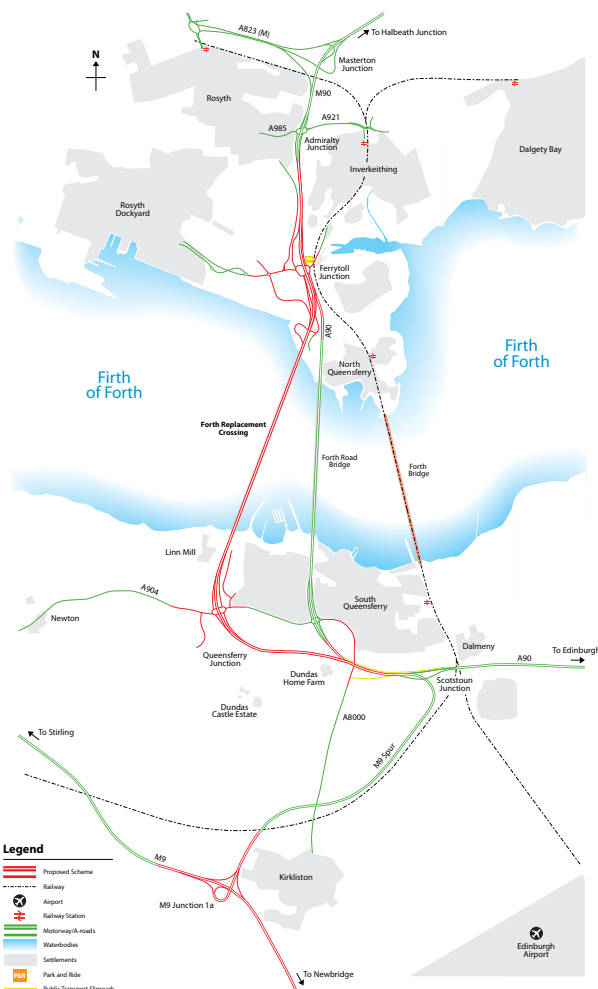
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1. Introduction

Background

This brochure is the Non-Technical Summary of the Environmental Statement for the Forth Replacement Crossing project (FRC).

The FRC is a major road infrastructure project proposed by Transport Scotland, an agency of the Scottish Government. The project is driven by uncertainty over the future viability of the existing Forth Road Bridge, and is designed to safeguard this vital connection in Scotland's transport network. It comprises a new cable-stayed bridge across the Firth of Forth, to the west of the existing Forth Road Bridge, and associated new and improved road infrastructure to the north and south of the bridge. The route of the proposed bridge and connecting roads is shown below.



The proposed scheme will retain the existing Forth Road Bridge as a public transport corridor for use by

buses, taxis and other specified users and for continued use by pedestrians and cyclists. The new bridge (referred to as the main crossing) will be used by all other traffic including private cars and heavy goods vehicles. Emergency vehicles will be able to use either bridge.

The proposed scheme will be authorised through a Hybrid Bill introduced in November 2009 and processed by the Scottish Parliament. A Hybrid Bill is a public Bill which affects a particular interest of a person or a body. It generally relates to a development project.

It is anticipated that construction will start in 2011 and that the FRC will open in late 2016.

Environmental Impact Assessment

An Environmental Impact Assessment (EIA) of the proposals is required under European legislation and by the Scottish Parliament to identify the potential environmental effects of the proposals. European and UK legislation also require an assessment of the effects of the proposals on internationally designated sites for nature conservation in the vicinity of the proposed scheme. Reports, which are called Reports to Inform an Appropriate Assessment, have been produced for these sites. Information from these separate reports is summarised in the Environmental Statement.

The Environmental Statement reports the findings of the Environmental Impact Assessment work carried out on the FRC proposals during 2008 and 2009. This Non-Technical Summary presents the key issues identified in the Environmental Statement, including the beneficial and adverse impacts considered to be of particular importance. The Environmental Impact Assessment process has also considered the likelihood that, in the absence of a replacement crossing, there will be a need for substantial repairs and refurbishment on the Forth Road Bridge, with associated significant impacts relating to the disruption created by these works.

Further details about the FRC proposals and their impacts can be found within the full text of the Environmental Statement.

Need for the Scheme

The FRC is required because of the uncertainty over the condition and long-term future of the existing Forth Road Bridge. The crossing over the Forth is critical to the east of Scotland economy, providing a vital link between Edinburgh, the Lothians and Fife.

The condition and operational capability of the Forth Road Bridge have deteriorated over time, primarily because of increased traffic and the effects of weather on the bridge. One of the main concerns in recent years has been the condition of the main suspension cables and whether the bridge can continue as the main crossing for all traffic, as well as other ongoing maintenance issues.

In February 2008, a study by the Forth Estuary Transport Authority (FETA) reported that it would be possible to replace the bridge's cables, however this would not be feasible without a replacement bridge being in place because of the severity of the impact on road users and the wider economy. Studies into the rate of cable deterioration are ongoing and the preliminary findings have been taken into account in the design and programming of the FRC proposals.

The FRC has been identified as a key strategic investment project in Scotland's national transport network in the Strategic Transport Projects Review (STPR) undertaken by Transport Scotland in December 2008, and the National Planning Framework (NPF2) published by the Scottish Government in June 2009.

Scheme Objectives

There are eight specific transport planning objectives for the FRC which have underpinned the work on the proposals. These are to:

- maintain cross-Forth transport links for all modes to at least the level of service offered in 2006
- connect to the strategic transport network to aid optimisation of the network as a whole
- improve the reliability of journey times for all modes
- increase travel choices and improve integration across modes to encourage modal shift of people and goods
- improve accessibility and social inclusion
- minimise the impacts of maintenance on the effective operation of the transport network
- support sustainable development and economic growth
- minimise the impact on people, and the natural and cultural heritage of the Forth area.



Artists impression showing the new cable-stayed Forth Replacement Crossing alongside the existing bridges in the Firth of Forth

Alternatives which have been considered

A Forth Replacement Crossing Study (FRCS) was undertaken during 2006 and 2007 to identify the most favourable option for a replacement crossing.

Five potential crossing corridors were identified from an original list of 65 potential crossing solutions. Each of the five corridors was appraised for its suitability for a tunnel or a bridge crossing. The appraisal process considered environmental issues alongside other factors, and concluded that a bridge option in a corridor east of Rosyth and to the west of South Queensferry was the best option due to lowest construction costs, shortest construction programme, lowest construction risk and greatest economic benefit.

Main Crossing Options

Development of the selected bridge (the main crossing) took place during 2008 and 2009. Initially a design was considered which incorporated a dual two-lane motorway, footway/cycleway and a public transport corridor.

The work undertaken by FETA during 2008 indicated that the main cables of the Forth Road Bridge were not deteriorating as rapidly as anticipated and confirmed that it would be feasible to replace them, if necessary, following the completion of a replacement crossing.

FETA has now installed dehumidification equipment to arrest or slow down the rate of corrosion on the main cables of the Forth Road Bridge. An assessment by Transport Scotland established that the Forth Road Bridge, once relieved of general traffic, would be capable of accommodating public transport, pedestrian/cycle facilities and of being adapted for tram/light rail use at a later date. In addition, assuming that FETA's dehumidification scheme is successful and with all general traffic transferred to the replacement crossing, the main cables of the Forth Road Bridge may not require replacement for the foreseeable future.

These findings were incorporated into the project, allowing a narrower, more cost-effective cross-section for the main crossing to be adopted. A range of deck and tower options were considered with aesthetics, construction and cost all taken into account. The selected option was a single deck, twin corridor bridge with single column towers.

Connecting Road Options

In 2008, a review of route corridor options was undertaken to consider potential road connections to the north and south of the Firth of Forth that could connect the recommended bridge corridor to the existing road network. Nine route corridors were identified for assessment: three options to the north of the Firth of Forth (providing connections to the A90/M90) and six options to the south (providing connections to the A90, M9 Spur and M9).



Artists impression of the proposed Forth Replacement Crossing with single column towers

The assessment of the route corridor options considered environmental impact, geotechnical issues (such as the presence of old mineworkings), cost and how successfully the routes would operate as part of the road network. Four options were taken forward for more detailed assessment and the overall recommendation was to develop options north and south of the Firth of Forth which would make best use of existing infrastructure, enable new and improved junction arrangements, minimise environmental impacts and which were the most affordable and economically efficient.

The proposals were further refined between August 2008 and April 2009. Feedback from the public and other project stakeholders was incorporated into this refinement process. This design process resulted in the proposed scheme reaching the stage described and assessed in the Environmental Statement.

The Proposed Scheme

The proposed scheme can be separated into the following three main sections, with overarching traffic management measures supported through the use of an Intelligent Transport System (ITS) which will operate between Halbeath Junction on the M90 and Newbridge Junction on the M9:

- the main crossing
- road connections north of the main crossing to Admiralty Junction (M90 Junction 1)
- road connections south of the main crossing to Scotstoun Junction (A90/M9 Spur), together with enhancement to M9 Junction 1a.

The Main Crossing

The main crossing will be located upstream of the Forth Road Bridge and will consist of a three-tower, cable-stayed bridge and approach viaducts. The total length of the main crossing is approximately 2.7km. This includes the bridge plus the north and south approach viaducts. It will be a dual two-lane motorway with hard shoulders. There will be adequate clearance

(more than 47m) under each of the two main spans of the bridge to maintain access for shipping. The main crossing will include wind shields.

The Forth Road Bridge will become a public transport crossing alongside the main crossing.

Northern Connecting Roads

North of the main crossing, the Ferrytoll Junction will be fully reconstructed to cater for all local and longer-distance traffic movements, pedestrian and cyclist movements, whilst also maintaining access to the existing Forth Road Bridge.

The B981 will be realigned over part of its length and will join Ferry Toll Road, west of the Dunfermline Wastewater Treatment Works. This will maintain access to North Queensferry during the construction period and improve the operation and safety of Ferrytoll Junction. Castlandhill Road will also be realigned to separate local traffic from A90 traffic.

Southern Connecting Roads and M9 Junction 1a

To the south of the main crossing, a new 3.1km section of dual carriageway will be built around the west and south of South Queensferry to join with the A90 and M9 Spur at the Scotstoun Junction. A new Queensferry Junction will link local roads (including the A904) to the new road infrastructure and the main crossing, whilst maintaining pedestrian and cyclist routes.

From the Queensferry Junction to the Scotstoun Junction, the road will be dual three-lane carriageway with hard shoulders, constructed to motorway standard. The additional carriageway width means that the existing A8000 overbridge will require to be reconstructed. Dedicated public transport lanes will be provided from the Forth Road Bridge eastwards in the direction of Edinburgh using the A90, and from the A90 to the A8000 westwards to join a proposed bus priority scheme on that road. There will be no change to the existing A90 from the Scotstoun Junction into Edinburgh.

Junction 1a on the M9 will be redeveloped to provide two general traffic lanes on the existing south-facing slip road and loop to help traffic flow and make better use of the current junction. New west-facing slip roads will be added to better serve West Lothian traffic. The M9 will be widened to provide four lanes of traffic in the southbound direction to complement the proposed improvements to this junction. An additional lane on the M9 will be added in the northbound direction between the River Almond Bridge and Junction 1a to help diverging traffic.

Traffic Management Measures

Traffic management measures will be implemented between Halbeath Junction on the M90 and Newbridge Junction on the M9. Overhead gantries and Intelligent Transport System (ITS) components will provide lane control signals, mandatory (variable) speed limits, ramp metering (to regulate the flow of traffic entering the mainline from a slip road) and other functions to improve the operational efficiency of the road network and reduce congestion.

Lighting

It is anticipated that the main line will be lit in the south between the Scotstoun Junction and the main crossing, as will the section between the main crossing and Admiralty Junction in the north. The side roads in the vicinity of Ferrytoll and South Queensferry junctions are also expected to be lit. The impact of extending the lighting over the full length of the scheme was assessed.

Delivering the Proposals

The Environmental Statement presents the assessment of the project as described in Chapter 4 (The Proposed Scheme). The design of the project may be refined but will still be deemed to comply with the Environmental Statement provided that such refinements incorporated in the design will be subject to environmental review to ensure that residual impacts will be no worse than those reported.

Overview of the Environmental Impact Assessment Process

The Environmental Impact Assessment has been undertaken as an integral part of the design process, informing decisions on the proposals as they were developed. Environmental constraints and issues were identified and incorporated into the decision-making process throughout. Information gathered in the extensive surveys undertaken for the scheme was used in the assessment.

The aims of the environmental impact assessment are to:

- gather information about the environment of the area in the vicinity of the scheme and identify environmental constraints and opportunities that may influence or be affected by the proposed scheme



Example of Intelligent Transport Systems (Picture courtesy of the Highways Agency)

- identify and assess potential environmental impacts
- identify and incorporate measures into the scheme design and operation to avoid, reduce or offset adverse impacts and enhance beneficial impacts
- assess the residual effects of the scheme.

Impacts were assessed by comparing them to the baseline conditions which would exist if the scheme did not go ahead. For the purposes of the Environmental Impact Assessment, it was assumed that the Forth Road Bridge and the existing road network would continue to be used if the FRC proposals were not implemented. In addition, it is recognised that if a new crossing is not provided, it is very likely that an extended period of major, very disruptive repair works on the existing bridge would be required. A supplementary assessment of the impact of these works was therefore undertaken and consideration given to the implications for the findings of the Environmental Impact Assessment if these works were included in the baseline conditions.

Consultation and Scoping

As part of the design development and assessment process, a comprehensive consultation exercise was carried out with more than 160 consultees, including local authorities, Historic Scotland, Marine Scotland, Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH), relevant community councils and more than 100 landowners and tenants. Public exhibitions were held in January 2009 as part of a programme of ongoing public engagement and consultation.

The purpose of the consultation exercise was 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 site conditions
- obtain input to the identification of potential impacts and the development of appropriate mitigation, including design development
- inform the scope of the Environmental Impact Assessment.

The FRC project team has worked closely with all the key stakeholders to develop a scheme that aims to reduce environmental impacts by avoiding sensitive features and through careful design. Stakeholder feedback was reviewed by the assessment team and incorporated into the assessment and design process where appropriate.

2. Impacts of the proposals

Land Use

The main settlements to the north of the Firth of Forth include Dunfermline, Rosyth, Inverkeithing, Dalgety Bay and North Queensferry. Settlements to the south of the Firth of Forth include South Queensferry, Dalmeny, Winchburgh and Kirkliston, as well as smaller communities such as Newton and a number of individual properties and farmsteads.

The careful design of the proposed scheme has ensured that no property demolitions will be required. However, the scheme will require part of the garden of Inchgarvie House for the main crossing abutment at the southern bridgehead (the structure connecting the bridge to the land).

The scheme may require a small amount of land from Hope Street Cemetery in Inverkeithing and this has been considered in the environmental assessment. The development of the detailed design may, however, avoid the need for this.

Businesses in the vicinity of the FRC and those in the wider regions of Fife and the Lothians will benefit from improved accessibility as a result of the scheme. Some businesses may experience adverse impacts, for example Deep Sea World as a result of the loss of the overflow car park, and the Queensferry Hotel as a result of disruption during construction and also possible interruptions in views of the hotel for northbound traffic travelling over the main crossing. Some areas used for recreation will also be affected by the proposed scheme, including the western edge of the playing fields at Kirkliston.

There are areas of high quality agricultural land located in the vicinity of the scheme to the north and south of the Firth of Forth. The proposed scheme will result in both the permanent and temporary loss of some of this agricultural land and some disruption to field access. Some land will be offered back to farmers under statutory procedures to be returned to agricultural use where practical. Accesses and boundary walls and fences will be suitably reinstated to reduce overall

impacts. Approximately 100 hectares of agricultural land will be lost overall, 74 per cent of which is classed as prime quality agricultural land. Approximately 12.5 hectares of this land may be returned to agriculture after construction.

The land use assessment also considered the potential for future development in the area. Adverse impacts are anticipated for several areas identified for future development to the south of the Firth of Forth. The impacts on all but one of these areas relate to the loss of fewer than 0.5 hectares of land. The exception is for the Springfield Road housing and open space allocations to the west of South Queensferry where construction of the proposed scheme will require more than five hectares.

Geology, Contaminated Land and Groundwater

There are two Sites of Special Scientific Interest (SSSI), designated for their national importance in terms of geology/geomorphology and ecology in the vicinity of the proposed scheme:

- Ferry Hills SSSI will be impacted by the rock cut for the proposed scheme. However, careful mapping of the weaknesses in the rock and the implementation of SNH recommendations regarding rock reprofiling will reduce impacts to a level deemed 'not significant'. Further refinement of the scheme design may avoid the need for this rock cut.
- St. Margaret's Marsh SSSI will potentially be impacted by changes to groundwater flow and quality. Careful design and construction of the B981 road embankment and monitoring both prior to, during and after construction, will ensure that impacts are successfully controlled and reduced to 'not significant'.

The proposed scheme will not affect the geomorphologic interest of the Firth of Forth SSSI.

The proposed scheme will carry risks associated with disturbance of areas of contaminated land, such as former landfills, backfilled quarries and former mining areas, however the risk of contamination is considered to be low. The contractor will use recognised best practice site management techniques to ensure that any risks to the environment are controlled.

The assessment has also considered the impacts on aquifers and private water supplies. No significant adverse impacts have been identified. If required, groundwater flow and quality monitoring equipment will be installed in selected areas to check impacts and inform the need for further mitigation, or alternative supplies will be provided. It is also proposed that the road drainage and treatment systems will be lined in areas close to sensitive aquifers or private water supplies in order to prevent potential contamination.

Water Environment

Environmentally sensitive waterbodies in the vicinity of the proposed scheme include:

- the Firth of Forth
- St. Margaret's Marsh
- the River Almond
- various minor burns and ponds including Niddry Burn, Swine Burn and Linn Mill Burn.

Swine Burn will be realigned and requires a new crossing structure, in the form of a culvert (a pipe taking

the watercourse under the carriageway). Existing culverts on Swine Burn, Niddry Burn and a tributary of Niddry Burn will be extended. These works have the potential to affect the form of the water channel and increase flood risk. Careful design and the provision of appropriate compensatory flood storage will reduce potential impacts to 'not significant'. The realignment of Swine Burn will also improve the channel form.

A range of Sustainable Drainage Systems (SUDS) for the treatment and attenuation of road drainage will be provided to reduce potential impacts on all identified waterbodies to 'not significant'.

Measures will be implemented to reduce the risk of adverse impacts on the water environment during construction. These will reduce potential construction impacts to 'not significant' for all identified waterbodies.

Terrestrial and Freshwater Ecology

There are a number of sites in the vicinity of the proposed scheme designated for their ecological importance. These include St. Margaret's Marsh SSSI, Ferry Hills SSSI and a number of locally important sites which are protected through local planning policy such as Sites of Importance for Nature Conservation (SINCs), Local Biodiversity Sites and Local Wildlife Sites.

The River Almond and its tributaries are designated under national legislation as 'salmonid waters' because they support Atlantic salmon, sea trout and brown trout.



Example of drainage ponds draining recent rainfall

The range of habitats close to the proposed scheme includes arable land and other farmland with smaller areas of wetland, grassland, woodland and freshwater habitats. Some of these are valuable habitats supporting protected species including badger, bats, great crested newt and otter.

Measures to reduce and offset potential adverse impacts on ecology include:

- creating and enhancing habitats through replacement and additional planting
- translocating important species such as maiden pink and bluebell
- providing bat boxes
- providing replacement badger setts and otter holts
- using mammal underpasses under the road and fencing to guide animals to the tunnels
- including mammal ledges in new culverts
- ensuring that culverts and watercourse realignments are constructed in accordance with best practice guidelines.

These measures will help to avoid or reduce impacts on habitats, protected species and designated sites.

No significant residual impacts are predicted for the following protected species during construction or operation:

- badger
- terrestrial wintering and breeding birds
- water vole
- red squirrel
- amphibians, reptiles and terrestrial invertebrates.

The assessment predicts negligible adverse effects on bats during construction at Port Edgar Barracks and west of South Queensferry, and low adverse effects on otter due to the disturbance and severance of commuting routes along the River Almond, Swine Burn and Niddry Burn.

During scheme operation, beneficial impacts are predicted at:

- North Queensferry and South Queensferry where the main crossing will facilitate movement of bats across the Firth of Forth
- Swine Burn where river habitat creation and enhancement as part of the watercourse re-alignment will benefit freshwater habitats and species.

Consultation is ongoing to develop an appropriate agreement with SNH for the management of wetland habitat at St Margaret's Marsh SSSI, which has the potential to achieve beneficial impacts at this site.



Estuarine Ecology

Internationally important sites in the vicinity of the proposed scheme include the Firth of Forth Special Protection Area (SPA), Forth Islands SPA and the Firth of Forth Ramsar site. These sites are designated for their international ecological importance for birds. In addition, the River Teith Special Area of Conservation (SAC), located approximately 35km upstream, is designated under the Habitats Directive for its populations of salmon and lamprey. The Imperial Dock Lock, Leith SPA is located approximately 16km downstream and is designated for regularly supporting breeding populations of common tern.

The Firth of Forth includes important areas of intertidal and subtidal habitats, and supports migratory and non-migratory fish, sediment-dwelling organisms, marine mammals (including dolphins, whales and seals) and a range of estuarine birds.

Surveys confirmed the presence of a wide range of bird species including 26 wildfowl species (ducks, divers and geese), 11 species of gulls/petrel and 14 species of wader. Auk, cormorants and herons, swans, raptor (peregrine), kingfisher and raven were also recorded. A number of these species (some 23) are protected by European and national legislation.

Measures which will be implemented during construction to reduce impacts on estuarine habitats and species include:

- using best practice construction techniques and following pollution prevention guidelines
- employing an Ecological Clerk of Works to supervise the works including excavation and piling activities
- sensitive timing of construction activities, e.g. to avoid the tern breeding season
- using acoustic deterrents during key construction periods to discourage sensitive species from entering the area.

The detailed Reports to Inform an Appropriate Assessment which have been prepared for all potentially affected international sites will be used for assessment by the Scottish Ministers. These reports conclude that the



Beamer Rock

integrity of the sites of international importance will not be affected by construction or operation of the proposed scheme.

Construction of the main crossing will require excavation on Beamer Rock, required for the central pier foundation and piling activities. Noise and vibration from construction will cause some disturbance to wildlife (including fish, estuarine birds and marine mammals), however the impacts will be short term and carefully controlled. There will be a loss of benthic habitats (habitats on the bottom of the Firth of Forth) but it is anticipated that fauna and flora will rapidly recolonise and populations of fish and estuarine birds are expected to return to the area once construction activities cease. The area affected by permanent impacts in the Firth of Forth is small compared to the total area of intertidal habitat within the estuary and it is likely that the main crossing structures will create a small amount of new intertidal hard substrate habitat.

Landscape

The Firth of Forth is a maritime landscape of intertidal shores, islands and harbours where the prevailing weather and light conditions provide a dramatic setting for the iconic Forth Road Bridge and Forth (rail) Bridge.

To the north, the landscape of Fife's coastal terrace is dominated by settlements and industry. Infrastructure is also prominent, with roads and railways cutting through the steep wooded cliffs and braes.

South of the Firth of Forth, the historic town of South Queensferry is surrounded by rolling arable farmland and the wooded estates of Dalmeny, Hopetoun and Dundas, which are designated as Historic Gardens and Designed Landscapes by Historic Scotland and SNH. There is an Area of Outstanding Landscape Quality around Humble Reservoir and an Area of Great Landscape Value along the shore of the Firth of Forth between Blackness and South Queensferry, which includes Hopetoun Estate. These are designations awarded by the relevant local planning authority.

The sensitivity of the Firth of Forth and the estates around South Queensferry is high, whilst the developed land in Fife is considered less sensitive.

Aesthetics are a major consideration in the design of the main crossing, which will be the most prominent element of the proposed scheme and will be a new structure in both the local and wider landscapes. The main crossing is designed to complement, rather than detract from the Forth Road Bridge and Forth Bridge. However, it

is recognised that opinions will vary on the effect of the new structure upon the familiar setting of the existing bridges, so its presence was assessed as neither beneficial nor adverse but as neutral, with only the significance of change noted in the Environmental Impact Assessment.

The assessment also looked at the potential impact of introducing new roads, traffic and features such as road lighting and gantries into the landscape. Impacts associated with the loss of mature woodland and disruption to the landscape character were also examined.

Measures are proposed to ensure continuity of the landscape, enhance the experience of the road user and promote a 'sense of place' (the character and spirit of an area). These measures include integrating the road alignment and earthworks with the surrounding topography, forming new rock cuttings and providing false cuttings to achieve a natural appearance.

Proposals include reinstating stone walls and providing noise barriers, woodland, hedgerow and standard tree planting to reflect the existing landscape character and provide screening.

On the north side of the Firth of Forth, the landing of the main crossing and northern road connections will have significant adverse impacts for the landscape of Ferry Hills and St. Margaret's Marsh, an area of reclaimed coastal flat west of North Queensferry.

South of the Forth, the landscapes of South Queensferry and the farmland to the west will be adversely affected



by the main crossing landing and southern connecting roads. The impacts of the main crossing are considered to be adverse in this location because of the presence of the bridge abutment and approach road structures. The designed wooded landscape of the Dundas Estate will also be adversely affected by significant impacts from the proposed scheme. Elsewhere, impacts upon the surrounding landscape will not be significant.

Visual

The open views across the Firth of Forth are dominated by the Forth Road Bridge and Forth Bridge. The bridges are visible from a wide area, including many of the small coastal settlements along the Firth of Forth and distant viewpoints in Edinburgh, Dunfermline and Kincardine and in clear conditions, the Ochil, Lomond, Pentland and Moorfoot Hills.

Views north of the Firth of Forth are generally enclosed by the surrounding steep wooded hillsides of Castlandhill and Ferry Hills and are influenced by the surrounding settlements, industry and infrastructure. South of the Firth of Forth, views are limited by the rolling topography of the open farmland around South Queensferry and screened by the mature woodland of the Dundas Estate.

The assessment of visual impact considered changes in views from buildings and outdoor public areas, which are called 'receptors'. Visual impacts will typically occur where a receptor is close to the proposed scheme or where open views are possible towards the proposed scheme.

The main crossing will be the most visually prominent element of the proposed scheme and will feature as an additional structure in both local and distant views.

The main crossing has been designed to be an aesthetically pleasing structure, sympathetic to the visual character of the area. The simple, elegant design of the bridge is intended to complement the existing views, including those where the main crossing would be viewed directly in front of or beyond the Forth Road

Bridge and Forth Bridge. The measures described in the landscape section above will also help to reduce the visual impacts of the scheme.

The main crossing was assessed (as in the landscape assessment) as having neutral rather than beneficial or adverse impact, because it is acknowledged that opinions will differ as to whether it will complement or detract from the visual character of the area. For the majority of receptors, views towards the main crossing will not be significantly changed. Significant (moderate or greater) neutral impacts are predicted for 217 properties and 23 outdoor receptors.

Adverse visual impacts will be significant for properties located in close proximity to the main crossing, including St. Margaret's Hope (also known as Admiralty House), St. Margaret's Hope Gatelodge, Ferry Craig House and Tigh-na-grian north of the Firth of Forth and Inchgarvie House, Clufflat, Clufflat Brae and Linn Mill south of the Firth of Forth.

The transfer of traffic from the Forth Road Bridge to the main crossing will result in beneficial impacts for properties in South Queensferry, where existing views are dominated by the constant heavy flow of traffic on the Forth Road Bridge.

Adverse visual impacts from the northern road connections will be significant for properties at Whinnyhill Crescent, St. Margaret's Hope Gatelodge and footpaths in the vicinity of Castlandhill, Ferrytoll and St. Margaret's Marsh.

The southern road connections will have significant adverse impacts on views from South Queensferry, properties at Linn Mill, Inchgarvie House, Springfield Lea, Springfield Place, Springfield Terrace, Echline Drive, Dundas Home Farm, Humble Farm and footpaths around the Echline fields. Proposed landscape mitigation will help reduce impacts.

Overall, views for the majority of receptors within 5km of the proposed scheme will not be significantly changed by the proposed scheme.

Cultural Heritage

Cultural heritage sites include archaeological remains, historic buildings, gardens and designed landscapes. The sites identified in the vicinity of the proposed scheme range in date from the Mesolithic period (10,000 years ago) to the more recent past. The sites have been assessed for direct impacts (potential damage or severance) and indirect impacts (potential changes to setting due to visual intrusion or impacts from vibration and noise). Significant impacts which have been identified are:

- direct impact on Dundas Castle Designed Landscape, St. Margaret's Hope Category B Listed Archway and Beamer Rock Beacon
- indirect impacts on the setting of St. Margaret's Hope, Gatelodge, walled garden and piers (listed as Category B individually and as a group), Port Edgar Barracks (Category B) and Inchgarvie House (Category C(S)) Listed Buildings
- indirect impacts on the setting of Dundas Castle Designed Landscape, St. Margaret's Hope Relict Country Estate, Inchgarvie House Lodge, and Ferry Craig House (South Queensferry).

Beamer Rock Beacon will be directly affected due to the proposed location of the central tower of the main crossing on Beamer Rock. The beacon is not listed but is of local interest and therefore it is proposed to carefully dismantle, record and store it for possible future relocation and re-erection.

Other mitigation measures that have been agreed include the recording of individual sites through archaeological excavation, historic building recording and archaeological evaluation through the excavation of a series of speculative trenches amounting to up to 10 per cent of the total area.

Other mitigation measures which will be implemented include pre-construction protection measures for historic buildings, such as sealing to prevent dust ingress, and construction vibration monitoring.

Air Quality during Scheme Operation

Local Air Quality

The existing air quality throughout the area of the scheme meets the prescribed air quality standards as set by the European Union and UK Government. The assessment considered any likely changes in local and regional air quality as a result of the operation of the proposed scheme, due to projected changes in traffic movements on the road network. The local air quality pollutants assessed included nitrogen oxides, nitrogen dioxide and fine particulate matter. The assessment of regional level air quality included consideration of carbon dioxide emissions. Nitrogen deposition at nature conservation sites was also assessed.

The proposed scheme results in both increases and decreases in air pollutant levels in its vicinity, although changes are generally very small. No significant adverse impacts are predicted, other than at the area around



St. Margaret's Hope. Areas to the west of North Queensferry and South Queensferry which are close to the proposed scheme will experience slight detrimental impacts, whereas areas in the vicinity of North Queensferry and South Queensferry which are close to the Forth Road Bridge will experience slight beneficial impacts because of the decrease in traffic on that bridge once the new crossing is open.

Regional Air Quality

The assessment of regional air quality impacts predicted slight increases in nitrogen oxides and fine particulate matter with the proposed scheme in place compared to the scheme not being in place. The continual improvements in vehicle technology and fuel efficiency underpinned by legislation are likely to reduce emissions of nitrogen oxides and fine particulate matter over time.

CO₂ and Climate Change

The main human influence on the global climate is emissions of greenhouse gases such as CO₂.

The assessment predicted an increase in carbon dioxide with the proposed scheme in place due to more vehicle kilometres being travelled. The scheme will increase the length of the majority of cross-Forth journeys by about 1 km because the new crossing is slightly further west than the Forth Road Bridge.

The increase in CO₂ emissions produced by the proposed scheme in 2032 is 20,317 tonnes, which represents 0.16 per cent of total transport sector emissions in Scotland in 2007 (12.4 million tonnes) (Scottish Government, 2009)¹. These figures are derived from strategic modelled traffic data covering the national road network using established Department for Transport methodology. 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 per cent by 2020 (interim target) and 80 per cent by 2050. Therefore, the increase in CO₂ as a result of the proposed scheme will require to be offset by greater reductions elsewhere within Scotland.

Further assessment was carried out to more fully capture 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. The assessment involved modelling a local network in the vicinity of the Forth Replacement Crossing using an alternative approach that better takes into account the emissions from such "stop-start" traffic conditions. Initial findings 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 situation without the scheme. There is less congestion relief in the evening peak and therefore the mitigating effect referred to above is less evident during this period.

The proposed scheme is also likely to avoid the need for main cable replacement and other maintenance works that are envisaged to be necessary to retain the Forth Road Bridge in use in the absence of a replacement crossing (see "Effect of Works on the Forth Road Bridge" page 21).

Noise and Vibration during Scheme Operation

Existing noise and vibration levels vary throughout the study area from the quiet rural locations to existing busy roads. The assessment has been undertaken in accordance with current best practice, and looked at potential changes in noise and vibration levels at sensitive receptors due to projected changes in traffic movements on the road network. All noise-sensitive receptors within 600m of the scheme have been considered including residential properties, schools and parks.

Measures have been built into the scheme to reduce noise impacts, including careful design of the alignment and cuttings and the use of low-noise road surfacing. Noise barriers will be installed as required to reduce or remove significant noise effects at various locations along the new southern connecting road between the main crossing and the tie-in with the A90. A noise barrier is also proposed to the southwest of Kirkliston.

¹ Scottish Government (2009). Scottish Greenhouse Gas Emissions 2007. Published September 2009.

Significant beneficial noise effects are predicted at the following locations

- the southern edge of the Echline estate, South Queensferry, facing directly onto the A904
- east and west of the approach road to the Forth Road Bridge.

Significant adverse effects are predicted at the following locations:

- Clufflat Brae and Springfield Lea in South Queensferry
- Linn Mill and Inchgarvie House
- the western side of the Echline estate, South Queensferry.

No potentially significant vibration effects from operation of the scheme were identified.

Pedestrians, Cyclists, Equestrians and Community Effects

There are a number of paths and cycle routes within the study area including core paths, rights of way, cycleways (including National Cycle Routes 1 and 76), equestrian routes and local paths.

The scheme has been carefully designed to incorporate new sections of footpaths, cycleways and safe crossing points to maintain these routes and minimise any potential increase in journey length for users.



The Forth Road Bridge will maintain the link between Fife and the Lothians for pedestrians and cyclists. The significant reduction in traffic on the bridge will improve the amenity of the route for users who will also gain a good view of the main crossing.

The significant decrease in traffic flow on the approaches to the Forth Road Bridge will also improve the amenity for pedestrians and cyclists using the surrounding area including paths and public parks such as Inchcolm Park in South Queensferry.

Significant adverse impacts are predicted for the existing paths at Ferrytoll and Echline due to the introduction of substantial new infrastructure to these areas. This will require changes to current routes and will alter the amenity of the area. Measures are included to reduce impacts on amenity value and access to the outdoors and limit the increase in journey length. These include providing alternative routes, safe crossings at junctions and landscape planting.



No communities will be directly severed by the proposed scheme and access to all community facilities will be maintained. The significant decrease in traffic flow on the A904 to the south of South Queensferry is predicted to relieve some existing severance between the housing development on the north side of the A904 and bus stops on the south side.

Vehicle Travellers

The assessment of impacts on vehicle travellers looked at the potential changes to views from the road and driver stress levels resulting from the proposed scheme.

North of the Firth of Forth, views for vehicle travellers will remain similar to those currently experienced from the existing A90, with steep rock cuttings, which will channel views towards the approach to the main crossing.

Views for travellers on the main crossing will also be similar to those from the Forth Road Bridge, with scenic, panoramic views across the Firth of Forth.

To the south of the Forth Road Bridge, the existing suburban views from the existing A90 will be replaced by a range of more open, attractive views from the new southern connecting roads, across rolling farmland and into the designed wooded landscape of Dundas. Overall, the proposed scheme will improve views for drivers and provide a stimulating and scenic journey.

Over time, traffic levels are forecast to increase on the road network and these increasing traffic levels impact on the level of driver stress. The assessment method uses a simple tabulated classification based on forecast traffic, speeds and carriageway provision. Driver stress is likely to remain the same as current conditions or increase during peak hours with or without the scheme, when expressed against a simple three-point scale. However, the following features of the design are examples of how the scheme may help to reduce the impact of some aspects of driver stress:

- improved signage to reduce confusion and uncertainty and improve navigation confidence

- additional hard shoulders and verges to improve road safety
- improved operational reliability and resilience in respect of maintenance requirements to reduce driver frustration during periods of maintenance
- reduction in the frequency and impact of incidents on traffic flow to reduce driver frustration arising from delays due to unplanned events

Disruption due to Construction

The construction works are scheduled to start in 2011 and are predicted to take more than five years in total, although some elements will be completed more quickly. The selected contractor will determine the precise programme for the works.

Land not already in the ownership of Scottish Ministers may be acquired through the Parliamentary Bill process for three temporary construction compounds located to the west of South Queensferry, to the west of the M9 Spur at M9 Junction 1a and at Ferrytoll Junction. These locations are indicative. If the contractor wishes to create site compounds outwith these areas, the necessary permissions to do this will be required.

Construction activities can potentially impact upon local communities and businesses, pedestrians, cyclists and equestrians and the natural environment. The operation of equipment and/or the movement of heavy construction traffic can create nuisance including noise, vibration, dust and loss of amenity.

The main impacts during construction relate to temporary traffic disruption, noise, dust, landscape and visual impacts, particularly for receptors close to the main crossing and the construction compounds situated at Ferrytoll, South Queensferry and M9 Junction 1a.

To ensure that construction impacts on people and the environment will be suitably reduced or avoided, a Code of Construction Practice has been produced, which sets out the minimum measures to control construction impacts. All contractors will be required to adhere to this code.

Examples of measures to avoid and reduce impacts include:

- programming of works to minimise the disruption period
- appropriate design or screening to reduce noise and visual impacts around the construction compounds
- following construction best practice to control dust generation and dispersal
- development of management plans for air pollution, noise and vibration control
- fencing off construction compounds to avoid health and safety hazards for the general public
- avoiding road closures wherever possible and providing diversion routes.

The main residual impacts from construction relate to temporary air quality, noise and vibration, landscape and visual impacts for properties close to the proposed scheme. Due to the extensive construction works which will be required, the landscape and visual impacts, although temporary in nature, cannot be completely mitigated. Adverse noise impacts have been identified at a number of receptors including at St Margaret's Hope, St. Margaret's Hope Gatelodge, Tigh-na-grian and Inchgarvie House, with vibration disturbance also anticipated at two of these - St. Margaret's Hope Gatelodge and Inchgarvie House. The residual effects of construction-related vehicle emissions on air quality are not significant. Dust impacts, considered to be of medium to low risk, will be controlled by implementing the measures set out in the Code of Construction Practice. However, due to the close proximity to the

construction works for the main crossing, it is anticipated that the risk of dust nuisance may be higher at Inchgarvie House during certain activities.

Policies and Plans

The principle of development of the proposed scheme is established within National Planning Framework 2 (NPF2) which identifies the scheme as a national priority of economic importance.

The scheme is not compliant with some national, regional and local policies in certain specific locations. Some of the road connections to the south of the Firth of Forth are located in green belt and this is contrary to national policy (see Scottish Planning Policy SPP21²) and policies included in the Edinburgh and the Lothians Structure Plan and the Rural West Edinburgh Local Plan. In addition, the proposed scheme affects some sites of cultural heritage importance both north and south of the Firth of Forth, which is also contrary to regional and local policies. These include St. Margaret's Hope, Gatelodge and Arch, Port Edgar Barracks, Inchgarvie House, Ferry Craig House and Dundas Castle Designed Landscape.

Overall, however, the proposed scheme is considered to be largely compliant with national, regional and local planning and transport policies.

² SPP21: Green Belt : sets out the objectives of green belt policy and the way in which it should be used and enforced



Construction of a mono-tower for a cable-stayed bridge



Installation of deck sections on a cable-stayed bridge.

Cumulative Impact Assessment

The cumulative impact assessment provides an overview of the combined impacts of the proposed scheme and also includes impacts from other proposed developments.

Two areas are identified as potentially experiencing cumulative impacts as a result of the combination of different types of impacts arising from the proposed scheme (but not from other developments). These are at the north bridgehead and the south bridgehead.

In the north bridgehead area, cumulative impacts may occur at the following receptors: St. Margaret's Hope Gatelodge, St. Margaret's Hope, the Queensferry Hotel, Ferry Craig House and Tigh-na-grian. Cumulative impacts may occur within the south bridgehead area for Inchgarvie House, Inchgarvie Lodge, residents at Clufflat Brae, pedestrians using informal footpaths and others in close proximity to the proposed location of the South Queensferry main construction compound and Port Edgar Barracks. These receptors may experience cumulative impacts produced by a combination of noise, ecological, land use, visual, and cultural heritage impacts.

Two national developments, at Rosyth and Grangemouth, are proposed to proceed at some time in the future. If they do, they may potentially produce cumulative impacts with the FRC since people and the general environment could potentially be more disturbed than by a single project. These impacts are not assessed in the Environmental Statement since detailed proposals for these developments are not available. When more information becomes available, the developers of these projects will be required to undertake assessments of the potential combined effects of the new developments and the FRC. Each project will have conditions which will have to be adhered to during construction and operation. These measures will control the significance of effects from each single project and therefore reduce the potential for significant cumulative impacts.



Effect of Works on the Forth Road Bridge

The environmental impacts associated with the scheme are derived from an assessment against a baseline which assumes continued operation of the existing road network and the Forth Road Bridge. Although this provides an understandable baseline as it is similar to the current situation, it may not be the most likely scenario, given the uncertain state of the existing Forth Road Bridge.

The uncertainties surrounding the various alternatives for refurbishing the existing bridge and the required closures are so great that any attempt to use these as the baseline against which to measure impacts could result in significant over or under-estimation of impacts. It would also be difficult to present findings in a clear and meaningful way.

To address this, the Environmental Statement includes a qualitative assessment of the likely impacts of partial closure of the Forth Road Bridge in the absence of a replacement crossing. This assessment should be considered together with the assessment of scheme impacts which assumes a baseline of continued Forth Road Bridge operation, as described above.

The assessment of impacts arising from the major repair works required for the Forth Road Bridge demonstrates significant disruption if these works were carried out in the absence of an alternative crossing. Significant delay is

predicted for vehicles using the Forth Road Bridge, which would result in reduced traffic demand and some vehicle travellers using alternative routes via Kincardine.

It is predicted that traffic congestion created by the works would affect access within and around communities including Inverkeithing, North Queensferry, Rosyth, Dalmeny and South Queensferry, where junctions are likely to be blocked and re-routing will occur as residents attempt to use alternative routes. This loss of mobility within these communities would lead to a number of community effects including:

- limiting vehicular movements within the community
- reducing accessibility to key community facilities such as doctor surgeries, hospitals, educational facilities for commuting staff and users
- reducing access to retail and commercial facilities, potentially affecting customers, staff and suppliers.

Reduced traffic demand and significant levels of congestion resulting from the recabbling works would adversely affect local businesses that rely on passing trade or on customers travelling by car.

If these major repair works were included in the baseline used to assess the environmental impact of the FRC, the FRC impacts for air quality, noise and community effects would significantly differ from those reported in the main body of the Environmental Statement. In particular, as impacts on the economy, people and communities in the vicinity of the Forth Road Bridge would be more severe with these works taking place, it follows that the beneficial impacts of the proposed scheme relative to this baseline would be greater than those reported in the main Environmental Statement and summarised in this NTS.

Regarding climate change issues, 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 predicted future baseline without the scheme in place and including main cable replacement over the period 2012 to 2025.



Contraflow on the Forth Road Bridge

3. Next steps

If you consider you may suffer an adverse effect as a result of the proposals described in this Non-Technical Summary and in the Environmental Statement, you are entitled to object.

Objections should be lodged with the clerks of the Scottish Parliament no later than 60 days after the introduction of the Bill, which is expected to be introduced in November 2009.

Objections should be sent in writing to:

**The Non Executive Bills Unit
Room T2 60
The Scottish Parliament
Edinburgh EH99 1SP**

The fee for lodging objections is £20 and is payable to the Scottish Parliament.

The Environmental Statement, including the Non-Technical Summary, can be viewed on the FRC website: www.forthreplacementcrossing.info. A bound paper copy of the Environmental Statement may be purchased at a cost of £500, and is also available in DVD format at a cost of £10 by writing to Transport Scotland.

Additional copies of this Non-Technical Summary are available free of charge on request from:

**Forth Replacement Crossing Team
Transport Scotland
7th Floor, Buchanan House
58 Port Dundas Road
Glasgow G4 0HF**

Telephone: 0141 272 7578

If you wish to view the full Environmental Statement, it is available for inspection during normal office hours at the above address and also by appointment at:

**Scottish Government
IMU Library Services
F Spur, Saughton House
Broomhouse Drive
Edinburgh
EH11 3XD**

Telephone: 0131 244 4556

Copies of the Bill and the accompanying documents published by the Parliament will be available on the Parliament's website (www.scottish.parliament.uk/bills) and also to purchase from any Blackwells bookshop.

Further information about the Hybrid Bill process, in particular the objection process, is provided in the Scottish Parliament leaflet Guidance on Hybrid Bills, which is available from the Non Executive Bills Unit (address as before) and online at www.scottish.parliament.uk/business/so/sto-c.htm.

4. Legend for larger scale maps

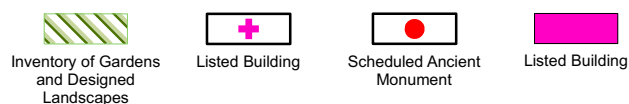
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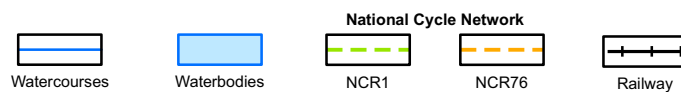
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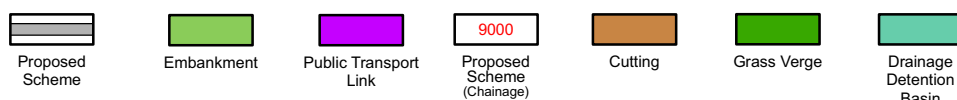
Cultural Heritage



Others



Scheme



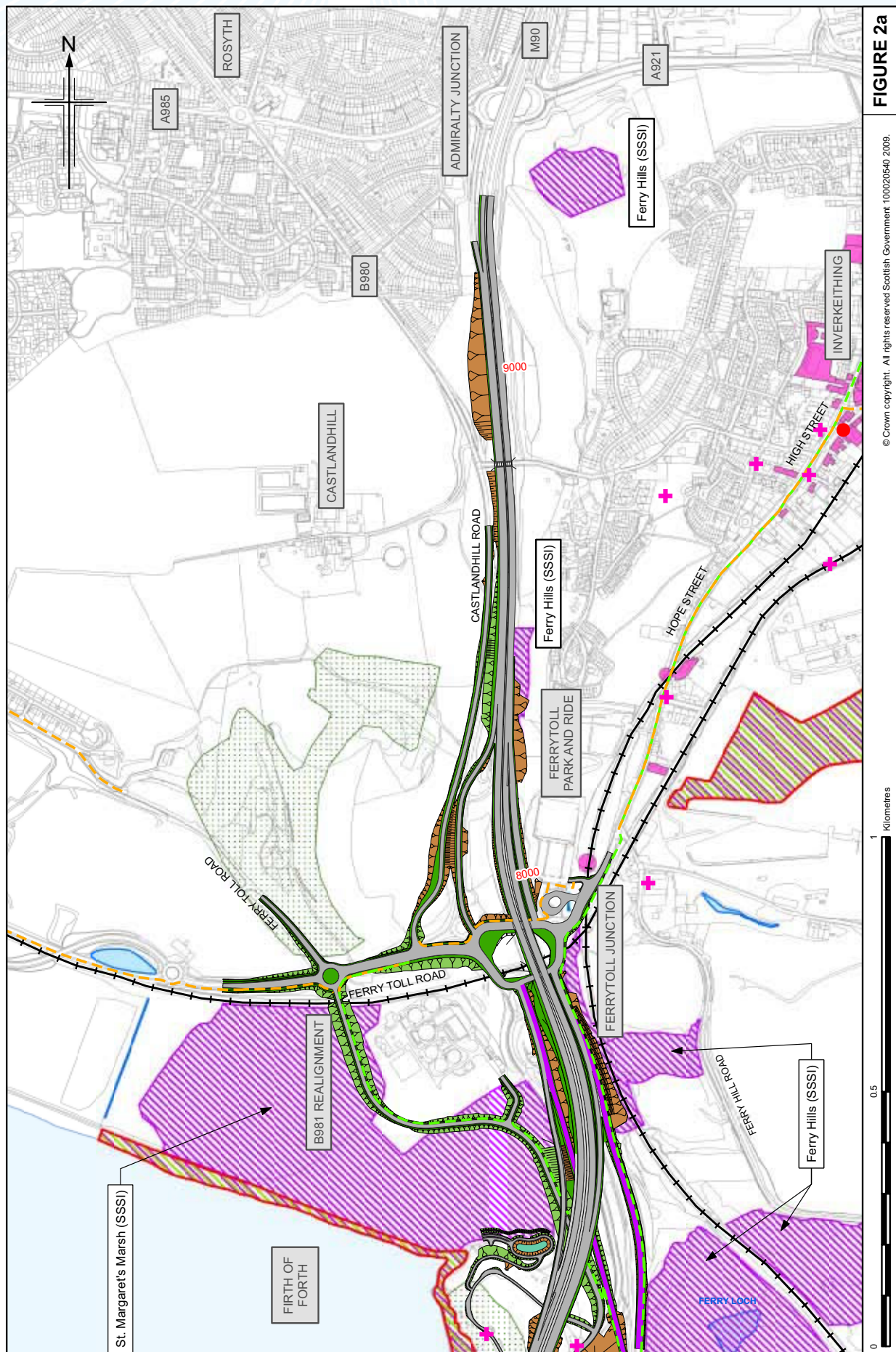
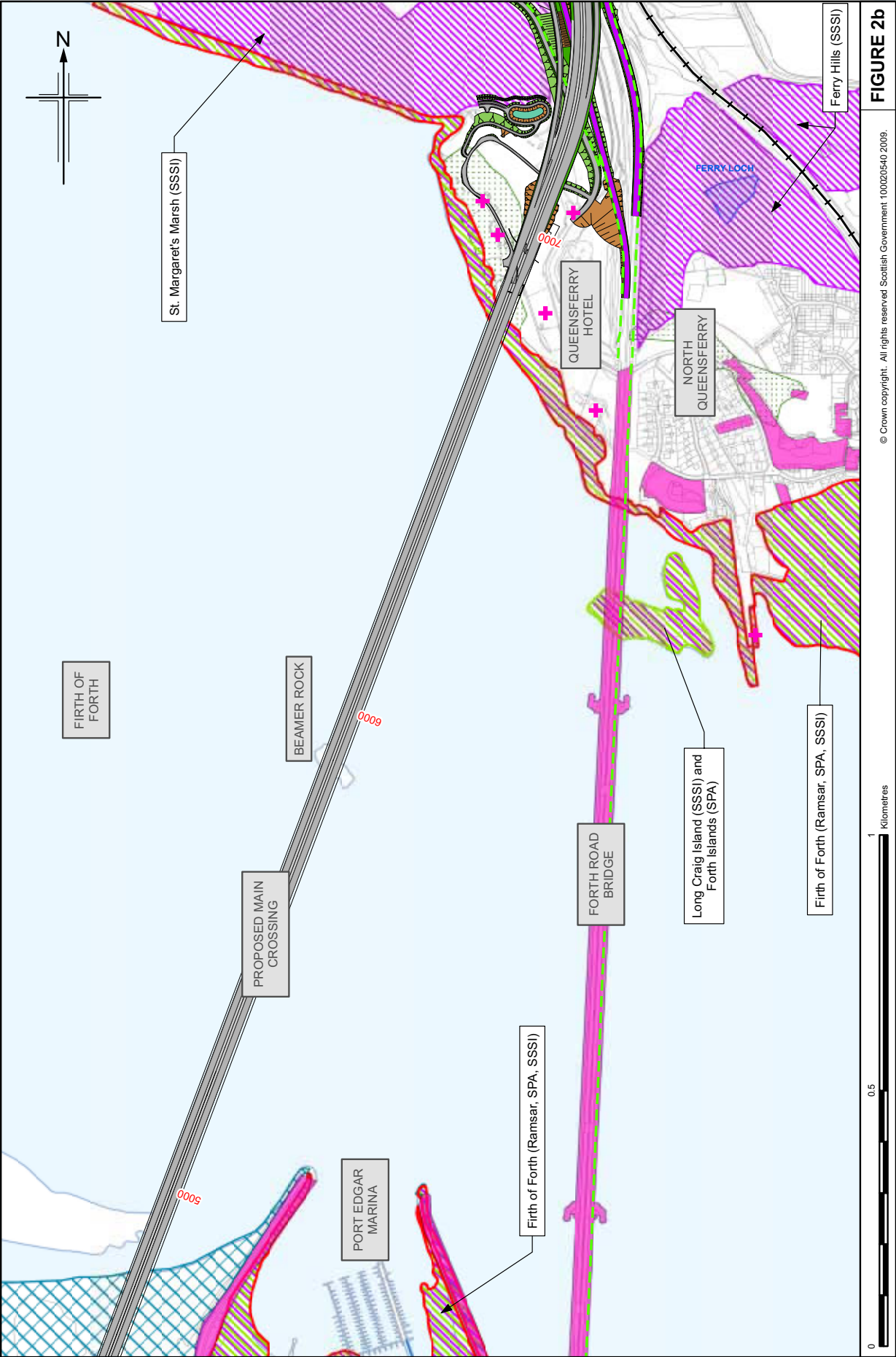
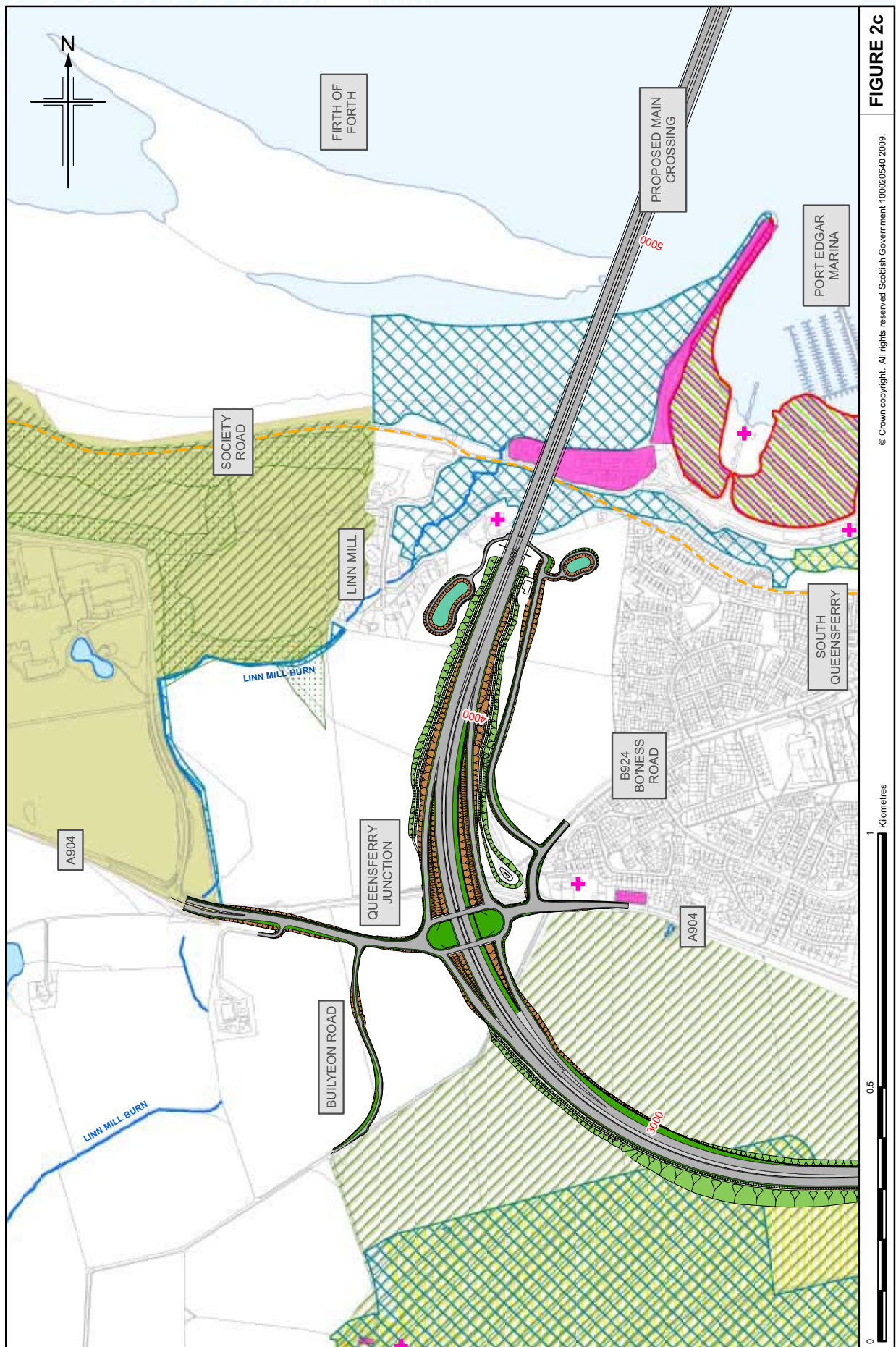


FIGURE 2a

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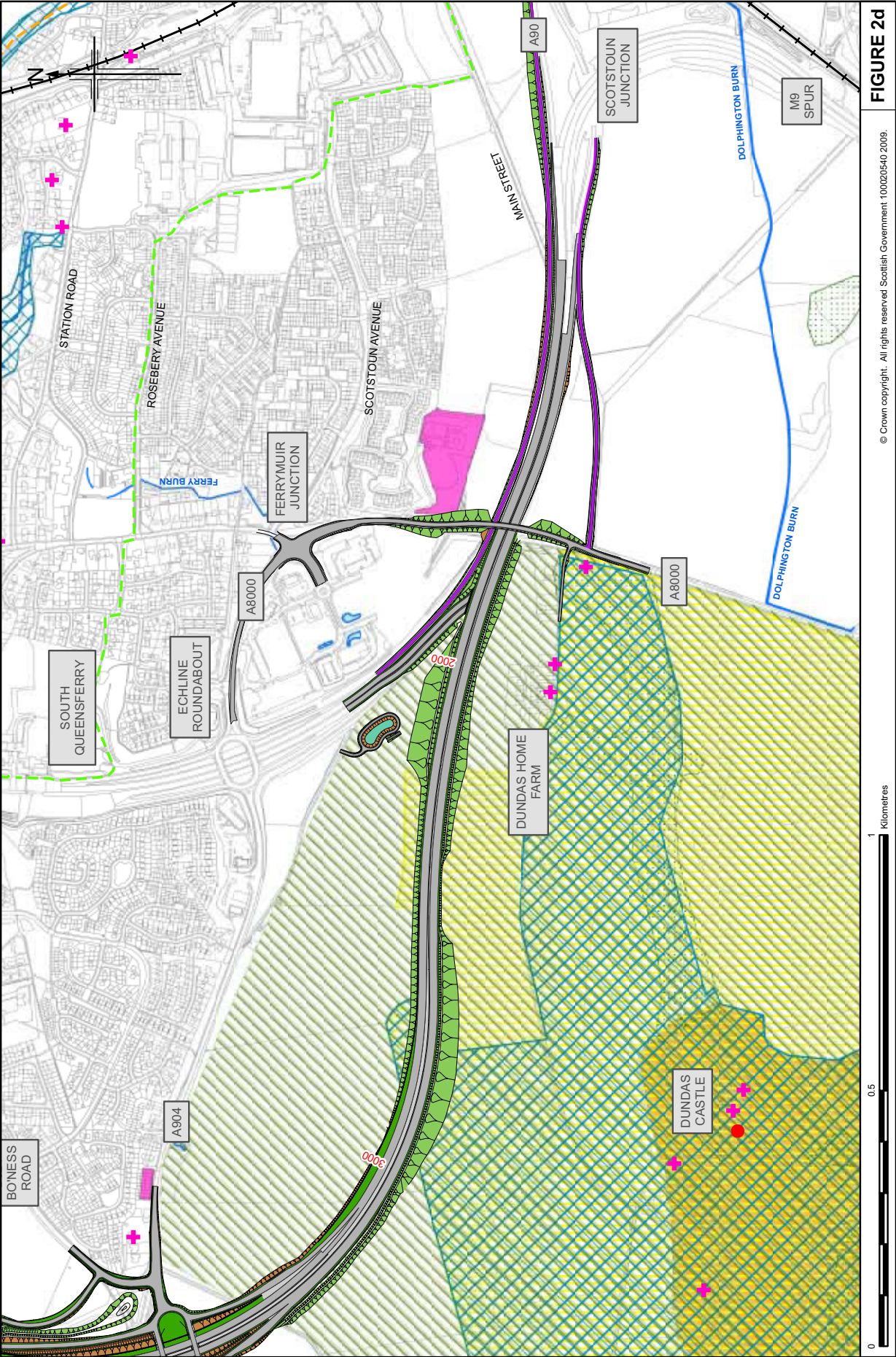


FIGURE 2d
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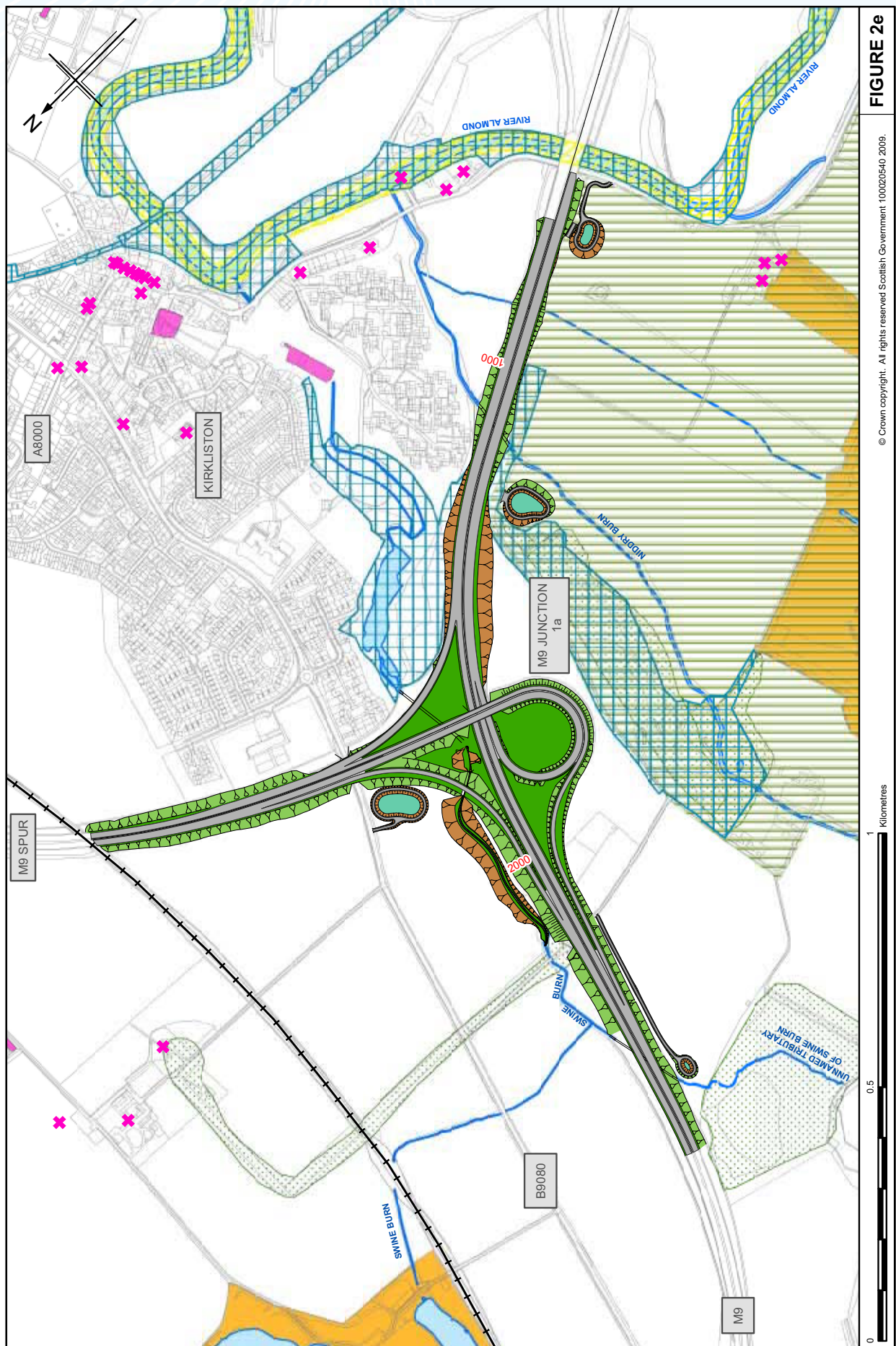


FIGURE 2e

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Ferrytoll Junction (South view)



Queensferry Junction



Computer generated images of the proposed junctions illustrating approximate layout and landscaping.