Transport Scotland
Trunk Road and Bus Operations
Document:

EC DIRECTIVE 97/11 (as amended)

ROADS (SCOTLAND) ACT 1984 (as amended)

RECORD OF DETERMINATION

Name of Project:	**Location:**
Forth Road Bridge Annual Routine Maintenance Bridge Works	Forth Road Bridge, on a line located by joining: NGR 312589, 680760 (northern point) NGR 312464, 678222 (southern point)

DESCRIPTION OF PROJECT

BEAR Scotland (BEAR) has been commissioned by Transport Scotland to undertake annual cyclic and routine maintenance works on the Forth Road Bridge (FRB). The bridge spans the Firth of Forth between South Queensferry and North Queensferry (Appendix A, Figure 1 and Figure 2).

Annual routine maintenance on the FRB is required to ensure operational and safety standards are maintained across the full 2.5 km length of the bridge.

Works programmed to 31st March 2022 are as follows:

- Main span billet repairs (repair damaged welds and paint protective system),
- End trimmer repairs (repair cracked welds on the end trimmer plates),
- Hanger anchor re-bore (increase 50 mm diameter holes to 64 mm),
- Trough weld repairs (31 weld repairs, MPI testing and application of protective paint system),
- Side span jack and pack (removal of worn pack(s) and replacement - 10 locations outstanding),
- Comb joint repairs (lift comb joint out of position, reface worn surfaces and repair broken nuts, bolts or springs),
- Grillage repairs (fabrication and installation of side and top grillage bars and application of 4 coat protective paint system),
- TEL bellows (fabrication of one set of bellows and installation of 7 sets of bellows),
- Pipe work decommissioning Phase 1 (removal of water and air pipes spanning the FRB).

The works are programmed to begin in early 2021, with works taking place Monday to Friday 08:00 to 18:00. Weekend working may be programmed to optimise weather and operational activities. With the exception of the grillage repair works, no traffic management will be required on the FRB to facilitate the programme of works detailed above. The FRB workshop will also be utilised, where possible, to undertake off-site fabrication of bridge components, prior to being reinstalled on the bridge.

Of note, this Record of Determination (RoD) is limited to the annual routine maintenance activities detailed above. As such, if any additional works are programmed, or any substantial changes are made to the working methodology or materials used, a separate RoD will be produced. A separate RoD will also be submitted if the environmental baseline information were to change significantly.

PROJECT PROCUREMENT

The scheme is executed by the operating company as site operations – 'As of Right' scheme.

DESCRIPTION OF LOCAL ENVIRONMENT

The sections below provide a brief description of the local environment in vicinity of the FRB. The baseline information is based on a review of currently available information obtained from a desk-based study and historical information provided by the previous Operating Company (Amey).

The headings have been set out to follow the recently updated Design Manual for Roads and Bridges (DMRB) chapters for environmental assessment and do not reflect a ranking of impact severity. Based on the nature of the works, unless otherwise stated, the demarcation of the study area for the assessment of potential impacts is limited to all land within 300 m of the FRB.

1.0 Population and human health

Baseline information was collected through a desktop assessment containing data obtained from online web-based mapping tools including; Google Maps and Google Street View, Envirocheck, Ordnance Survey (OS), NatureScot, Scotland's Environment (SE), Scotland's Environment Scotland's Soils (SESS), SUSTRANS and the Road Traffic Statistic.

1.1 Properties (within distance bands)

There are numerous residential properties and business / industrial premises, one greenspace (play space), and three community facilities (sheltered accommodation, community centre and library) within 300 m of the scheme extents. Properties nearest to the FRB (e.g. within 50 m) have no screening from the bridge. Properties further afield are generally screened by intervening properties. The play space is located 245 m northeast of the bridge and is screened by a vegetated embankment. The community facilities are located > 80 m from the bridge and screened by woodland belts or intervening properties.

1.2 Land use

The FRB crosses the Firth of Forth between South Queensferry, within the City of Edinburgh local authority area, and North Queensferry in the Fife Council local authority area. At the time of writing, there are five planning applications within 300 m of the FRB. Two are within the City of Edinburgh Council[1] area of responsibility and three are within Fife Council's[2] area of responsibility. Details of all five planning applications are outlined in Table 1.1.

Table 1.1. Planning applications within 300 m of FRB

Local Authority	Application Details	Decision Status
City of Edinburgh	Solid panel roof replacement to sunroom at rear of semi-detached dwelling.	Application granted
City of Edinburgh	Proposed change of use from Class 1 retail unit to a mixed-use facility comprising production facility for the manufacture of chocolate products (class 4 light industrial), a cafe (Class 3 food	Awaiting decision

1 https://citydev-portal.edinburgh.gov.uk/idoxpa-web/spatialDisplay.do?action=display&searchType=Application (City of Edinburgh Council) [Accessed 05/11/2020]
2 https://planning.fife.gov.uk/online/spatialDisplay.do?action=display&searchType=Application (Fife Council) [Accessed 05/11/2020]

	and drink), small retail unit (Class 1 retail), & gallery (Class 10). Existing roof replaced with new to match existing, new curtain wall glazing and balconies to north & south gables, new first floor of 425sqm formed, new roller shutter door formed.	
Fife	Removal of overhanging branch of White Poplar Tree North Queensferry Conservation Area.	Application permitted – no conditions
Fife	Single storey extension to front of dwelling house.	Registered
Fife	Erection of two storey extension to side of dwelling house.	Registered

BEAR do not currently have any major projects programmed in vicinity of the FRB.

Land use within 2 km of the FRB is categorised into the following[3]; (i) motorway, (ii) urban, (iii) recreation area, (iv) maritime installation, (v) designed landscape, (vi) managed woodland, (vii) medieval village, (viii) plantation, (ix) rough grazing, (x) industrial / commercial area, and (xi) quarry. The national scale land capability for agriculture[4] for land north and south of the FRB is 'Class 888 urban[5]'. Land qualifying as urban has no agricultural value.

1.3 Non-motorised user & community facilities

National Cycle Network[6] route 1 (NCNR1) crosses the Firth of Forth via a dedicated cycleway that runs along both sides of the FRB, and NCNR76 crosses beneath the FRB, adjacent to the south abutment, utilising a dedicated cycleway. One Core Path[7] (ID: 1259) is located on the FRB and utilises the dedicated footpaths[8], which run along both sides of the bridge. Three Core Paths (ID: 14745, 10739 and 18811) also lie within 300 m of the bridge at North and South Queensferry. There are no Public Rights of Way[9], pedestrian crossing points (controlled or uncontrolled), bus stops, bridle paths or other community assets on the FRB and no private residencies or businesses are directly accessed from the FRB. Street lighting is present on the bridge.

1.4 Vehicle travellers

The FRB is a two-lane dual carriageway with an Annual Average Daily Traffic (AADT) flow (2019 data) of 640 (ID: 90005) comprised of:

- 17 two wheeled motor vehicles,
- 179 cars and taxis,
- 321 bus and coaches,
- 118 Light Goods Vehicles (LGVs), and
- 5 Heavy Goods Vehicles (HGVs).

[3] https://map.hlamap.org.uk (HLAmap) [Accessed 03/11/20]
[4] http://map.environment.gov.scot/Soil_maps/?layer=1# (Scotland's Environment Scotland's Soils) [accessed 03/11//20]
[5] The classification provides for seven grades of land based on its agricultural, forestry and recreational potential, with four of the classes further subdivided into divisions. The methodology considers climate, gradient, soil, wetness, erosion and pattern. The best and most versatile land is classified as Class 1, 2 and 3.1 as this is the land which is most flexible, productive and most likely to deliver future crops.
[6] The National Cycle Network (NCN) is a network of cycle routes comprising minor routes, disused railways, pedestrian routes, canal towpaths and traffic calmed routes, created by the charity Sustrans. Given the mixed nature of routes that make up the NCN, sections of the network are also designated as Core Paths or Public Rights of Way.
[7] Core Paths can include; Public Right of Ways, footpaths, cycle tracks, paths covered by path agreements / orders, waterways, or crossing land to facilitate, promote and manage the exercise of access rights under the Land Reform (Scotland) Act 2003 (Sections 20 and 21), and are identified as such in Local Authority Core Paths plans.
[8] Local paths hold no statutory designation and can be pavements adjacent to roads or off-road paths.
[9] The National Catalogue of Rights of Way is maintained by ScotWays in partnership with Scottish Natural Heritage and local authorities (who can also retain their own records). Access along Public Rights of Ways are protected by the Countryside (Scotland) Act 1967, Section 46.

As of September 2017, all other traffic has used the new Queensferry Crossing.

The AADT flow recorded for pedal cycles (2019 data) was 160.

2.0 Air quality

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Scotland's Environment (SE), Air Quality in Scotland (SEAQS), Google Maps and Google Street View, Envirocheck, EU Pollutant Release and Transfer Register (PRTR), and Ordnance Survey (OS).

Baseline air quality is mainly influenced by vehicles travelling along the FRB. Secondary sources are derived from vehicles travelling along the Queensferry Crossing, train movement on the Forth Bridge, coastal industrial processes at Rosyth Dockyard and day-to-day urban activities within North and South Queensferry.

There are no Air Quality Management Areas[10] (AQMAs) within 300 m of the scheme. Whilst no monitoring of air quality levels has been undertaken as part of this assessment, at the time of writing, automatic monitoring stations within the wider area record bandings in the 'green zone' (Low Index 1), and it is considered that these readings are representative of air quality within the scheme extents[11]. Readings in the 'green zone' suggest that National Air Quality Strategy (NAQS) objectives are likely to be met and that air quality in the area is relatively good. The European PRTR[12] online mapping tool identified that Dunfermline Sewage Treatment Works lies 900 m northwest of the scheme and serves 81,000 customers per year.

3.0 Cultural heritage assessment

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; the Royal Commission on the Ancient and Historical Monuments of Scotland (RCAHMS), Ordnance Survey (OS), Google Maps and Google Street View.

Thirteen listed buildings (two Category A, seven Category B and four Category C), an Inventory Battlefield[13], two Conservation Areas, thirty-nine Canmore National Records (CNRs) and twenty-one Canmore Maritime Records (CMRs) lie within 300 m of the FRB.

The Forth Road Bridge, including approach ramps and piers, is a Category A listed structure (ID: LB47778 Edinburgh and LB49165 Fife)[14]. The northern extent of the bridge also lies partially within the boundary of the Inventory Battlefield

[10] Under section 83(1) of the Environment Act 1995, Local Authorities have a duty to designate any relevant areas where air quality objectives are not (or are unlikely to be) being met as Air Quality Management Areas.
[11] http://www.scottishairquality.scot/latest/?la=falkirk (Air Quality in Scotland) [accessed 05/11/20]
[12] A pollutant release and transfer register (PRTR) is an inventory of pollution from industrial sites and other sources. A PRTR is a national or regional environmental database or inventory of potentially hazardous chemical substances and/or pollutants released to air, water and soil and transferred off-site for treatment or disposal. The industrial or business facility quantify and report the amounts of substances released to each environmental medium (air, water, soil) or transferred off-site for waste management or wastewater treatment. https://prtr.eea.europa.eu/#/home [accessed 05/11/20]
[13] Scotland's Inventory of Historic Battlefields is a list of Scotland's most important historic battlefields. Battlefields are landscapes over which a battle was fought. When a battlefield is included on the inventory it becomes a material consideration in the planning process. This means that it has to be taken into account when deciding planning applications.
[14] https://hesportal.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d (Historic Environment Scotland) [accessed 05/11/20]

'*Battle of Inverkeithing II'* (BTL23). The boundary defines the area in which the main events of the battle are considered to have taken place, and where associated physical remains and archaeological evidence occur or may be expected. The FRB also lies adjacent to both the North Queensferry and Queensferry Conservation Areas. Of lesser cultural heritage value, the Forth Road Bridge and approach ramps and piers is documented as a CNR (ID: 50549). There are no World Heritage Sites[15], Scheduled Monuments, Garden and Designed Landscapes[16], or any other historically designated sites within 300 m of the FRB.

4.0 Biodiversity

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Google Maps and Google Street View, Spatial Hub, Ordnance Survey (OS), NatureScot and Scotland's Environment (SE).

All environmental features have been assessed with reference to prior knowledge and experience of trunk road bridge refurbishment project construction methods, and the potential environmental impacts associated with these types of works in order to provide a robust impact assessment decision-making process. The assessment therefore aims to characterise environmental impacts rather than placing a reliance only on magnitude. The character of an impact is used to inform the determination of whether or not the impact on the feature in question is a significant one.

Invasive non-native flowering plant species (INNS) have been scoped out from ecological evaluation due to their lack of conservation status and so are not discussed further in that context. INNS are however discussed in the context of their potential as a risk to biodiversity and, under the Wildlife and Countryside Act 1981 (as amended) (WCA), regarding legal responsibilities to prevent their transfer.

The study area for Natura 2000 (and other sensitive sites) was defined as an area extending to 2 km in all directions from the centre line of the FRB.

The FRB spans the Firth of Forth, which is a complex estuarine site stretching for over 100 km from the River Forth at Stirling eastwards past Edinburgh and along the coasts of Fife and East Lothian to a wide estuary mouth. A wide range of coastal and intertidal habitats is found within the site, including saltmarshes, dune systems, maritime grasslands, heath and fen, cliff slopes, shingle and brackish lagoons. Extensive mudflats occur particularly in the Inner Firth, notably at Kinneil Kerse and Skinflats on the south shore and Torry Bay on the north shore. Typically, the flats support a rich invertebrate fauna, with eelgrass (*Zostera spp*.) growing on the main mudflats. In the Outer Firth, the shoreline diversifies, with sandy shores, some rocky outcrops, mussel beds and some artificial seawalls. The North Berwick coast includes cliffs and dune grassland, with extensive dune systems at Aberlady. Several large urban areas, including Edinburgh, lie adjacent to the Firth of Forth and these include several areas of heavy industry. The Forth is also one of the most important shipping areas in Scotland. The Firth of Forth is important for a large number of wintering waders and wildfowl, many in nationally and internationally important numbers (NatureScot 2020[17]).

[15] World Heritage Sites are cultural and/or natural sites considered to be of 'Outstanding Universal Value', which are important across countries and generations and have been inscribed on the World Heritage List by the World Heritage Committee.
[16] Records of historic gardens and designed landscapes in Scotland are compiled and maintained by both Historic Scotland and NatureScot.
[17] https://rsis.ramsar.org/RISapp/files/RISrep/GB1111RIS.pdf?language=en

A number of designated sites were identified on NatureScot Sitelink[18] that are either spanned by the FRB, connected to the FRB via the Firth of Forth, or lie within 2 km of the bridge. Long Craig Island for example, which forms part of the Forth Islands Special Protection Area (SPA) (EU Site Code UK9004171), is spanned by the FRB. Long Craig Island is also noted as a Site of Special Scientific Interest (SSSI) (EU Site Code 169962). The Firth of Forth SPA (EU Site Code UK9004411), Firth of Forth RAMSAR[19] (EU Site Code UK13017) and Firth of Forth SSSI (EU Site Code 169840) are also spanned by the FRB at both the North Main Span and South Main Span. Three SSSIs also lie within 2 km of the FRB North Main Span. Ferry Hills SSSI (EU Site Code 135444) lies 50 m northeast, St Margaret's Marsh SSSI (EU Site Code 170133) lies 580 m northwest and Carlingnose SSSI (EU Site Code 135279) lies 800 m east of the FRB North Main Span.

The Forth Islands SPA consists of seven islands, together with outlying rocky islets, in the Firth of Forth. The SPA conservation objectives are to avoid deterioration of the habitats of the qualifying species[20] or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. The objective is also to ensure for the qualifying species that the following are maintained in the long-term: (i) population of the species as a viable component of the site, (ii) distribution of the species within site, (iii) distribution and extent of habitats supporting the species, (iv) structure, function and supporting processes of habitats supporting the species, and (v) no significant disturbance of the species[21].

The Firth of Forth SPA is designated for five Annex I species (qualifying under Article 4.1 of the EU Birds Directive), five migratory bird species (qualifying under Article 4.2 of the EU Birds Directive), and its large overwintering waterfowl assemblage (ten individually cited species plus an additional sixteen wildfowl and Sandwich terns). The SPA conservation objectives are to avoid deterioration of the habitats of the qualifying species[22] or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained. The objective is also to ensure for the qualifying species that the following are maintained in the long-term: (i) population of the species as a viable component of the site, (ii) distribution of the species within site, (iii) distribution and extent of habitats supporting the species, (iv) structure, function and supporting processes of habitats supporting the species, and (v) no significant disturbance of the species[23].

The Firth of Forth RAMSAR has been designated for its internationally important waterfowl assemblage (greater than 20,000 birds). The RAMSAR is a large coastal area comprising a complex of estuaries, mudflats, rocky shorelines, beaches and saltmarshes, including many fragmentary bits of shoreline considered to act as a single ecological unit. Several large urban areas, including Edinburgh, are adjacent to the site and include areas of heavy industry and well-used maritime shipping lanes. The site provides habitat for large numbers of wintering waders and wildfowl, many in

[18] https://sitelink.nature.scot/map (NatureScot) [Accessed 04/11/2020]
[19] Wetland of International Importance.
[20] Forth Islands SPA Conservation Objectives. https://sitelink.nature.scot/site/8500 (NatureScot) [Accessed 04/11/2020]
[21] Forth Islands SPA Conservation Objectives. https://sitelink.nature.scot/site/8500 (NatureScot) [Accessed 04/11//2020]
[22] Firth of Forth SPA Conservation Objectives. https://sitelink.nature.scot/site/8499 (NatureScot) [Accessed 04/11/2020]
[23] Firth of Forth SPA Conservation Objectives. https://sitelink.nature.scot/site/8499 (NatureScot) [Accessed 04/11/2020]

nationally and internationally important numbers. Over winter the site regularly supports internationally important populations of waterfowl assemblage[24].

The Firth of Forth SSSI stretches from Alloa to Crail on the north shore and to Dunbar on the south shore. It includes the estuary upriver from the Forth bridges and the firth east of the bridges.

Ferry Hills SSSI is cited for its geology and unimproved calcareous grassland on a small hilltop north of North Queensferry. The grassland represents a biological habitat which is becoming increasingly scarce in the Fife region[25].

St Margaret's Marsh SSSI lies on the northern shore of the Firth of Forth at Rosyth. The SSSI is noted for its coastal reedbed and saltmarsh which supports locally important breeding bird communities, including reed buntings and sedge warblers. The SSSI represents 3% of Scotland's coastal reedbeds, and the saltmarsh is the largest remaining saltmarsh in Central and West Fife[26].

Carlingnose SSSI is a small coastal site on the Firth of Forth and is cited for herb-rich calcareous grassland found on a hill-top plateau, which is becoming increasingly scarce in the Fife region. The site also supports an exceptionally high number of vascular plant species, several of which are considered rare at the local and national level[27].

Table 4.1. Carlingnose SSSI biological notified features

Lowland grassland:	Lowland calcareous grassland

The NBN online mapping tool records no mammal species of conservation significance within 300 m of the scheme (in the last 10 years) within 10 km grid squares NT17 and NT18. Eighty-one bird species, including migratory overwintering waterfowl, wintering waders and wildfowl are recorded[28].

The routine maintenance schemes will occur within the boundary of the FRB therefore it is not expected that any INNS, as listed on Schedule 9 of the WCA 1981, will be encountered. Moreover, a search of the NBN online mapping tool records no INNS within 300 m of the scheme (in the last 10 years) within 10 km grid squares NT17 and NT18.

5.0 Landscape & visual effects

[24] https://rsis.ramsar.org/RISapp/files/RISrep/GB1111RISformer2001_EN.pdf?language=en
[25] Ferry Hills SSSI. SSSI Citation. https://apps.snh.gov.uk/sitelink-api/v1/sites/630/documents/1 (NatureScot) [Accessed 04/11/2020]
[26] St Margaret's Marsh SSSI. SSSI Citation. https://apps.snh.gov.uk/sitelink-api/v1/sites/1659/documents/1 (NatureScot) [Accessed: 04/11/2020]
[27] Carlingnose SSSI. SSSI Citation. https://apps.snh.gov.uk/sitelink-api/v1/sites/317/documents/1 (NatureScot) [Accessed: 04/11/2020]
[28] https://records.nbnatlas.org/occurrences/search?q=*%3A*&qc=&wkt=MULTIPOLYGON(((-3.4029817584087136+56.0145738609923,-3.4009218218852766%2056.01390216580146,-3.3991193774272688%2056.012894601113835,-3.398690223984886%2056.01183902896633,-3.399891853623558%2055.98904123126625,-3.40032100706594%2055.987648930089854,-3.4026384356548 08%2055.98659266816583,-3.4048700335551985%2055.98640061744316,-3.407702446274925%2055.98697676674956,-3.4091615679790266%2055.988513122929,-3.4081315997173 08%2056.01193499126258,-3.4073591235210183%2056.01347035558208,-3.4048700335551985%2056.01438194927255,-3.4029817584087136%2056.0145738609923)))#tab_mapView (NBN Gateway) [Accessed 04/11/2020]

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Google Maps and Google Street View, Inventory of Gardens and Designed Landscapes, Ordnance Survey (OS), NatureScot and Scotland's Environment (SE).

The FRB passes over the lower Forth estuary, which is an active waterway, and views from the bridge are of large-scale exposed coastlines with harbours containing moored shipping vessels. Inland of the coastline, an array of urban and industrial zones are a feature of the landscape.

Excluding the FRB, the dominant structures in the landscape are the Queensferry Crossing and Forth Rail Bridge. Large shipping vessels sailing up the Forth estuary are also distinct features. North and south of the FRB, the A90 and A9000 spurs form large linear elements in the landscape that are distinct from surrounding landscape features. The spurs are characterised by cuttings through hills and large embankments with scrub woodland planting in places.

There are no areas of ancient woodland[29] or any trees covered by a Tree Preservation Order within 300 m of the FRB. 5.79 ha of broadleaved woodland borders the shoreline below the FRB South Main Span, and 6.8 ha of broadleaved woodland borders the shoreline below the FRB North Main Span and surrounding area. There are no National Scenic Areas within 300 m of the FRB.

6.0 Noise & vibration

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Scotland's Noise, Ordnance Survey (OS), Google Maps and Google Street View.

The FRB does not fall within a Candidate Noise Management Area (CNMA), as defined by the Transportation Noise Action Plan Road Maps[30]. The day and night modelled noise level (Lden) for the carriageway along the FRB ranges from 75dB up to 80dB, whereas the night only modelled noise level (Lnight) ranges between 60dB and 70dB. The 'barrier' effect of the bridge deck ensures that traffic noise experienced by receptors directly below the FRB will experience levels lower than receptors slightly further away. That said, areas beneath and directly adjacent to the North Main Span and South Main Spans are subject to rhythmic low frequency noise caused by vehicles passing over bridge expansion joints.

7.0 Road drainage & the water environment

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Drinking Water Quality Regulator for Scotland (DWQRS), Google Maps and Google Street View, Ordnance Survey (OS), SEPA Flood Maps, SEPA Water Environment Hub, UK Soil Observatory and Scotland's Environment (SE).

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[29] There are two types of ancient woodland: ancient semi-natural woodland and ancient replanted woodland. Ancient semi-natural woodland are sites that have retained the native tree and shrub cover and have not been planted (although it may have been managed by coppicing or felling and allowed to regenerate naturally). Ancient replanted woodland are sites where the original native tree cover has been felled and replaced by planting, usually with conifers and usually this century.

[30] https://noise.environment.gov.scot/action-planning-round-two.html (Scotland's Environment Scotland's Noise) [Accessed 04/11/2020]

The catchments of the River Forth and Firth of Forth Estuary cover a total area greater than 3600 km^2. The area can be split into two distinct sections; the River Forth drainage basin and those catchments that drain into the southern side of the Forth estuary. The FRB spans the Firth of Forth at the location of the Lower Forth Estuary transitional waterbody. The 38.6 km^2 Lower Forth Estuary transitional waterbody is classified[31] (ID: 200435) and lies in the Scotland river basin district. The transitional waterbody has been assigned a Water Framework Directive 2000/60/EC (WFD) overall classification of 'Good' and possesses an ecological classification of 'Good'. The transitional waterbody also has been assigned a classification of 'Good' for fish migration. As the scheme spans a transitional waterbody, there is no groundwater data available. There is no likelihood of flooding on the FRB due to its height above the estuary[32]. However, SEPA records that the area around the Firth of Forth is subject to varying likelihoods of coastal flooding risks[33].

The FRB is not located within a Nitrate Vulnerable Zone[34], and the bridge foundations at the northern and southern extents lie on the 'Burntisland' and 'South Queensferry' groundwater respectively, which have been classified as 'Good'[35].

8.0 Geology & soils

Baseline information was collected through a desktop assessment including data obtained from online web-based mapping tools including; Spatial Hub, British Geological Survey (BGS) Superficial and Bedrock Geological map viewer, BGS Geoviewer, BGS UK Hydrogeology viewer and UK Soil Observatory Soils map viewer.

In addition to its biological interest, the Firth of Forth SSSI is important for the wide range of geology that can be found, especially in the firth west of the three bridges where the coastline is rockier. The SSSI geological and geomorphological diversity includes an array of recorded fossil deposits, volcanic rocks, minerals, strata exposures and raised beaches (Table 8.1). Of the nine geological or geomorphological features, six are in favourable condition, with three being unfavourable. All three unfavourable features are obscured in some way, either by graffiti or dumped material[36].

Table 8.1. Firth of Forth SSSI Geological notified features

Stratigraphy:	Lower Carboniferous [Dinantian – Namurian part)] Upper Carboniferous [Namurian (part) - Westphalian]
Igneous petrology:	Carboniferous – Permian Igneous
Mineralogy:	Mineralogy of Scotland
Palaeontology:	Arthropoda (excluding insects & trilobites)

[31] The Scottish Environment Protection Agency (SEPA) have developed a surface waterbody classification system in line with the requirements of the River Basin Management Plan in accordance with Annex V of the European Union Water Framework Directive 2000/60/EC (WFD), which is applied to all significant surface waterbodies in Scotland. This system is based on an assessment of key chemical and ecological indicators. The classification system categorizes waterbodies into the following bands; High, Good, Moderate, Poor, Bad.
[32] https://www.sepa.org.uk/data-visualisation/water-environment-hub/ (SEPA Water Environment Hub) [Accessed 05/11/20]
[33] http://map.sepa.org.uk/floodmap/map.htm (SEPA Flood Map) [Accessed 05/11/20]
[34] A Nitrate Vulnerable Zone defines areas designated under the EU Nitrates Directive that are at risk of pollution from nitrates used in agricultural practice.
[35] https://map.environment.gov.scot/sewebmap/ (Scotland's Environment) [Accessed 05/11/20]
[36] file://n4-cld-fs-02/Environmental/02%20Screening%20Study%20Reports/2020%20-%202021/02%20Bridges/M90_A90/A90%20Forth%20Road%20Bridge%20-%20SSUDA%20Phase%206/Sensitive%20Site%20downloads/Firth%20of%20Forth%20SSSI/Firth%20of%20Forth%20SSSI%20Site_Management_Statement_8163.pdf

	Palaeozoic Palaeobotany Permian - Carboniferous Fish/Amphibia
Quaternary geology and geomorphology:	Quaternary of Scotland
Geomorphology:	Coastal Geomorphology of Scotland

In addition to its biological interest, the Ferry Hills SSSI is noted for its Carboniferous-Permian Igneous geology. The extensive road cuttings along the A90 north of the FRB provide by far the best and most comprehensive fresh exposures of the Late Carboniferous age Midland Valley Sill-complex, which underlies much of the central Midland Valley of Scotland[37].

Table 8.2. Ferry Hills SSSI Geological notified features

Igneous petrology:	Carboniferous – Permian Igneous

The bedrock geology under the FRB South Queensferry foundations are recorded as Strathclyde Group, which has a lithological description of 'sandstone, siltstone, mudstone and seatrock, with some coal seams, ironstones and limestones; non-marine faunas common; marine faunal bands rare except in top part'. The bedrock geology under the FRB North Queensferry foundations are recorded as unnamed Igneous Intrusion, Carboniferous to Permian - Dolerite and Tholeiitic Basalt. The superficial geology (deposits overlying the bedrock) under the FRB South Queensferry foundations are recorded as Till (Diamicton) which is unsorted and unstratified drift, generally over consolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape. There is no superficial geology recorded under the FRB North Queensferry foundations[38].

9.0 Material assets & waste

Baseline data has been obtained from the Design Engineer.

The individual schemes are executed by the operating company as site operations e.g. 'As-of-Right' schemes of values less than £350,000, therefore a Site Waste Management Plan (SWMP) is not required for individual schemes.

The materials required for the individual schemes (combined into one list):

▪ Fire blanket	▪ Hardox plates (various plate thickness)	▪ 2.5 mm weld rods (carbon steel)
▪ 4.5" cutting disk	▪ 100 x 6 carbon / mild steel flat bar	▪ 3.2 mm weld rods (carbon steel)
▪ 3.2 mm rods (dissimilar)	▪ WD40	▪ Bridon metal coat
▪ 3.2 mm roads (carbon)	▪ Copper slip	▪ A 4-coat protective paint system for grillage repairs (20/NSE/1203/029).
▪ Paint thinner	▪ Replacement nuts (carbon steel black)	▪ Aluminium flat bar
▪ Rags	▪ 25 x 25 x 3 hollow section	▪ Stainless steel rivets
▪ Tungsten burrs	▪ Hypalon sheet	▪ Stainless steel fixings (bolts, washers)
▪ Nyloc nuts	▪ Bostic activator	▪ Rotabroach mag drill bits

[37] Ferry Hills SSSI. SSSI Citation. https://apps.snh.gov.uk/sitelink-api/v1/sites/630/documents/1 (NatureScot) [Accessed 04/11/2020]
[38] http://mapapps.bgs.ac.uk/geologyofbritain/home.html?&_ga=2.136273905.1738612801.1601396294-1677363405.1601396294 (British Geological Survey) [Accessed 05/11/2020]

▪ Bostic	▪ Galvanised component parts	

The equipment required for the individual schemes (combined into one list):

▪ Weld glen	▪ Band saw	▪ Extinguisher
▪ MMA equipment	▪ Plasma cutter	▪ Rod bucket
▪ 110v extension cables	▪ Monarflex containment (aluminium hanging rails)	▪ Staging boards / b-line hangers
▪ Roatbroach	▪ MPI inspection equipment (magnetic yoke, magnetic paints and sprays)	▪ Jack and stools
▪ Nuts, bolts & washers	▪ Hydraulic jacking equipment (ram, manifold, gauges, hoses and button jack)	▪ Rod quiver
▪ G-Clamps	▪ Tube 7 fitting scaffolding (edge protection)	▪ Pencil grinder
▪ Oxy-Acetylene Burning equipment	▪ Rigging equipment	▪ Propane heating equipment
▪ Hanger painting cradle	▪ Polypropylene brushed	▪ Sling
▪ Generator	▪ Hand Drill (Drilling Tap Set)	▪ Shackle
▪ Bending gig	▪ Long neck & 4.5” grinders	▪ Welfare van or portable chemical toilet

The fleet required for the individual schemes (combined into one list):

▪ Telehandler	▪ Long wheel-based pick-up	▪ Viaduct gantry
▪ Hiab vehicle	▪ Pick-up	

The following fuel and/or chemicals will be stored on site for the duration of the scheme(s):

▪ Diesel	▪ Gas
▪ Petrol	▪ Oil

10.0 Climate

Fuel will be required for transport to and from the scheme which will lead to greenhouse gas emissions. Any release of greenhouse gas emissions can contribute to climate change. The project is unlikely to be affected by the impacts of climate change, other than increasing likelihood of extreme weather events leading to issues with work taking place on site.

DESCRIPTION OF THE MAIN ENVIRONMENTAL IMPACTS OF THE PROJECT AND PROPOSED MITIGATION

As a result of a desktop study and site visit, issues requiring consideration have been identified and potential effects, their magnitude and overall significance (based on the sensitivity of receptor) have been considered in terms of both construction and operational effects. Residual effects are based on consideration of potential impacts (i.e. impacts in the absence of mitigation, and with mitigation implemented). Compliance with environmental mitigation measures detailed in Marine Licence[39] (MS-00008903), which is a recent extension to a five-year Marine Licence secured in October 2015 (05568/15/0), will form part of the mitigation measures in place to minimise environmental impacts. Compliance measures also include adherence to the Construction Noise Management Plan (CNMP), which formed part of the original five-year Marine Licence (05568/15/0).

Headings have been set out to follow the recently updated DMRB chapters for environmental assessment and do not reflect a ranking of impact severity. Based on the nature of the works, unless otherwise stated, the demarcation of the study area for the assessment of potential impacts is limited to all land within 300 m of the FRB.

11.0 Population and human health (properties, land use, vehicle travellers, NMU & community facilities)

No access will be restricted to properties during the works and there will be no loss of land or change in land use as a result of the works.

The FRB is currently closed to southbound traffic[40], with all traffic utilising a contraflow on the northbound lanes. However, traffic management (TM) is only required for the grillage repair scheme, with TM programmed for nine days only. AADT flow is also low. As such, no temporary effects on traffic movement are predicted from the maintenance schemes. Closure of the southbound carriageway also permits material lay-down and welfare facilities to be accommodated within the closure, thus ensuring safety of the workforce. Through-access will also be maintained at all times on the dedicated footpaths which run along both sides of the FRB and accommodates NCNR1 and a Core Path.

The following mitigation measures will reduce impacts of works on vehicle travellers and non-motorised users[41] (NMUs) using the FRB during the construction phase:

- Appropriate measures will be implemented to permit the safe passage of pedestrians and cyclists of all abilities through the site.
- Journey planning information will be made available for drivers online at the trafficscotland.org website. Journey planning information is also be available for drivers online through BEARs social media platforms.

[39] As FRB Cyclic, Routine and Planned Maintenance works are undertaken over the Lower Forth Estuary, within the Mean High Water Springs (MHWS), a Marine Licence is required under Part 4 of the Marine (Scotland) Act 2010 and Part 4 of the Marine and Coastal Access Act 2009. A five-year Marine Licence application was therefore secured on October 25th, 2015 by the previous Operating Company (Amey). The current licence expired on 25th October 2020, therefore a licence extension (until 31st March 2021) has been secured (MS-00008903) to permit a new five-year Marine Licence application to be submitted. Extensive consultation with a range of stakeholders is currently being undertaken to support the application for the new five-year Marine Licence.

[40] A Works Contract is currently underway to replace the FRB expansion joints.

[41] For the purposes of this report, NMUs are considered to be all non-motorised traffic, including pedestrians, cyclists and equestrians (with particular consideration of the needs of those with disabilities).

The works will provide a permanent safety improvement for all NMUs and vehicle travellers utilising the bridge, and no residual impacts are anticipated at the operational phase of the proposed scheme.

12.0 Air quality

During the construction phase, activities undertaken on site could potentially have some localised and short-term air quality impacts in proximity to the works. The construction phase will, for example, require a range of equipment, vehicles and non-road mobile machinery[42] (NRMM) which will contribute to local dust and air pollutants. There is also the potential for fugitive dust emissions associated with the various maintenance schemes which are the subject of this report.

However, with mitigation in place following 'Best Practicable Means' and 'Best Practice Guidelines'[43], effects on air quality during construction are not anticipated to be significant, and any minor impacts will also be intermittent, transient, temporary and short-lived. The following mitigation measures will also be implemented to ensure potential impacts are not significant:

- A designated laydown area for plant, material and welfare facilities will be established on the southbound road closure. Good housekeeping will also be employed throughout the works.
- Wherever possible, equipment, vehicles and NRMM will be shut-down when stationary.
- All equipment, vehicles and NRMM will have been regularly maintained, paying attention to the integrity of exhaust systems.
- If any emissions of dark smoke should occur (except at start up) the machinery involved will be taken out of service immediately and any defect rectified before use.
- If powered generators are required, the use of diesel or petrol will be avoided and the use of mains electricity or battery powered equipment will be used (where practicable).
- Cutting, grinding and sawing equipment will be fitted or used in conjunction with suitable dust suppression techniques e.g. water spray or local exhaust ventilation system that fits directly onto tools.
- Regular monitoring (e.g. site walkover by engineer or Clerk of Works) will take place when dust, particulate matter and exhaust emissions (DPMEE) generating activities are occurring. In the unlikely event that unacceptable DPMEE are emanating from the site, the operation will, where practicable, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include: (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) repositioning equipment, (d) changing the method of working, etc.
- Upon completion of the works, the working area will be cleaned.

The works will not result in any significant impacts on air quality during the operational phase.

13.0 Cultural heritage assessment

[42] Non-Road Mobile Machinery is a broad category which includes mobile machines, and transportable industrial equipment or vehicles which are fitted with either an internal spark ignition petrol engine, or a compression ignition diesel engine and not intended for transporting goods or passengers on roads. Examples of non-road mobile machinery include, but are not limited to: (i) generators, (ii) bulldozers, (iii) pumps, (iv) construction machinery, (v) mobile cranes, etc.

[43] Institute of Air Quality Management. (2014). Guidance on the assessment of dust from demolition and construction (version 1.1).

Consultation was undertaken with the City of Edinburgh Council by the previous Operating Company (Amey) regarding consent requirements for maintenance works on the Category A listed structure. The consultation process concluded that all maintenance work concerned with the FRB that is undertaken on a like-for-like basis (e.g. cyclic and routine maintenance), does not require Listed Building Consent. No significant adverse impacts on the cultural heritage or material assets of the FRB are therefore predicted as the works are purely maintenance and restricted to upgrading and strengthening, on a like-for-like basis, essential bridge components. However, if during the works it is assessed that 'new' engineering works are deemed necessary to complete any of the maintenance scheme(s), consultation will take place with the City of Edinburgh Council to discuss requirements for Listed Building Consent.

All works are confined to the FRB, therefore there is no connectivity with the North Queensferry and Queensferry Conservation Areas, Inventory Battlefield '*Battle of Inverkeithing II'* or twelve listed buildings located north and south of the FRB. Moreover, the works are purely maintenance and do not include any alterations that would affect the historic and architectural character of these features.

14.0 Biodiversity

A Habitats Regulations Assessment (HRA) was submitted as part of the five-year Marine Licence (05568/15/0), which expired on 25th October 2020. An extension of the licence until 31st March 2021 has been secured (MS-00008903) to permit a new five-year Marine Licence application to be submitted. If any works other than those detailed in the 'description of project' are programmed, or any substantial changes are made to the working methodology or materials used, a separate RoD will be produced. A separate RoD will also be submitted if the environmental baseline information were to change significantly.

All works will be contained to the FRB therefore no direct land take or clearance within the designated sites is required, and the works will therefore not result in loss or function (e.g. habitat loss or species fragmentation) of the designated sites. There is also no requirement for resources from the designated sites. Moreover, it is not anticipated that the works will result in changes to water quality provided pollution control measures outlined in Section 17.0 'Road drainage and the water environment' are followed.

It is likely that equipment, vehicles and NRMM as part of the work processes will lead to a slight increase in noise in the area surrounding the works. This could potentially disturb local wildlife. However, when granting the five-year Marine Licence (05568/15/0), Marine Scotland, at the request of NatureScot, stipulated that a baseline noise survey should be carried out and a Construction Noise Management Plan (CNMP) established (for the five-year Marine Licence) which would be mandatory for any works undertaken within 400 m of Long Craig Island SSSI between 1st May and 15th August. The requirements for noise monitoring and management was to ensure that potential noise effects from maintenance activities did not affect the population of breeding Roseate tern on Long Craig Island. The measures detailed within the current CNMP are being evaluated with relevant stakeholders to support the new five-year Marine Licence application. Feedback will be reviewed and the CNMP will be updated where necessary. The programme of maintenance works runs from January 2020 until 31st March 2022, therefore works which will take place within 400 m of Long Craig Island SSSI between 1st May and 15th August will be subject to the requirements of the CNMP.

The following 'Best Practicable Means' and 'Best Practice Guidelines' mitigation measures will also be implemented to ensure potential impacts on wildlife and designated sites are not significant.

- All mitigation measures detailed within Section 12.0 'Air quality', Section 16.0 'Noise and vibration' and Section 17.0 'Road drainage and the water environment' will be followed to protect wildlife and designated sites.
- BEAR Scotland will appoint an Environmental Clerk of Works (EnvCoW) to visit the site periodically between 1st May and 15th August to ensure compliance with the CNMP.
- Equipment, vehicles, NRMM and personnel will be constrained to the FRB, thereby eliminating damage to designated sites and potential direct mortality and disturbance to species.
- If during works unforeseen disturbance of protected species becomes evident, works will cease, and appropriate mitigation measures will be discussed, agreed and implemented with stakeholders e.g. NatureScot, SEPA, Marine Scotland, etc.
- BEAR Scotland's Environmental Team will be contacted to allow consideration of potential environmental effects if unplanned works will be undertaken outwith the agreed working areas, or there is any deviation from the agreed programme and/or method of working.

Based on the like-for-like maintenance nature of the works, there will be no operational impacts to the FRB upon completion of the works. As such, it is not anticipated that there will be any impacts on designated sites or their qualifying features during the operational phase.

15.0 Landscape & visual effects

During the construction period (January 2021 to 31st March 2022), there will be intermittent short-term impacts on the visual amenity of the area due to the presence of equipment, vehicles and NRMM, site compounds and stockpiles of materials on the FRB.

The following mitigation measures will reduce the visual impacts of the works:

- During all stages of the works, the site will be kept clean and tidy, with equipment, vehicles, NRMM, materials and wastes stored appropriately in the designated laydown area on the southbound road closure.
- Good housekeeping will also be employed throughout the works.

Based on the like-for-like maintenance nature of the works, there will be no operational impacts to the FRB upon completion of the works.

16.0 Noise & vibration

During the construction phase, activities undertaken on site could potentially have some localised and short-term noise impacts in proximity to the works. The works will, for example, require a range of equipment, vehicles and NRMM, and

noise will also be generated through the use of grinders, impact wrenches, chipping hammers, etc. Any temporary short-term increase in noise levels may also cause disturbance to local wildlife, including within the breeding season of Roseate tern on Long Craig Island (1st May to 15th August). The works are therefore subject to the requirements for noise monitoring and management, as stipulated in the CNMP (refer to Section 14.0). However, with mitigation in place following 'Best Practicable Means' and 'Best Practice Guidelines', as described within BS 5228-1[44] and BS 5228-2[45], effects on noise and vibration during construction are not anticipated to be significant, and any minor impacts will also be intermittent, transient, temporary and short-lived. Given the nature of the works, and the height of the bridge above the Firth of Forth, no ground-borne vibration impacts have been forecast.

The following mitigation measures will also be implemented to ensure potential impacts are not significant:

- If unacceptable noise is emanating from the site the operation will, where possible, be modified and re-checked to verify that the corrective action has been effective. Actions to be considered include (a) minimizing cutting and grinding on-site, (b) reducing the operating hours, (c) repositioning equipment, (d) changing the method of working etc. Corrective actions will be actioned through the non-conformance reporting procedure, which ensures a root-cause analysis is carried out on each incident. The non-conformance procedure also ensures that appropriate corrective and preventative action measures are agreed and implemented in a timely fashion with all parties and are recorded, actioned through to closeout, and fully auditable and traceable.
- If equipment, vehicles or NRMM not assessed by this RoD are required to complete the works, then an immediate review will take place between the Clerk of Works, Senior Engineer and BEAR's Environmental Team, as appropriate.
- Equipment, vehicles and NRMM with directional noise characteristic will (where practical) be shut down in intervening periods between site operations.
- Drop heights from vehicles and NRMM will be kept to a minimum to minimise noise when unloading.
- Equipment, vehicles and NRMM will be started sequentially rather than all together.
- All equipment, vehicles and NRMM used onsite will have been regularly maintained, paying attention to the integrity of silencers and acoustic enclosures.
- The use of grinders, impact wrenches, chipping hammers, etc. will be avoided (except where there is an overriding justification), and if used will be fitted with mufflers or silencers of the type recommended by the manufacturer.
- All compressors will be 'sound-reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed when in use.
- Reversing warning systems of HGVs, site vehicles and NRMM will be switched to the minimum setting required by HSE and, where possible, will utilise 'broadband non-tonal' or 'directional sound reversing' alarms. Speed limits will also be reduced through the works.

The works will not result in any significant impacts on noise during the operational phase.

17.0 Road drainage & the water environment

Any construction work above a waterbody has inherent risk factors. Potential risks to the Lower Forth Estuary from routine maintenance works include spills from equipment, vehicles and NRMM, and dirty water runoff from the designated laydown areas. There is also the potential for liquid runoff linked to dust suppression mitigation. There is

[44] BS 5228-1:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise.
[45] BS 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Vibration.

also a risk that material and equipment could fall into the Lower Forth Estuary during the works. The risk factor has however been somewhat reduced through adoption of offsite fabrication e.g. the FRB workshop will be utilised, where possible, to undertake off-site fabrication of bridge components, prior to being reinstalled on the bridge. Debris catch-netting will, where feasible, also be installed before works commence to ensure no material can escape to the Lower Forth Estuary. Plant, fuel, oils, generators etc. will also be bunded appropriately in the designated laydown areas. The likelihood of flooding on the FRB is also not a risk factor, due to the bridge deck's height above the estuary. There is also no requirement for in-water works.

Provided the following mitigation measures are adhered to during the works, potential risk factors are not anticipated to be significant:

- All mitigation measures detailed within Section 14.0 'Biodiversity' will be followed to protect the water environment.
- The abstraction or transfers of water, or the washing of tools in the Lower Forth Estuary is not permitted.
- No discharges into the Lower Forth Estuary will be permitted.
- Regular visual pollution inspections of the designated laydown areas and work sites (particularly near road drainage at the laydown areas) shall be conducted (e.g. site walkover by engineer or Clerk of Works), especially during periods of heavy rain.
- All site personnel will be made aware of site spillage response procedures and in the event of a spill, all works associated with the spill will stop, and the incident reported to the Clerk of Works. Small spills that did not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact would most likely not be required to be notified to SEPA, NatureScot, Marine Scotland or other stakeholders. However, all such incidents will be recorded and reported to BEAR Scotland's Environmental Team. In the event of a 'serious incident'[46], SEPA, NatureScot and Marine Scotland will be notified without delay. Such notification will include: (i) the time and duration of the incident, (ii) a description of the cause of the incident, (iii) any effect on the environment as a result of the incident, and (iv) any measures taken to minimise or mitigate the effect and prevent a recurrence.
- Spill kits will be available and replenished onsite when required.
- Refuelling and material storage areas will be fully bunded and secure and will be located, if space is available, at least 10 m from drainage entry points, in order to comply with SEPA Guidance for Pollution Prevention (GPP) 5 'works and maintenance in or near water' and to minimise pollution risk.
- Material, plant, fuel, oils, generators etc., will be stored in the laydown areas in a manner that ensures they are protected from damage by collision or extremes of weather.
- All vehicles and NRMM used onsite will have been regularly maintained, paying attention to the integrity of oil tanks, coolant systems, gaskets etc. A checklist will be present to make sure that the checks have been carried out.
- Any vehicles and NRMM not in operation will (where possible) be sited in designated areas.
- No refuelling or vehicle washing will take place on the FRB e.g. all refuelling and vehicle washing will take place in approved vehicle washing areas with access to appropriate drainage.
- Generators, and other NRMM, where there is a risk of leakage of oil or fuel, will have internal bunding OR will have a secondary containment system (e.g. drip trays, plant nappies, etc.) placed beneath them that meets 110% capacity requirements.

[46] 'serious incident' means: (i) any accident, spillages, or uncontrolled discharge which has had, or could have, an adverse impact on the water environment, or (ii) any malfunction, breakdown or failure of plant or techniques which has had an adverse impact on the water environment, or (iii) any event, such as force majeure or action taken to save human life or limb, which results, or is likely to result, in a breach of contract or any condition of a licence.

18.0 Geology & soils

As the works will take place entirely on the FRB, and due to the structure's height above the estuary, there will be no impact on geology and soils.

19.0 Material assets & waste

There will be limited consumption of materials and natural resources or generation of waste associated with the works and none of the maintenance activities will require any resources from the Natura 2000 sites. The FRB workshop will also be utilised, where possible, to undertake off-site fabrication of bridge components, prior to being reinstalled on the bridge.

The schemes are executed by the operating company as site operations e.g. 'As-of-Right' schemes of values less than £350,000, therefore a Site Waste Management Plan is not required.

All wastes removed from site will be consigned, transported and disposed of in full accordance with all relevant UK legislation e.g. Duty of Care[47] requirements apply e.g. evidence of material transfer notes and/or waste exemption certificates will be supplied by a licenced waste carrier.

Provided the following mitigation measures are followed, environment impacts from the use of materials and natural resources and disposal of waste during the construction phase are not anticipated to be significant:

- If hazardous substances must be used on site, each substance will be required to undergo assessment under the Control of Substances Hazardous to Health (COSHH) Regulations 2002. Hazardous substances (if required) will also be clearly labelled and stored in line with COSHH safety data sheets within the designated laydown area, at least 10 m from surface drains (where possible).
- COSHH waste will NOT be mixed with general waste and/or other recyclables.
- COSHH waste and/or special waste (if required) will be removed from site by a specialised waste carrier.
- If any substance used on site displays the 'Dangerous to the Environment' COSHH symbol, then the following controls will be implemented: (i) the substance will not be permitted to enter surface drains (ii) any spillages will be contained using bunding and then absorbed with an absorbent material (e.g. dry sand or earth) and then collected and stored in a suitable container which is properly labelled and sealed securely in preparation for disposal, (iii) spillages or uncontrolled discharges will be immediately reported to SEPA.
- The site will be monitored regularly for signs of litter and other potential contaminants and litter will be removed before and after works take place. The site will also be left clean and tidy.
- Wastewater from welfare facilities (if required) will be subject to effluent treatment followed by tanker removal.

20.0 Climate

[47] The 'Duty of Care' requires that a waste holder (producer, carrier or disposer) takes all reasonable steps to ensure that waste is described in a way that permits its safe handling and management and that any transfer of waste is accompanied by a written description of the waste, including an EWC code.

The Climate Change (Scotland) Act sets out the target and vision set by the Scottish Government for tackling and responding to climate change. The Act includes a net-zero target for greenhouse gas emissions before 2045 (from the baseline year 1990)[48]. In response, BEAR Scotland, working on behalf of Transport Scotland, undertake carbon monitoring of our major projects and operational activities. Emissions from our activities are recorded using Transport Scotland's Carbon Management System. BEAR Scotland also undertakes resource efficiency activities to manage and reduce emissions contributing to climate change. Actions and considerations for the routine maintenance works are detailed in Section 19 'Material assets & waste'.

The FRB also has provision of road lighting therefore there is no requirement for additional power generated tower lighting along the scheme extents. Moreover, local contractors and suppliers will be used as far as practicable to reduce fuel use and greenhouse gas emitted as part of the works. The FRB workshop will also be utilised, where possible, to undertake off-site fabrication of bridge components, prior to being reinstalled on the bridge.

21.0 Risk of major accidents or disasters

The FRB is not located within a geographical region that is subject to natural disasters and there is no likelihood of flooding on the FRB due to its height above the estuary.

AADT flow is low and traffic management will only be utilised for nine days during grillage repairs works, therefore any risk of collision from errant vehicles within traffic management will be temporary and short-lived.

Release of pollutants during works, or as a result of an accidental spillage, have the potential to affect all habitats and species present within the Lower Forth Estuary. The key issue with respect to pollution is the procedures put in place to minimise the risk of contaminants entering the Forth Estuary in sufficient concentrations to cause adverse effects on site integrity. A Site Environmental Management Plan (SEMP) will therefore be produced by BEAR Scotland which will set out a framework to reduce the risk of adverse impacts from construction activities on sensitive environmental receptors. The SEMP will set-out a process for recording environmental risks, commitments and constraints and will identify the procedures and measures that will be used to manage and control these aspects. In addition, the SEMP seeks to ensure compliance with environmental legislation, government policy, and scheme-specific environmental objectives. The SEMP will also formalise a mechanism for monitoring, reviewing and auditing environmental performance and compliance. As such, any sub-contractors contracted for the works will comply with all conditions of the SEMP and may be subject to audit throughout the contract.

A Designer's Risk Register will also be prepared by BEAR Scotland, which addresses potential environmental risks. Activity-specific RAMS will also be produced and will recognise and highlight environmental risks and detail how these will be addressed, as well as contingency plans to deal with environmental incidents. RAMS produced by sub-contractors (if required) will also be approved by BEAR Scotland prior to works commencing.

[48] The Climate Change Act was amended in Scotland in 2019 from an 80% reduction by 2050, to a net-zero target by 2045. https://www.legislation.gov.uk/asp/2009/12/part/1/crossheading/the-netzero-emissions-target and https://www.legislation.gov.uk/asp/2019/15/enacted

Considering the above, it is judged that the residual effects of the scheme(s) to risks from major accidents or disasters is low.

22.0 Cumulative effects

Due to the nature and scale of the proposed planning applications (Table 1.1), no significant effects are likely that may result in 'in-combination' or 'cumulative effects'.

FRB maintenance works are delivered through annual Cyclic, Routine and Planned Maintenance programmes. Separate 'Works Contracts' are also undertaken on a needs basis e.g. expansion joint replacement. However, there are no major projects currently at the planning stage that will be carried out by BEAR Scotland or sub-contractors on the FRB, or in the immediate vicinity of the bridge during 2020/2021, that could result in 'in-combination' or 'cumulative effects'. Annual maintenance works also improve safety on the bridge and protect against future deterioration of the structure. Regular maintenance therefore extends the period between major interventions on the FRB. As maintenance works on their own are not anticipated have a significant effect, there will be no 'in-combination' or 'cumulative effects' of the works given that standard best practice mitigation measures will be in place to avoid environmental impacts.

EXTENT OF EIA WORK UNDERTAKEN AND DETAILS OF CONSULTATION

The following environmental parameters have been considered within this RoD:

- Population and human health (properties, land use, NMU & community facilities)
- Air quality
- Cultural heritage assessment
- Biodiversity
- Landscape & visual effects
- Noise & vibration
- Road drainage & the water environment
- Geology & soils
- Material assets & waste
- Climate
- Risk of major accidents or disasters
- Cumulative effects.

As FRB Cyclic, Routine and Planned Maintenance works are undertaken over the Lower Forth Estuary, within the Mean High Water Springs (MHWS), a Marine Licence is required under Part 4 of the Marine (Scotland) Act 2010 and Part 4 of the Marine and Coastal Access Act 2009. A five-year Marine Licence application was therefore prepared in March 2015 by the previous Operating Company (Amey). The application, as submitted, included an HRA and environmental risk assessment of all FRB Cyclic, Routine and Planned Maintenance activities on the FRB as part of the 4th Generation Term Contract for Management and Maintenance of the Scottish Trunk Road Network. As the impacts of FRB Cyclic, Routine and Planned Maintenance works have been covered by the HRA, an Appropriate Assessment is not required for this RoD.

The previous five-year Marine Licence (05568/15/0) expired on 25th October 2020, therefore an extension of the licence until 31st March 2021 has been secured (MS-00008903) to permit a new five-year Marine Licence application to be

submitted. Extensive consultation with a range of stakeholders is currently being undertaken to support the application for the new five-year Marine Licence.

STATEMENT OF CASE IN SUPPORT OF A DETERMINATION THAT A FORMAL EIA AND ENVIRONMENTAL STATEMENT IS NOT REQUIRED

The works are considered to constitute a relevant project falling within Annex II of the Environmental Impact Assessment Directive 2014/52/EU because the FRB spans, and therefore has connectivity to, several 'sensitive areas'.

Cyclic, Routine and Planned Maintenance works have been subject to screening using the Annex III criteria to determine if a formal Environmental Impact Assessment (EIA) is required under the Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017. Screening using Annex III criteria, reference to Marine Licence (MS-00008903) and review of available information has not identified the need for an EIA.

The project will not have significant effects on the environment by virtue of factors such as:

- **Characteristics of the scheme**
  - Works are limited to annual cyclic, routine and planned maintenance and will be exclusively delivered on a 'like-for-like' basis and will therefore not damage, modify, or alter the character or footprint of the FRB.
  - There will be limited consumption of materials and natural resources or generation of waste associated with the works.
  - A Marine Licence has been obtained for all maintenance works on the FRB. Marine Scotland undertook consultation with NatureScot who considered no significant impacts with mitigation implemented. The application, as submitted, included an HRA and environmental risk assessment of all FRB Cyclic, Routine and Planned Maintenance activities on the FRB as part of the 4th Generation Term Contract for Management and Maintenance of the Scottish Trunk Road Network. As the impacts of FRB Cyclic, Routine and Planned Maintenance works have been covered by the HRA, an Appropriate Assessment is not required for this RoD.

- **Location of the scheme**
  - All works are confined to the FRB, which spans the Firth of Forth SPA, RAMSAR, and SSSI in addition to the Forth Islands SPA and Long Craig Island SSSI.
  - Land use will not change as a result of the works.
  - The scheme is not located within any areas designated for landscape interests.

- **Characteristics of potential impacts of the scheme**
  - No nationally or internationally designated nature conservation sites will be significantly affected by the proposed works.
  - The works do not include any alterations that would affect the historic and architectural character of the Category A listed FRB.
  - With good practice pollution prevention measures implemented onsite, there is a negligible risk of a pollution event e.g. the SEMP, Designer's Risk Register, and activity-specific method statements will include plans to address environmental incidents.
  - Measures will be in place to limit any short-term impacts on NMUs.

- Measures will be in place to ensure appropriate removal and disposal of waste.
- No change is predicted in respect to the vulnerability of the FRB to the risk (or severity) of major accidents or disasters.
- Annual cyclic, routine and planned maintenance works improve safety on the bridge and protect against future deterioration of the structure. Regular maintenance therefore extends the period between major interventions on the FRB.
- If any works other than those detailed in the 'description of project' are programmed, or any substantial changes are made to the working methodology or materials used, a separate RoD will be produced. A separate RoD will also be submitted if the environmental baseline information were to change significantly.
- No impacts on the environment are expected during the operational phase.

Mitigation measures detailed above and compliance with mitigation stipulated in requirements of Marine Licence MS-00008903 will ensure no significant negative impacts on sensitive receptors.

Appendix A: Scheme location and site photographs

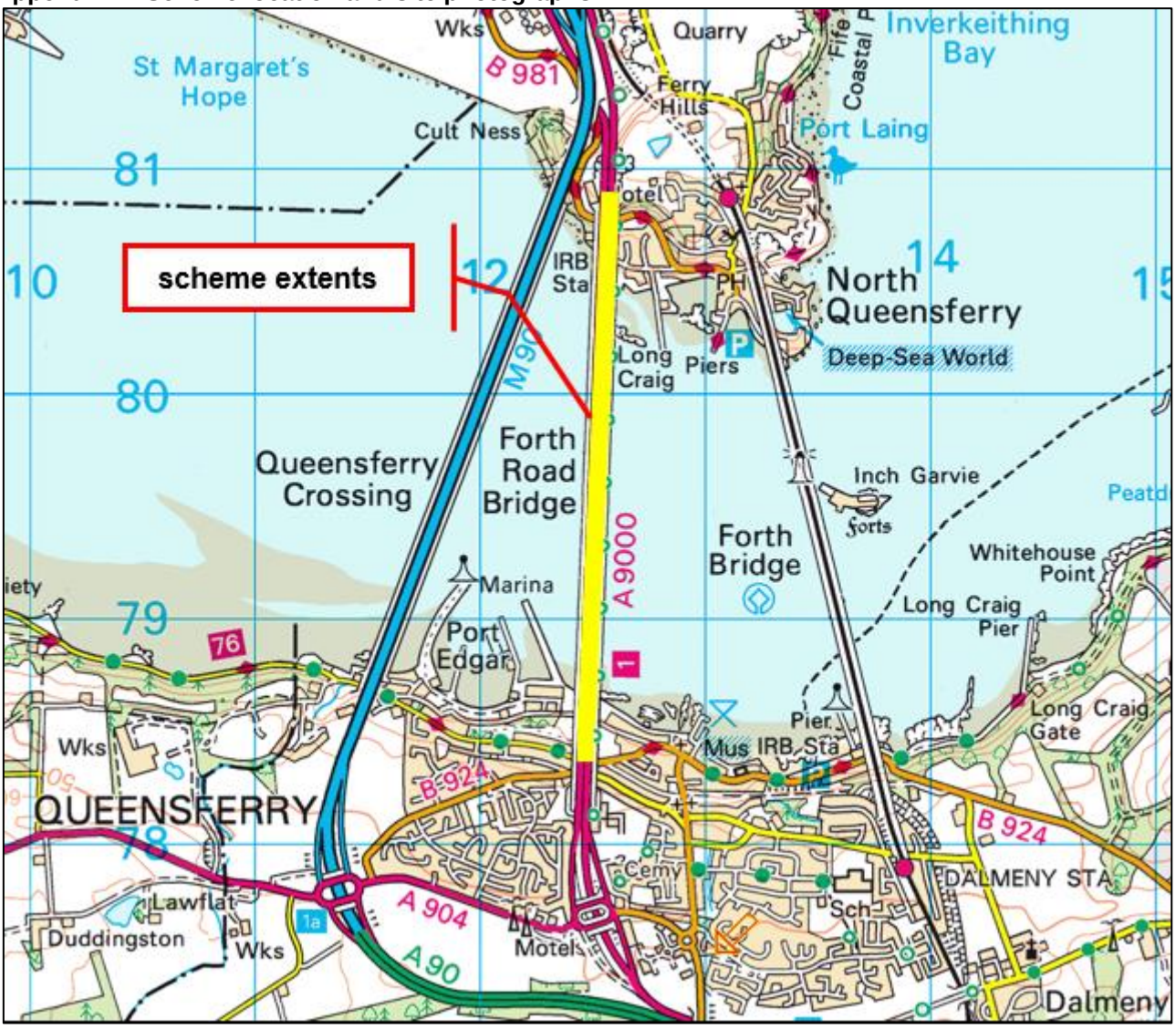

Figure 1. A90 Forth Road Bridge (highlighting scheme extents). Source: Grid Reference Finder. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2020.

Figure 2. The Forth Road Bridge. Source: New Civil Engineer.