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Environmental Impact Assessment Record of Determination

A9000 Forth Road Bridge FY25/26 Works

Record of Determination

Contents

Project Details

Description

BEAR Scotland (BEAR) has been commissioned by Transport Scotland to undertake a programme of maintenance and improvement works on the Forth Road Bridge (FRB) over the 2025 / 2026 Financial Year. This Record of Determination (RoD) has been produced to cover the following schemes assessed to be relevant projects:

- Main Tower Lateral Thrust Bearing Refurbishment
    - The project brief consists of bearing replacement on both the North and South Main Towers and steelwork strengthening. It also consists of painting of new and existing steelwork.
- SSUDA Phase 10 and 10a
    - The project brief consists of continuing improvements on the Suspended Span Under Deck Access (SSUDA).
- Viaduct Box Girder Assessment and Strengthening
    - The project brief is to undertake a variety of refurbishment works including drainage refurbishment, blasting and repainting at gullies, and sealing of gaps and holes across the girders. Blasting and repainting works will help remove a considerable proportion of the lead-based paint systems still present on the FRB.
- Footpath Concrete Refurbishment and Resurfacing
    - The project brief is to undertake resurfacing of the footpath across the span of the northbound and southbound carriageways including concrete repairs to the deck where necessary.
- Footway Elastomeric Bearing Replacement
    - The proposed works are to conduct refurbishment works on the elastomeric bearings on both the east and west footway along the length of the structure.
- Vehicle Restraint Barrier / Grillage Refurbishment – Phase 2

    - The project brief consists of continuing, predominately in-situ, refurbishment of the grillages, via blasting, steelwork repair and painting on site from encapsulation structures.

- Removal of Side Tower Post Tensioned Cables
    - The project brief consists of removing damaged post tensioned cables within the side towers within the northern and southern extents of the FRB.

- Suspended Span Carriageway Concrete Deck
    - The project brief consists of removal of damaged / defective areas of concrete below the span of the deck along with concrete repairs of these areas and replacement of corroded reinforcement where necessary.

- Runway Beam Bracket Replacement – Phase 2
    - The project brief consists of continuing the fabrication and installation of the remaining brackets on the north and south side of the main span of the bridge.

The works are programmed to be completed within the 2025/2026 financial year with the first scheme expected to begin on 1st April 2025. All works are currently programmed to utilise a daytime working pattern.

Where a site compound is necessary to facilitate the works, it will likely be located beneath the bridge within areas which have been used previously as a contractor's compound.

Where traffic management (TM) is required, it may involve carriageway closures, single lane closure and footway closures.

Location

All proposed schemes lie on the A9000 FRB, which spans the Firth of Forth, connecting South Queensferry to North Queensferry (Figure 1 and Figure 2).

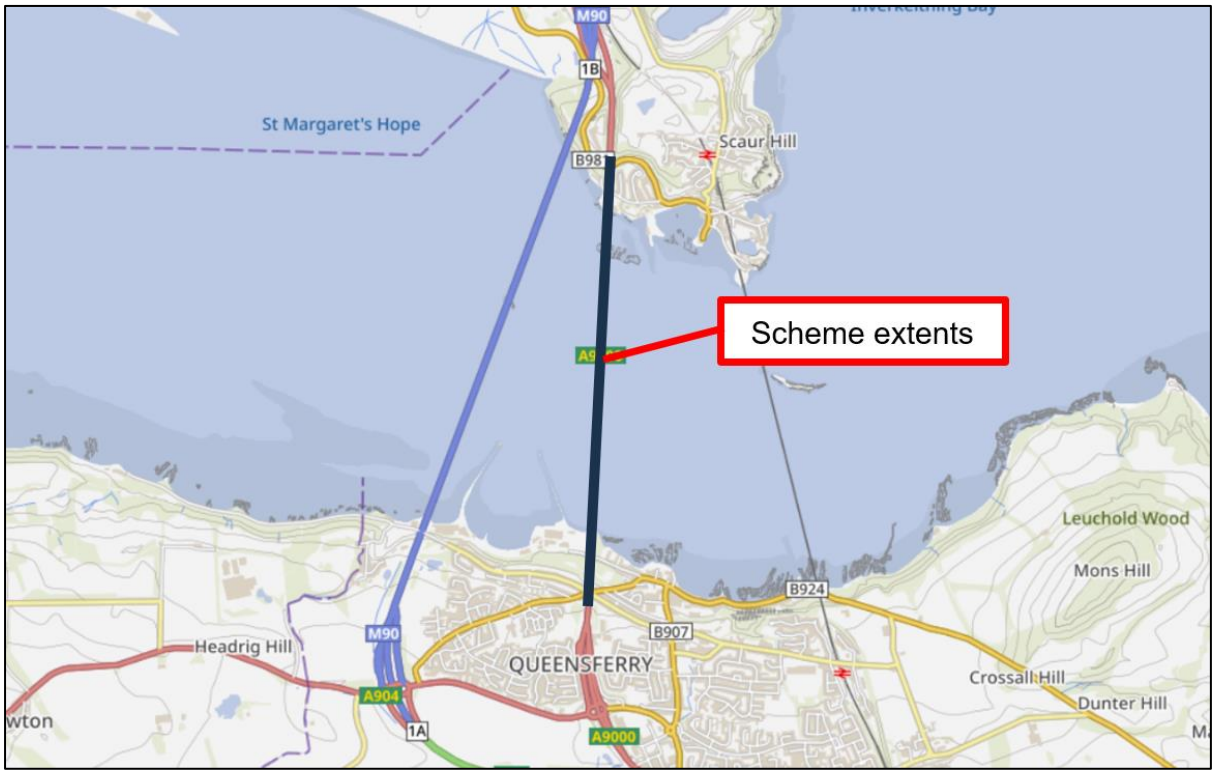

Figure 1. Extents of the Works. - Source: Asset Management Performance System (AMPS). © Europa Technologies Ltd. Contains Ordnance Survey data © Crown copyright and database right 2018.

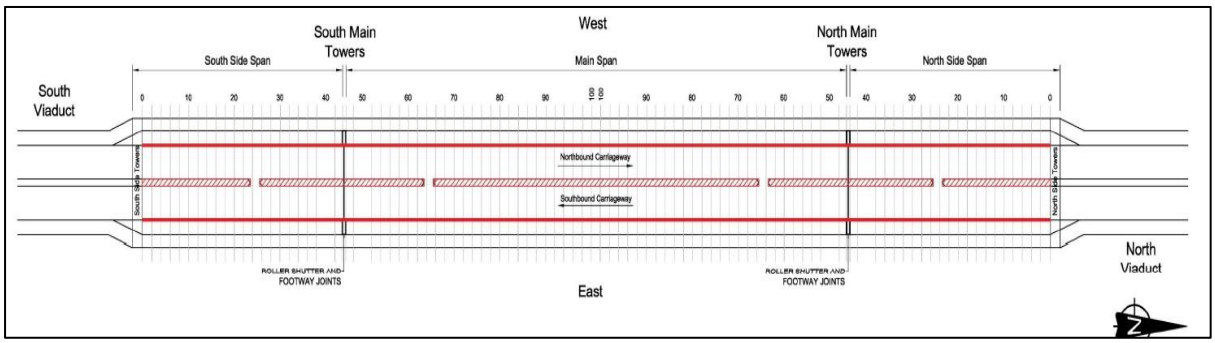

Figure 2. A9000 FRB, scheme extents. Source: BEAR Scotland

Description of local environment

Air quality

For properties within 300m of each of the schemes refer to “Population and Human Health”.

A search of the Air Quality in Scotland online mapping tool records air quality monitoring sites in the wider area show bandings in the ‘green zone’ (Low Index 1-3).

The FRB lies within the boundary of both the City of Edinburgh Council and Fife Council, which have five Air Quality Management Areas (AQMAs) and no AQMAs within their administrative boundaries respectively. The nearest, 'Glasgow Road 2013', lies approx. 5.5km south of the closest scheme and has been declared for nitrogen dioxide (NO_2).

There are 15 sites registered on the Scottish Pollutant Release Inventory (SPRI) for pollutant releases to air within 10km of the scheme:

- Dalmeny Hound Point, South Queensferry - Energy sector – located 2.6km southeast, which has been declared for hydrochloroflurocarbons (HCFCs) (kg), methane (t) and non-methane volatile organic compounds (NMVOs) (t).
- Rosyth Dockyard, Dunfermline - Other activities - located 3km northwest, which has been declared for NMVOs (t).
- Hillwood Quarry, Ratho, Midlothian - Mineral industry – located 6km south, which has been declared for CO2 and particulate matter PM_{10} and smaller.
- VION Food Scotland Ltd, Broxburn - Animal and vegetable products from the food and beverage sector – located 6.8km southwest, which has been declared for CO_2.
- Glendevon Poultry Farm, Wagon Rd, Dunfermline - Intensive livestock production and aquaculture - located 6.8km northwest, which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Muir Dean Coal Site, Drumcooper Farm Crossgate - Mineral industry – located 7.1km northeast, which has been declared for CO_2, methane (t) and particulate matter PM_{10} and smaller.
- Elmbank Poultry Farm, Crossgates, Fife - Intensive livestock production and aquaculture – located 7.2km northeast, which has been declared for methane (t) and ammonia (t).
- Clifton Poultry Farm, Clifton Road, Newbridge - Intensive livestock production and aquaculture – located 7.5km south, which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Gogarbank Poultry, Corstorphine, Edinburgh - Intensive livestock production and aquaculture – located 8.5km south, which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Clapperton Poultry Complex, Broxburn, West Lothian - Intensive livestock production and aquaculture – located 8.6km south, which has been declared for ammonia (t), particulate matter PM_{10} and smaller and particulate matter total (t).
- Mossbank Poultry Farm, Cowdenbeath, Fife - Intensive livestock production and aquaculture – located 9.2km northeast, declared for ammonia (t).
- Craigies Poultry Farm, Townhill, Dunfermline - Intensive livestock production and aquaculture – located 9.7km northwest, declared for ammonia (t).

- Sighthill Biscuit Factory, Edinburgh - Animal and vegetable products from the food and beverage sector - located 9.8km southeast, declared for hydrofluorocarbons (HFCs) (kg)
- Raw Camps Poultry Farm, Kirknewton, W.Lothian- Intensive livestock production and aquaculture – located 9.9km northeast, declared for ammonia (t).
- Fife Council, Lochhead L/F, By Wellwood, Fife - Waste and waste-water management - located 10km north, declared for CO_2 (kt), Chlorofluorocarbons (CFCs) (kg) and Methane (t).

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

Cultural heritage

The PastMap and Historic Environment Scotland (HES) online mapping tools records that the FRB is a Category A listed building ('FRB, with Approach Ramps and Piers', LB47778/LB49165). Nine further listed buildings lie within 300m of the schemes the closest of which lies approx. 35m west of schemes located within the northern bridge extents.

Schemes within the southern extent of the FRB lie directly adjacent to the Queensferry Conservation Area (CA) and schemes within the northern extent of the FRB lie approx. 35m west of the 'North Queensferry' CA. The 'North Queensferry' CA consists of a marina, urban areas with residential properties, and small areas of scattered parkland and the 'Queensferry' CA consists of coastline, both residential and business properties, urban areas and small areas of scattered parkland.

Schemes located within the northern extents of the FRB are within the 'Battle of Inverkeithing II' (ID: BTL23) Inventory Battlefield (IB).

Of lesser cultural heritage value, the FRB (including approach ramps and piers) is also recorded as an undesignated cultural heritage asset (UCHA). Fourteen additional UCHAs of known interest are recorded within 300m of the schemes, four of which lie within a 15m radius, however these UCHAs are all located below the FRB:

- Telesilla: Macintosh Rock, Firth of Forth - Canmore Maritime - Classification: steamship (19th century) located directly below the FRB.
- North Queensferry, Lifeboat Station – Canmore - Classification: lifeboat station (19th century) - (20th century) located 5m west.

- Telesilla - Canmore Maritime - Classification: steamship (period unassigned) located 10m east.
- North Queensferry, Craigdhu, Hand Crane – Canmore - Classification: crane (period unassigned)) located 10m east.

All remaining UCHAs are found over approx. 30m from the bridge.

Construction of the FRB road corridor is likely to have removed any archaeological remains that may have been present within the trunk road boundary. The potential for the presence of unknown archaeological remains in the study area has therefore been assessed to be low.

Landscape and visual effects

The nine schemes are not situated within a National Park (NP) or National Scenic Area (NSA).

The Landscape Character Type (LCT) within the northern extents of the FRB is 'Coastal Hills - Fife' (no. 192) and the southern extents of the FRB is located within the 'Coastal Farmland – Lothians' (no. 280) a LCT (Scottish Landscape Character Types). The key characteristics of 'Coastal Hills – Fife' (no.192) are:

- Close association with the coast, either through views of the sea, the Firths or the estuaries or indirect coastal experiences of sounds, smell, etc.
- Predominantly medium to large, open, undulating arable fields, often with no field boundaries or with mainly wire fences, low hedges or some stone dykes and little other vegetation cover.
- Isolated farms and extended or converted farmsteads amongst open, exposed fields.
- Extensive seaward views across the North Sea or the Firths and land beyond, but generally landward views are contained by hills in the near distance.
- Distinctive edges to the character type, created either by distinct breaks of slope or by rivers, roads, built development or *Coastal Cliffs* or *Coastal Braes*.
- General lack of tree cover, with relatively few forests and shelterbelts.
- Some pasture and rough hill grazing on the poorer hill soils. Occasional field corner plantations and small semi-natural woodland alongside burns.
- Infrequent, small, often exposed and conspicuous settlements of stone or white or pale colour-washed render and grey roofs and single storey or two storey houses with small windows to the sea.
- Designated landscapes, castles, dovecotes historic villages and rural churches.
- Golf courses, primarily in eastern parts.

- Medium to large scale, often open or exposed coastal landscape, where the character is always influences by the sea and can be particularly affected by the weather conditions and views of the sky and the sea.
- Generally a simple, sloping, organised, tended, farming landscape with regular or geometric patterns.

The key characteristics of 'Coastal Farmland – Lothians' (no. 280) are:

- Open, sweeping and gently rolling agricultural area of mostly intensively managed arable farmland on the fertile soil of underlying Carboniferous rock.
- Some prominent igneous rock outcrops.
- Generally north-facing towards the coast.
- Drained by inconspicuous burns falling to the Firth of Forth.
- Significant policy and shelterbelt woodland associated with farm estates
- Significant gardens and designed landscapes associated with historic houses.
- Generally medium scale fields but in areas smaller or larger scale, defined by hedgerows, hedgerow trees, stone dykes or wire boundaries.
- An even scatter of farm steadings, estates and cottages, with a limited number of other settlements.
- Distinctive grid pattern of major transport corridors of the M9, A904, the Edinburgh to Glasgow/Perthshire railway and the Union Canal passing through the area in a west-east direction and linked by a series of minor roads running north-south.
- Highly distinctive and differing designs of the three Forth bridges and their approaches.
- Often extensive views northwards across the Firth of Forth and its bridges to the Ochil Hills and beyond, and to the south to the Bathgate Hills and Pentland Hills beyond.

Land use located within 300m of the schemes can be categorised as the following:

- Urban area,
- Maritime installation,
- Motorway and major roads,
- Rough Grazing,
- Designated landscape, and
- Recreation area.

The national scale land capability for agriculture classifies land surrounding the schemes as being:

- 'Urban' – land of no agricultural value.

The FRB lies above a transitional waterbody, with land use at the bridge foundations at the northern and southern extents dominated by transport infrastructure and urban

development. 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 Bridge. Large shipping vessels sailing up the Forth estuary are also distinct features. North and south of the FRB, the M90 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. The FRB is a prominent landscape feature. The FRB, for example, has a distinct character shaped by fast-flowing traffic, road markings, safety barriers, signage and landscaping.

Woodland within the study area is comprised of:

- Approx. 8ha of broadleaved woodland, registered on the Native Woodland Survey of Scotland, borders either side of the southern extents of the FRB.
- Approx. 3.6ha of broadleaved woodland, approx. 2ha of which is registered on the Ancient Woodland Inventory Scotland, borders southbound carriageway at the northern extents of the FRB.
- Approx. 0.5ha of broadleaved woodland is located approx. 10m west of the southern extents of the FRB.
- Approx. 1.7ha of broadleaved woodland is located approx. 25m west of the northern extents of the FRB.
- Approx. 0.7ha of broadleaved woodland is located approx. 30m east of the northern extents of the FRB.
- Approx. 0.6ha of broadleaved woodland is located approx. 150m northwest of the northern extents of the FRB.

There are no trees covered by a Tree Preservation Order (TPO) with connectivity to the FRB. However, the FRB is located in proximity to the Queensferry CA and the North Queensferry CA, and as such all trees located within these CAs are protected.

Biodiversity

The NatureScot Sitelink online mapping tools identifies that the Firth of Forth Special Protection Area (SPA) (EU Site Code UK9004411), Firth of Forth Ramsar (EU Site Code UK13017) and Forth Islands SPA (EU Site Code UK9004171) are spanned by the FRB.

The Outer Firth of Forth and St Andrews Bay Complex SPA (UK9020316) has also been identified approx. 2.7km east from the FRB. The FRB is located directly above the Firth of Forth waterbody which outfalls to the SPA and therefore shares hydrological connectivity with this designated European site.

Three Sites of Special Scientific Interest (SSSIs) have been identified within 300m of the FRB:

- Firth of Forth (EU Site Code: 169840) is located directly beneath both the northern and southern extents of the FRB along the coastline.
- Long Craig Island (EU Site Code: 169962) is located directly beneath the bridge within the northern extents.
- Ferry Hills (EU Site Code: 135444), is located approx. 30m northeast of the northern extents of the FRB.

Hopetoun Road Local Nature Conservation Site (LNCS) is spanned by the southern extents of the FRB.

There are no Local Nature Reserves (LNRs) designated for biodiversity features within 300m of the scheme.

A search of the NBN online mapping tool records the following plant species as listed within the Network Management Contract (NMC) within 2km of the each of the schemes (within the last 10-years):

Four invasive non-native species (INNS):

- Rhododendron (*Rhododendron ponticum*),
- Giant Hogweed (*Heracleum mantegazzianum*),
- Himalayan balsam (*Impatiens glandulifera*), and
- Japanese knotweed (*Reynoutria japonica*).

Five invasive injurious weeds (as listed under the Weeds Act 1959):

- Common ragwort (*Senecio jacobaea*)
- Creeping thistle (*Cirsium arvense*),
- Broad-leaved dock (*Rumex obtusifolius*),
- Curled dock (*Rumex crispus*), and
- Spear thistle (*Cirsium vulgare*).

One invasive native perennial (as listed in the Trunk Road Inventory Manual):

- Rosebay willowherb (*Chamaenerion angustifolium*).

The closest record pertains to common ragwort, creeping thistle, broad-leaved dock, curled dock and rosebay willowherb, located approx. 65m west of the closest scheme.

A search of the Asset Performance Management System (AMPS) online mapping tool records no invasive or injurious plant species within the any of the schemes.

The Firth of Forth consists of a wide range of coastal and intertidal habitats, 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. However, the ecological habitat potential in and around the FRB is somewhat limited because of a number of anthropogenic pressures. The area immediately under the footprint of the FRB, for example, is an active waterway containing well-used maritime shipping lanes, as well as being heavily utilised for marine tourism activities.

Geology and soils

The Firth of Forth SSSI (Site Code 169840), which is noted for its biological and geological features is spanned by the FRB. Firth of Forth SSSI is important for the wide range of geology that can be found 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, and is notified for:

- Lower Carboniferous [Dinantian – Namurian part)]
- Upper Carboniferous [Namurian (part) - Westphalian]
- Carboniferous – Permian Igneous
- Mineralogy of Scotland
- Arthropoda (excluding insects & trilobites)
- Palaeozoic Palaeobotany
- Permian - Carboniferous Fish/Amphibia
- Quaternary of Scotland
- Coastal Geomorphology of Scotland

The Ferry Hills SSSI (EU Site Code: 135444), is located approx. 30m northeast of the northern extents of the FRB. The geological features that this SSSI is designated for are carboniferous – Permian igneous.

The FRB within the most northern schemes extents is located within North Queensferry (A90) Road Cuttings which is a Geological Conservation Review Site (GCRS).

The FRB within the most southern schemes extents spans the South Queensferry Shore and Dalmeny Local Geodiversity Sites (LGS).

The National Soil Map of Scotland online mapping tool records the generalised soil type and major soil group beneath schemes found in the northern extents of the FRB is restored soils and the generalised soil type is made up ground.

There is no recorded data beneath schemes within the southern extents of the FRB.

The British Geological Survey online mapping tool records that the superficial geology below the schemes extents is comprised of:

- Till, Devensian (Diamicton), (south span only), and
- Raised Tidal Flat Deposits, Late Devensian (silt and clay), (south span only).
- Raised Marine Deposits of Holocene Age – sand and gravel, and
- Marine Beach Deposits – gravel, sand, and silt.

The bedrock geology below the schemes extents is recorded as:

- Midland Valley Sill – complex quartz microgabbro,
- Calders Member – sedimentary rock cycles, Strathclyde group type, and
- Hopetoun Member – sedimentary rock cycles, Strathclyde group.

There is no evidence of historical industrial processes or the storage of hazardous materials that could have given rise to significant land contamination.

Material assets and waste

The proposed works consists of nine separate projects.

The main materials used are expected to be but are not limited to:

- Various steel items, including bars, plates, brackets, bolts, vehicle restraint barriers, lighting columns etc.
- Paint.
- Glass reinforced plastic grating (SSUDA walkways).
- Concrete.
- Surface course.
- Waterproofing.

Where the value of an individual scheme is greater than £350,000, a Site Waste Management Plan (SWMP) will be required for the works.

The main wastes produced across all nine projects will consist, of but are not limited to:

- Steel (bearings, bolts, beams, plates etc) (European Waste Catalogue Code: 17 04 05, 17 04 09).
- Paint (European Waste Catalogue Code: 08 01 11) including lead-based paints.
- Concrete (European Waste Catalogue Code: 17 01 01).
- Bituminous material (European Waste Catalogue Code: 17 03 02) none of which is classified as hazardous material containing coal tar.

- Timber formwork (European Waste Catalogue Code: 17 02 04).

Where possible wastes will be cleaned and reused on site or removed to a licensed facility.

Noise and vibration

Receptors – refer to 'Population and Human Health'.

Works are not located within a Candidate Noise Management Area (CNMA) or Candidate Quiet Areas (CQA).

The day-time modelled noise level (Lden) for the carriageway along the FRB ranges from 75 to 80 decibels, with levels dropping to between 60 and 65 decibels at the nearest NSR (residential property) (Scotland's Noise Scotland's Environment). Baseline noise and vibration in the study area is mainly influenced by vehicles travelling along the FRB, in addition given the size and elevated nature of the structure climatic conditions can impact baseline noise level i.e. during periods of high winds. Secondary sources are likely derived from vehicles travelling along the Queensferry Crossing, train movement on the Forth Bridge (rail) and from coastal industrial processes at Rosyth Dockyard, in addition to day-to-day urban activities within North and South Queensferry.

Population and human health

The nine schemes are located on the FRB, which spans the Firth of Forth connecting South Queensferry to North Queensferry. Numerous properties (including residential, commercial and industrial properties) lie within 300m of the FRB. The closest residential properties lie 30m east of the schemes undertaken within the northern extents of the FRB.

Of note, Castle Rock Edinvar sheltered housing is located approx. 70m east of the bridge at the southern extents, The DoubleTree by Hilton Edinburgh lies approx. 70m northwest of the northern extents and the North Queensferry Community Centre lies approx. 200m northeast of the northern extents.

Segregated cycleways/footways run alongside the FRB northbound and southbound carriageways. National Cycle Network (NCN) route 1 and a Core Path (ID: CB) cross the Firth of Forth via the southbound cycleway/footway.

The FRB, including the segregated cycleway/footways, include street lighting over the full length.

The FRB is a dual carriageway with a 50-mph speed limit applying throughout. The road carries vehicles primarily used as public transport (e.g., buses and taxis). The Annual Average Daily Traffic (AADT) flow is low (635 motor vehicles (ID: 90004, 2023 data)) (Road traffic statistics) and is comprised of:

- 17 two-wheeled motor vehicles,
- 192 cars and taxis,
- 271 bus and coaches,
- 148 Light Goods Vehicles (LGVs), and
- 5 Heavy Goods Vehicles (HGVs)

There are no congestion issues noted on the FRB within the any of the schemes during the proposed working hours.

Road drainage and the water environment

The Scottish Environment Protection Agency (SEPA) River Basin Management Plan online mapping tool records one classified surface waterbody within 300m of the schemes:

- The Lower Forth Estuary transitional waterbody. The 38.6km^2 Lower Forth Estuary is classified (ID: 200435) and lies in the Scotland river basin district. The Lower Forth Estuary has been assigned a Water Framework Directive 2000/60/EC (WFD) overall classification of 'Good', an ecological classification of 'Good', and a classification of 'Good' for fish migration.

There are no unclassified surface waterbodies within 300m of any of the nine schemes.

A search of the SEPA's Flood Map online mapping tool records that the FRB is not at risk of surface water flooding.

A search of the Scotland's Environment (SE) online mapping tool determined that foundations of the FRB at the north extents lie on the 'Burntisland' groundwater, which has been classified as 'Good'. Foundations at the south extents lie on the 'South Queensferry' groundwater, which has been classified as 'Good'.

A search of the SE online mapping tool determined that the FRB does not lie within a Nitrate Vulnerable Zone.

Climate

The Climate Change (Scotland) Act 2009 sets out the target and vision set by the Scottish Government for tackling and responding to climate change (Climate Change

(Scotland) Act 2009). The Act includes a target of reducing CO_2 emissions by 80% before 2050 (from the baseline year 1990). The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amended the Climate Change (Scotland) Act 2009 to bring the target of reaching net-zero emissions in Scotland forward to 2045 (Climate Change (Emissions Reduction Targets) (Scotland) Act 2019).

The Scottish Government has since published its indicative Nationally Determined Contribution (iNDC) to set out how it will reach net-zero emissions by 2045, working to reduce emissions of all major greenhouse gases by at least 75% by 2030 (Scotland's contribution to the Paris Agreement: indicative Nationally Determined Contribution). By 2040, the Scottish Government is committed to reducing emissions by 90%, with the aim of reaching net-zero by 2045 at the latest.

Transport Scotland is committed to reducing carbon across Scotland's transport network and this commitment is being enacted through the Mission Zero for Transport (Mission Zero for transport | Transport Scotland). Transport is the largest contributor to harmful climate emissions in Scotland. In response to the climate emergency, Transport Scotland are committed to reducing their emissions by 75% by 2030 and to a legally binding target of net-zero by 2045.

Policies and plans

This Record of Determination has been undertaken in accordance with all relevant regulations, guidance, policies and plans, notably including the Environment and Sustainability Discipline of the Design Manual for Roads and Bridges (Design Manual for Roads and Bridges (DMRB)) and Transport Scotland's Environmental Impact Assessment Guidance (Guidance - Environmental Impact Assessments for road projects).

Description of main environmental impacts and proposed mitigation

Air quality

During the construction phase of each scheme, activities undertaken on site could potentially have some minor localised and short-term air quality impacts in proximity to the works. The construction phases will, for example, require a range of ancillary plant, vehicles, and non-road mobile machinery (NRMM) which could contribute to local dust and air pollutants.

However, a large proportion of the schemes will be undertaken using hand tools with limited potential for impacts to air quality. Moreover, the impacts will be further reduced on those projects where there is no requirement for TM, as vehicle idling time will be reduced.

Therefore, considering the nature of the individual schemes, along with implementation of mitigation detailed below, the proposed works' impacts on local air quality levels during the construction period are assessed to be temporary, negligible adverse in magnitude.

Upon completion of the works, no residual air quality impacts are anticipated.

Air quality mitigation measures:

- Where above deck schemes are undertaken, a water-assisted dust sweeper will sweep the carriageway after dust-generating activities, and waste will be contained and removed from site as soon as is practicable.
- Any works requiring shot-blasting will be fully encapsulated within a containment area, reducing the risk of materials entering the air. In addition, any shot-blasting detritus and spent grit / shot will be covered prior to disposal.
- Ancillary plant, vehicles and NRMM will have been regularly maintained, paying attention to the integrity of exhaust systems.
- Ancillary plant, vehicles and NRMM will be switched off when stationary to prevent exhaust emissions (e.g., there will be no idling vehicles).
- Materials that have a potential to produce dust will be removed from site as soon as possible.
- Cutting, grinding, and sawing equipment (where required) will be fitted or used in conjunction with suitable dust suppression techniques e.g., local exhaust ventilation system that fits directly onto tools.

- Regular monitoring (e.g., by engineer or Clerk of Works) will take place when activities that have the potential to impact local air quality are occurring. In the unlikely event that unacceptable dust or exhaust emissions 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) changing the method of working, etc.

Cultural heritage

Historical consultation with the City of Edinburgh Council and Fife Council regarding consent requirements for maintenance works on the Category A listed FRB concluded that all maintenance work concerned with the FRB, that is undertaken on a like-for-like basis, does not require Listed Building Consent. As such, application for consent or any other permission is not currently required.

People, ancillary plant, vehicles, NRMM and materials will be restricted to areas of made ground on the FRB and below the north and south viaducts, and as such there is no potential for impacts to any other listed buildings, the closest of which is 35m west or the ‘North Queensferry’ CA located 35m west.

There is potential for the Removal of Side Tower Post Tensioned Cables scheme to require encroachment within the boundary of the ‘Queensferry’ CA, however all works will be undertaken internally within the side tower and do not include any alterations that would affect the historic and architectural character of the CA. As such, consultation with Edinburgh City Council is not required.

While schemes undertaken within the northern extents of the FRB are located within the Battle of Inverkeithing II, there is no requirement for excavation works outwith the existing carriageway boundary, and as such there is negligble potential for impacts to any battlefield artefacts. Mitigation measures detailed below will further reduce any potential for impacts to the Battlefield.

The majority of the schemes are located on the elevated areas of the FRB structure and as such there is no potential to impact upon any unknown archaeological remains as there will be no excavations to ground conditions. While a small number of the schemes may require compounds to be sited on land below the bridge, the construction of the FRB is likely to have removed any archaeological remains that may have been present. Therefore, the potential for the presence of unknown archaeological remains in the study area has been assessed to be low.

With the implementation of mitigation detailed below, the proposed works impacts on cultural heritage during the construction period are assessed to be negligible in magnitude.

Upon completion of the works, no residual impacts on cultural heritage are anticipated.

Proposed cultural heritage mitigation measures:

- Site personnel will be made aware of the sensitivity of the 'FRB, Including Approach Ramps and Piers' Category A Listed Building.
- In the event a requirement for alterations to the bridge or works that were not considered to be like-for-like the local authorities will be consulted to determine if listed building consent is required.
- Site personnel will be made aware of the sensitivity of the 'North Queensferry' CA, 'Queensferry' CA and 'Battle of Inverkeithing II' Inventory Battlefield where projects are located within or border these features.
- Access out with the existing carriageway within the boundary of the Battlefield will be limited as far as is possible. No plant, equipment or materials will be stored within the area of soft verge within the Battlefield. Where there is a requirement for use of a compound below the northern viaduct, contractors will stay within the confines of the existing compound boundary. In the event there is a requirement for excavation within this area, BEAR Scotland's Environment Team will be notified as soon as possible to allow for consultation with Fife Council / Historic Environment Scotland.
- People, ancillary plant, vehicles, NRMM and materials will be restricted to the areas of made/engineered structure of the FRB and land below north and south viaducts. Where access out with the made/engineered structure is required for the safe and effective completion of the scheme, the area will be reduced as much as is reasonably practicable, and ideally will be accessed on foot.

Landscape and visual effects

There will be a short-term impact on the landscape character and visual amenity of the site as a result of the presence of construction plant, vehicles, and TM (where necessary) during the schemes.

However, people, ancillary plant, vehicles, NRMM and materials will be restricted to areas of made/engineered ground on the FRB and below the north and south viaducts. Additionally, where schemes are located on the underside of the FRB (such as for SSUDA Phase 10 and 10a, Viaduct Box Girder Assessment and Strengthening, Runway Beam Bracket Replacement), the works will not be visible from carriageway level, and only an obscured view of the works will be evident from the shoreline or water. Moreover, the impacts will be further reduced on those projects where there is no requirement for TM.

Considering the nature, duration, size, and scale of the schemes, and with implementation of mitigation detailed below, impacts on landscape and visual effects are assessed as temporary, negligible adverse in magnitude.

Upon completion of the works, no residual impacts on landscape and visual effects are anticipated e.g., when complete the visual appearance will remain largely unaffected, with like-for-like refurbishment being the only discernible change.

Landscape and visual effects mitigation measures:

- 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 be left clean and tidy following construction.

Biodiversity

As the FRB spans 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 submitted and approved on 30th September 2021 (MS-00009380). The application, as submitted, included a Habitats Regulations Appraisal (HRA) of all projects scheduled to be undertaken on the FRB within the MHWS over the five year period. The list of schemes approved in Marine Licence (MS-00009380) include the projects being considered within this RoD. The HRA Screening concluded that the proposed works had the potential to result in Likely Significant Effects (LSE) to some of the qualifying features of the Firth of Forth SPA and Ramsar Site and Forth Islands SPA, and as such an Appropriate Assessment (AA) was undertaken. The AA concluded that with mitigation measures implemented there will be no adverse effects on site integrity for any of the qualifying features of Firth of Forth SPA and Ramsar sites or for the Forth Islands SPA for the five-year duration.

The Ferry Hills SSSI is located 30m northeast of the FRB at the nearest point and is designated for lowland calcareous grassland, therefore, given the restriction of the works to the FRB structure and the distance separating the works from the SSSI there are no anticipated impacts to the features of the SSSI.

People, ancillary plant, vehicles, NRMM and materials will be restricted to areas of made ground on the FRB, therefore there is no connectivity between the works and Hopetoun Road Local Nature Conservation Site (LNCS) which is spanned by the southern extents of the FRB, however mitigation detailed below will further reduce the risk.

Artificial lighting may be required to facilitate safe working as the days become darker or in the event there becomes a requirement to change the working hours, which has the potential to cause disturbance to local wildlife. However, given the presence of existing street lighting across the length of the FRB the overall impact of any additional lighting used during construction is expected to be reduced.

A temporary short-term increase in noise levels may cause disturbance to local wildlife. However, given the nature of the works, and the height of the FRB above the Lower Forth Estuary, no ground-borne vibration impacts have been forecast. Species are also likely accustomed to existing level of disturbance from traffic in on the Firth of Forth and the trunk road. Mitigation measures detailed below will reduce the potential for noise and visual disturbance to any wildlife in proximity to the bridge during each of the scheme's construction.

While works will not result in a direct impact on the Forth Islands SPA or Firth of Forth SPA/Ramsar, unmitigated, potential indirect risk exists. The proposed works will, for example, take place directly above the Lower Forth Estuary. Any loss of containment e.g., a spill of fuel, oil, chemicals (i.e., hydraulic fluid) or debris from grit-blasting, could therefore result in detrimental impacts to the Lower Forth Estuary and the species it supports. However, with mitigation measures implemented, the accidental release of pollutants is extremely unlikely. Pollution prevention measures, for example, will be strictly enforced onsite and Guidance for Pollution Prevention (GPPs) will be strictly adhered to, mitigating a loss of containment.

Considering the nature, duration, size, and scale of the scheme, and with implementation of mitigation detailed above, the proposed works impacts on biodiversity throughout the construction period are therefore assessed to be temporary, minor adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to biodiversity.

Biodiversity mitigation measures:

- Multiple designated sites are found in proximity to the FRB as such site operatives will be made aware of those relevant to each scheme prior to the commencement of works.
- Conditions detailed within the Marine Licence, HRA and supporting documents for minimising the potential for impacts to qualifying features of the Firth of Forth SPA, Ramsar and SSSI and the Forth Island SPA will be adhered to on site. This includes but is not limited to the avoidance of works within 400m of Long Craig Island during the breeding season and the requirement for a full time Ecological Clerk of Works (ECoW) for projects where this is not possible.

- The works corridor will be minimised as far as possible and materials, ancillary plant, vehicles, NRMM and personnel will be constrained through the use of temporary barriers.
- Where lighting is required, the site lighting layout will be positioned and angled to only illuminate the working area (e.g. not shining onto the Lower Forth Estuary) and will be temporary in nature.
- The works are not permitted to disturb or destroy any active birds nests. If an active birds nest is identified onsite that will be impacted by works, the Environmental Team will be contacted.
- The use of tool tethers will be implemented when working from suspended areas.
- Where works are required on structures below the FRB i.e. SSUDA, viaduct box girders etc. or where they will require operatives to be suspended from the structure i.e. during the Main Tower Lateral Thrust Bearing scheme, or where there is a risk of pollution i.e. during grit blasting / painting they will be fully encapsulated to ensure no material can escape to the Lower Forth Estuary.
    - Debris netting / encapsulation measures will be periodically checked throughout the works to ensure they remain effective.
- The Contractor will employ 'soft-start' techniques for all noisy activity to avoid sudden and unexpected disturbance during works. Each time the activity is started up after a period of inactivity, the noise levels will be gradually increased over a period of 30 minutes to permit animals (and birds) to move away from the disturbance.
- All equipment stored onsite will be checked at the start of each workday to ensure protected species, and any or other mammal species, are not present. Any storage containers/plant within the compound will also be secured overnight to prevent exploration by protected species (and any or other mammal species). Any areas where an animal could become trapped (e.g., storage containers) will also be covered at the end of each working day, to avoid mammals falling in and becoming trapped.
- Site personnel will remain vigilant for protected species and will be instructed to not approach or touch any animals seen on site. Any sightings of protected species will also be reported to BEARs Environmental Team. Should a protected species be encountered or move within 50m of the active works (including compounds), works will be temporarily halted until the animal(s) move at least 50m away from the construction site, or until BEARs Environmental Team can provide advice.
- BEAR Scotland's Environmental Team will be contacted to allow consideration of potential environmental effects if:
    - Unforeseen site clearance is required.
    - Unplanned works must be undertaken out with the carriageway boundary.
    - There is any deviation from the agreed plan, programme and/or method of working.

  - Nesting birds are found onsite.
- BEAR Scotland's Control Room will be contacted if there is a pollution incident.

Geology and Soils

Road schemes have the potential to impact upon the geology and soils through direct and indirect impacts on sensitive sites, loss or sterilisation of mineral deposits or soil resources, disturbance of contaminated land, or surcharging of ground which may accelerate erosion and subsidence.

Schemes within the northern extents of the FRB span the Firth of Forth SSSI, are partially located within the North Queensferry (A90) Road Cuttings GCRS and are at their closest 30m south of the Ferry Hills SSSI. While schemes within the southern extents of the FRB also span the Firth of Forth SSSI and the South Queensferry Shore and Dalmeny LGS). However, all works will be undertaken on the elevated FRB structure and due to its elevated nature there is negligble risk of any vibration impacts to surrounding areas from works on the bridge. Furthermore, where there is a requirement for compounds on made ground i.e. below the FRB, existing compounds will be utilised minimise the potential for any impacts. Mitigation measures detailed below will further reduce the potential for any impacts to geology and soils.

Considering the nature, size, and scale of each of the schemes, and with implementation of the mitigation detailed below, the proposed works impacts on geology and soils throughout the construction period are therefore assessed to be temporary, negligible adverse in magnitude. Upon completion of the works, no residual impacts are anticipated on geology and soils.

Proposed mitigation measures:

- Site personnel will be made aware of the sensitivity and proximity of the Firth of Forth SSSI, Ferry Hills SSSI, North Queensferry (A90) Road Cuttings GCRS and the South Queensferry Shore and Dalmeny LGS.
- Works will be restricted to elevated FRB structure as far as possible and will stay within the existing compound boundaries.

Material assets and waste

Minimising impacts arising from construction materials are focussed upon making the most efficient use of materials onsite to reduce the need for imported primary materials and minimise the creation and disposal of waste through (i) reduction, (ii) re-use, and (iii) recycling. Potential impacts have been assessed for both the construction and operational phases of these schemes. It is anticipated that most

material impacts are likely to arise during construction, though long-term residual impacts could occur post construction during the operational phase e.g., during the disposal of materials arising from routine maintenance operations.

However, the detailed design will reduce the requirements for primary materials e.g., the carriageway surfacing, and subbase will be carefully considered to minimise the requirements for importing primary material. Materials will also be derived from recycled, secondary, or re-used origin as far as practicable within the design specifications to reduce natural resource depletion.

Full encapsulation of the works area, where required for a scheme, will ensure that all waste generated from the construction activities (external works, removal of brackets, blasting, hydro-demolition etc.) will be contained and controlled to minimise the risk of unwanted emissions of pollutants.

Considering the nature, duration, size, and scale of the schemes, and with implementation of the mitigation detailed below, the proposed works impacts on material assets and waste throughout the construction period are therefore assessed to be temporary, negligible adverse in magnitude. Upon completion of the works, no residual impacts are anticipated on materials or waste.

Material assets and waste mitigation measures:

- Where individual schemes exceed the £350,000 value threshold, a SWMP will be completed by the Designer and Contractor as required. The SWMP will provide details of the following:
  - The quantity and type of waste that will be produced.
  - How waste will be minimised, reused, recycled, recovered, or otherwise diverted from landfill.
  - How materials that cannot be reused, recycled, or recovered will be removed from site and consigned, transported and disposed of in full accordance with all relevant legislation.
- Full encapsulation of the works area, where required, will ensure that all waste generated from the construction activities of each scheme (external works, removal of brackets, blasting, hydro-demolition etc.) will be contained and controlled to minimise the risk of unwanted emissions of pollutants.
- Good materials management methods (e.g., ‘just-in-time’ delivery) will be implemented on each scheme wherever possible.
- Care will be taken to order the correct quantity of materials to prevent disposal of unused materials.
- The Contractor will comply with all ‘Duty of Care’ requirements, ensuring that any surplus materials or waste are stored, transported, treated, used, and disposed of safely without endangering human health or harming the

environment. Waste transfer notes and/or waste exemption certificates (if required) will also be completed and retained.

- The Contractor is responsible for the reuse / disposal of non-hazardous road planings, and this will be registered in accordance with a Paragraph 13(a) waste exemption issued by SEPA as described in Schedule 3 of the Waste Management Licensing Regulations 2011, the rules of which will be complied with.
- Bulk material will be ordered/delivered to site, without packaging where possible.
- Any material removed from site will be taken to a licensed facility.
- Designated areas will be identified, within which all materials and personnel, including construction compounds, will be contained to limit environmental disturbance during construction works. This will include a designated area (if required) for segregation and reuse of waste materials.
- The selection of areas for materials stockpiling will avoid sensitive locations such as road drainage. Stockpiled materials with leachate potential, for example, will be stored away from road drainage to prevent cross-contamination with other materials, wastes, or groundwater.
- Materials will be stored with the appropriate security to prevent loss, theft, or vandalism.
- Wastewater from welfare facilities (if required) will be subject to effluent treatment followed by tanker removal.
- If hazardous substances are used onsite, each substance will be subject to assessment under the Control of Substances Hazardous to Health (COSHH) Regulations 2002. Hazardous substances will also be clearly labelled and disposed of, in line with relevant waste regulations. Special waste will not be mixed with general waste and/or other recyclables.

Noise and vibration

Given that the majority of the schemes are located on an elevated structure there is limited potential for vibration impact to the surrounding areas. While some of the schemes may require site compounds or access to areas below the bridge these are existing facilities and will not require any excavation activities or the use of tools which could generate vibration impacts.

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 ancillary plant, vehicles and NRMM. Noise will also be generated by the removal of steel, unloading materials, vehicle movement, using breakers (jackhammers), chipping hammers, use of rollers, etc. As a result, there is potential for noise effects.

However, the schemes are not located within a CNMA or CQA, and works will also be completed utilising a daytime working programme (07:30 – 17:30). Works with the potential to induce worst-case scenario noise (vehicle movements, material delivery, use of hand tools etc.) will also be intermittent, temporary, and short-lived. The potential for disturbance will therefore be somewhat diminished.

Additionally, the proximity of road space suggests that residents of surrounding properties have a degree of tolerance to noise disturbance. Moreover, the impacts will be further reduced on those projects where there is no requirement for TM, as vehicle idling time will be reduced.

Considering the likely sources of noise, with the nature, duration, size, and scale of the schemes, and with implementation of the mitigation detailed below, it is unlikely that noise associated with the works will lead to significant impacts, disruption and/or complaints. The proposed schemes are therefore anticipated to result in temporary, minor adverse noise impacts.

Noise mitigation measures:

- FRB Construction Noise Management Plan (CNMP) will be briefed to all personnel onsite prior to works commencing and strictly adhered to.
- 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 and actioned through to closeout, and fully auditable and traceable.
- Toolbox Talk TTN 095 ‘Noise and Vibration (wildlife)’ will be briefed to all personnel onsite prior to works commencing.
- Ancillary plant, vehicles and NRMM with directional noise characteristic will (where practical) be shut down in intervening periods between site operations.
- The use of percussive hand-tools, grinders, impact wrench’s, chipping hammers, etc. will be minimised as far as is possible, and when used will be fitted with mufflers or silencers of the type recommended by the manufacturer.
- Drop heights from vehicles and NRMM will be kept to a minimum to minimise noise when unloading.
- All ancillary plant, vehicles and NRMM used onsite will be regularly maintained, paying attention to the integrity of silencers and acoustic enclosures.

- All compressors will be 'sound-reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed when in use.
- HGV, 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.

Population and human health

During construction, activities undertaken on site have the potential to cause temporary adverse impacts on local residents and road users. Numerous properties (including residential, commercial and industrial properties) lie within 300m of the FRB. The closest residential properties lie 30m east of the schemes located within the northern extents of the FRB, as such there is potential for noise disturbance as well as some limited potential for visual disturbance to these residents during these schemes.

However, the properties in proximity to the FRB are positioned below the viaducts and are therefore somewhat screened from a number of the schemes (such as Footpath Concrete Refurbishment and Resurfacing, Suspended Span Carriageway Concrete Deck and Vehicle Restraint Barrier / Grillage Refurbishment) on the deck of FRB. TM is not required for all schemes and when utilised TM will only be in place for a short duration, and no congestion issues are noted during the proposed construction hours.

There is potential for NCN Route 1 and the Core Path (ID: 28499) to be temporarily impacted during above deck schemes, however through access will be maintained at all times. Mitigation measures detailed below will further reduce the potential for impacts to NMUs.

Considering the nature, duration, size, and scale of the schemes, and with implementation of the mitigation described below, impacts on population and human health are assessed as temporary, minor adverse in magnitude.

Upon completion of the schemes such as Footpath Concrete Refurbishment and Resurfacing, Suspended Span Carriageway Concrete Deck and Vehicle Restraint Barrier / Grillage Refurbishment, there will be a positive impact in relation to population and human health due to the improvement of usability and safety provided by the new FRB refurbishments.

Population and human health mitigation measures:

- Where properties are located within 50m of the schemes, Toolbox Talk TTN-042 Being a Good Neighbour will be briefed prior to works commencing.

- In the event the timing of the works changes and there becomes a requirement for night works, construction lighting will take into account the need to avoid illuminating surrounding properties to avoid a nuisance at night, and non-essential lighting will be switched off at night.
- Through access will be maintained at all times on one of the dedicated footpaths which run along both sides of the FRB and accommodates National Cycle Network Route 1 (NCN1) and the Core Path (ID: CB). If access must be restricted, appropriate signage will be in place, at either end of the bridge, to direct travellers along the cycleway / footpath on the other side of the FRB.
- Where appropriate, a communication strategy (e.g., social media, consultation with local authority and other stakeholders, letter drop (for night-time works), etc.) will be initiated to keep local residents and/or businesses informed of the proposed working schedule for each relevant scheme, particularly the times and durations of noisy construction activities. The communication strategy will also provide a 24-hour contact number for the BEAR Scotland Control Room.
- Where necessary for above deck works, advanced signage will be strategically placed on the trunk road to notify stakeholders of the road closure and diversion, as well as the closure of the bus stops and footpath where necessary.
- Where necessary, a Traffic Management Plan (TMP), which includes measures to avoid or reduce disruption to road traffic, will be produced in accordance with the Traffic Signs Manual (Department of Transport 2009). The TMP will ensure that there is no severance of community assets, access routes or residential development.
- Journey planning information will be available for drivers online at the trafficscotland.org website. Journey planning information will also be available for drivers online through BEARs social media platforms.

Road drainage and the water environment

During the schemes, there is potential for temporary adverse impacts on the Lower Forth Estuary which is spanned by the FRB within the majority of the scheme extents. Potential changes in water quality e.g., from pollution events (either by accidental spillage of sediments, particulate matter, chemicals, or fuels) during the refurbishment works have the potential to have a direct or indirect effect on Lower Forth Estuary and other surrounding waterbodies. There is also a risk that, unmitigated, material and equipment could fall into the Lower Forth Estuary during the works.

However, the potential for a direct pollution incident within a the Lower Forth Estuary is unlikely e.g., experience gained from BEAR maintenance schemes elsewhere on the network has shown that where standard best working practice is adopted (e.g., adherence to SEPA GPPs or PPGs, etc.), water quality is protected. With mitigation

measures detailed below being implemented, the risk to surrounding waterbodies during each of the schemes is considered to be very low.

Considering the nature, size, and scale of the each of the schemes, and with implementation of the mitigation detailed below, the proposed works impacts on the road drainage and water environment are assessed as temporary, negligible adverse in magnitude.

Upon completion of the works, no residual impacts are anticipated in relation to the road drainage and water environment.

Road drainage and the water environment mitigation measures:

- No works or access will be permitted within the Lower Forth Estuary. If any works are identified that would require entering a waterbody, BEAR Scotland's Environmental Team will be contacted (before works commence) to allow consideration of potential environmental effects.
- The abstraction or transfers of water, or the washing of tools in the Lower Forth Estuary will not be permitted.
- No discharges into the Lower Forth Estuary, or drainage systems, will be permitted.
- Where works are required on structures below the FRB i.e. SSUDA, viaduct box girders etc. or where they will require operatives to be suspended from the structure i.e. during the Main Tower Lateral Thrust Bearing scheme, or where there is a risk of pollution i.e. during grit blasting / painting or paint removal they will be fully encapsulated to ensure no material can escape to the Lower Forth Estuary.
    - Debris netting / encapsulation measures will be periodically checked throughout the works to ensure they remain effective.
- Pollution prevention measures will be implemented onsite with Guidance for Pollution Prevention (GPPs) being strictly adhered to.
- Where schemes involve the removal of lead paint mitigation is expected to consist as a minimum the following measures:
    - As above no discharges to the water environment and encapsulation of the works.
    - Encapsulation will include installation of extraction equipment with dust filters to create negative air pressure within the encapsulated area and vacuum extractors to pipe out waste (e.g. grit and old paint) into an enclosed skip.
    - Upon completion of works, the working area will be cleaned, and the encapsulation material (e.g. plastic sheeting) will be dismantled and folded in such a way as to contain any trace of remaining debris before removal from site.

- Appropriate measures will be implemented during applicable schemes (i.e. Footpath Concrete Refurbishment and Resurfacing) to limit the potential for wastes and materials to enter any gullies present along the viaducts of the FRB. On completion of operations, any gullies present on site will be visually checked to ensure they have not become blocked as a result of the scheme.
- Where required for specific schemes, concrete, cement, grout, etc. mixing and washing areas will be sited 10m from road drainage entry points. The washing out and cleaning of concrete batching plant will be undertaken within a contained area, and wash waters will be collected and contained for authorised disposal off site. Wash waters from concrete works will not be discharged into the Lower Forth Estuary.
- Where applicable and practicable, bio-degradable hydraulic fluids and oils will also be utilised in machinery. Plant, fuel, oils, generators etc., will also bunded appropriately in the designated laydown area.
- Any loose material or bagged cement/concrete (if required) will be stockpiled in an area of the site where it can be left undisturbed and will not interfere with site operations. Bagged cement/concrete will also be protected to ensure it remains dry. The surface of stockpiles will also be graded to reduce surface runoff and will be located at least 10m from road drainage and stored on an impermeable surface or have bunds erected around stockpiles.
- During hydro-demolition (where required for schemes such as the footway refurbishment) the following will be implemented:
    - Prior to the discharging of water, the appropriate level (i.e. registration, simple licence, complex licence) of authorisation will be gained from SEPA under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 Registration Application Form Discharge of Trade (or Other) Effluent.
    - Prior to works commencing, a bund will be created below the work area to contain the runoff water from the hydro demolition works and allow it to be pumped onto the treatment process. Before the hydro-demolition works commence, clean water will be sprayed into the encapsulated area to check its effectiveness / robustness. The hydro-demolition works will not commence until this is found to be satisfactory.
    - Water from hydro-demolition will be discharged as per the authorisation conditions.
    - All water to be used onsite will be delivered by bulk tanker and be of potable quality.
    - Once in operation, the waste-water produced will be contained within the encapsulation. Waste-water will be collected in the sump and pumped to a bin using a sub pump positioned within the bund, with a second pump in the bin to transfer the water to the Siltbuster HD Unit (positioned on the bridge) for the treatment phase. The solid waste will be removed manually where at all possible. The solids falling into the encapsulation will be removed by hand, as and when required.

  - Once the waste-water has been pumped onto the bridge, it will then undergo a two-phase treatment using the Siltbuster HD Unit, which is specifically designed to treat waste-water from hydro-demolition operations. The system will firstly remove suspended solids to an acceptable level and secondly will neutralise the high pH by using a fully automated CO2 dosing process to neutralise the alkalinity. Safe estimate target values are: (i) suspended solids – 50 mg/l (50 parts per million), (ii) pH level to be neutral (7 to 9) at discharge.
  - The waste-water that has been treated by the Siltbuster will then be disposed of in line with the granted SEPA authorisation. It will be discharged in an appropriate manner.
  - Hydro-demolition works will avoid heavy rainfall periods which could affect the performance of the Siltbuster HD Unit.

- 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 Site Supervisor. 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 or other authorities. However, all such incidents will to be recorded and reported to BEAR Scotland's Environmental Team. In the event of a 'serious incident', SEPA 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.
- All waste, vehicles, ancillary plant, NRMM and fuels will be stored in the compound(s) or laydown area and will be secured and located, if space is available, at least 10m from drainage entry points, in order to comply with GPP 5 'works and maintenance in or near water'. Refuelling will only be undertaken at designated refuelling areas (e.g., on hardstanding, with spill kits available, and >10m from drainage entry points, where practicable). Spill kits will also be available within all site vehicles and spill kits will be replenished onsite when required. Only designated trained and competent operatives will be authorised to refuel plant. Generators, and other ancillary plant and 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. Containment systems will also be emptied regularly. All waste, vehicles, ancillary plant, NRMM and fuels will also be stored in a manner that ensures they are protected from damage by collision or extremes of weather. Any vehicles, ancillary plant, and NRMM not in operation will (where possible) be sited in the laydown area.
- Where required, plant, fuel, oils, generators etc. will be bunded appropriately in the designated laydown area, and all ancillary plant, vehicles and NRMM will also be stored in the laydown area above the work site.
- Regular visual pollution inspections of the work site (particularly for schemes near road drainage entry points) will be conducted (e.g., site walkover by engineer or Site Supervisor), especially during periods of heavy rain.

- All vehicles and NRMM used during each scheme 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.
- When the works are complete, the Contractor will ensure that all materials, debris, tools, plant, and equipment are removed from the work area. The Contractor will also check the area thoroughly for spillages or potential pollution sources and remove or clean-up anything found.

Climate

BEAR Scotland, working on behalf of Transport Scotland, undertake carbon monitoring of major projects and operational activities. Emissions from 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. The works will also extend the maintenance intervals required for future works. In doing so, the service life of the trunk road is also extended.

During each of the schemes there is potential for impacts as a result of the emission of greenhouse gases through the use of equipment, vehicles, and NRMM, material use and production, and transportation of material/waste. However, considering the nature, size and scale of the individual schemes, and the mitigation detailed below, the risk of significant impacts to climate are considered to be negligible and adverse in magnitude.

Upon completion of the proposed schemes no residual impacts are anticipated on the climate.

Climate mitigation measures:

- Local contractors and suppliers will be used as far as practicable to reduce fuel use and greenhouse gases emitted as part of the works.
- BEAR Scotland will adhere to its Carbon Management Policy.
- Where possible, waste will be removed to local waste management facilities.

Vulnerability of the project to risks

There will be no change to the likelihood of flooding on the FRB upon completion of the schemes.

Works are restricted to areas of made/engineered ground on the FRB and areas located below the northern and southern viaducts, with access to the each of the

schemes gained via the A9000 mainline. TM is not required for all works, where it is required, it may involve: carriageway closures, single lane closure and footway closures. NMU's will be appropriately accommodated within traffic management arrangements as required. As such, the proposed schemes impact on road traffic accidents are assessed to be of negligible magnitude.

A Site Environmental Management Plan (SEMP) will be produced by BEAR Scotland, for each individual scheme, which sets out a framework to reduce the risk of adverse impacts from construction activities on sensitive environmental receptors. The Contractor will comply with all conditions of the SEMP during works and may be subject to audit throughout the contract.

Considering the above, the vulnerability of the project to of major accidents and disasters is considered to be low.

Assessment cumulative effects

While several of the schemes are currently programmed to occur simultaneously there is potential for small cumulative effects on impacts such as noise, however the works are located on an active trunk road which is spans an active waterway in close proximity to a marina, the Queensferry Crossing and the Forth Bridge (rail). As such the existing baseline noise conditions in and around the FRB are likely to be moderate and slight temporary increases in noise as a result of construction activities are not expected to be significant, even when occurring at the same time as other schemes. As such, the proposed works are not anticipated to result in significant environmental effects. Any small cyclic activities undertaken on the FRB, not included within this RoD will take into account already-programmed works and as such, any cumulative effect will be limited.

A search of the Scottish Road Works Commissioner's website (map search) has identified that no other road works are currently ongoing, or noted as being planned, on the FRB or in proximity to the works which will be undertaken at the same time, other than those already assessed within this report. TM is not required for every project but where it is necessary TM will be coordinated to minimise disturbance. Furthermore, traffic flows on the FRB are low reducing any likely impacts created by TM such as vehicle idling.

In addition, a search using City of Edinburgh Council Simple Search identified 11 planning applications within 300m of the scheme.

Table 1: Planning Applications in Last 2 Years within 300m of the southern bridge extents.

Reference	Proposal	Status	Decision	Distance from scheme
24/03849/ADV	Wayfinding and gateway signs as part of the Forth Bridges Trail (established 2022), an interpretative walking trail covering North and South Queensferry.	Application Granted	Granted	Located partially beneath the FRB.
18/08266/VAR8	Non-Material Variation application to 18/08266/AMC. Hopetoun House type amendments for plots 13 - 15 and external materials changes to plots 13-15, 22 and 23 (as amended).	Permission has been varied	Varied	Located partially beneath the FRB.
24/03953/FUL	Side extension over garage.	Application Granted	Granted	110m east
24/01505/FUL	Proposed side extension to dwelling to create utility, WC and storage on GF, new master bedroom and en-suite on first floor.	Application Granted	Granted	160m east
23/01908/FUL	Rear extension.	Application Granted	Granted	170m west
25/00446/FUL	Rear dormer roof conversion.	Awaiting Assessment	Unknown	180m southwest
23/01826/FUL	2 storey side extension.	Application Granted	Granted	220m southwest
24/06029/FULSTL	Retrospective change of use from residential dwellinghouse (Class 9) to short term let holiday accommodation (Sui Generis).	Awaiting Decision	Unknown	230m east
24/01424/ADV	Advertisement of the following types: Fascia sign, box sign, projecting sign. Up and down lights - floodlights.	Application Granted	Granted	230m east
24/00248/FUL	Construct new garage adjoining existing.	Application Granted	Granted	250m east
24/06333/FUL	Single storey rear extension and single storey side extension.	Awaiting Assessment	Unknown	270m southwest

There are six planning applications listed on Fife Council Simple Search within 300m of the nine schemes:

Table 2: Planning Applications in Last 2 Years within 300m of the northern bridge extents.

Reference	Proposal	Status	Decision	Distance from scheme
23/02811/ADV	Display of 4no. pole mounted lectern display signs, 2.no pole mounted double sided signs, 1no. pole mounted wayfinding sign and 3no. wall mounted signs (all non-illuminated).	Decided	Application Permitted with Conditions	Located immediately north.
23/02812/FULL	Erection of 6.no freestanding poles.	Decided	Application Permitted with Conditions	Located immediately north.
24/01921/FULL	Display of wayfinding signs at various locations around North Queensferry.	Application Granted	Granted	210m east
24/01920/ADV	Display of wayfinding signs at various locations around North Queensferry.	Decided	Application Permitted - no conditions	210m east

Reference	Proposal	Status	Decision	Distance from scheme
23/03122/TCA	Two poplars at the junction of Ferry Road and the road down to the harbour - Felling.	Decided	Application Permitted - no conditions	210m east
24/01223/FULL	Erection of garden room to rear of dwellinghouse.	Decided	Application Permitted - no conditions	230m east

The works associated with these applications are minor in nature therefore it is unlikely that the proposed works will have a significant cumulative effect with any other future works in the area. Additionally, the planning applications are only within 300m of four of the FRB projects (Viaduct Box Girder Assessment and Strengthening, Footpath Concrete Refurbishment and Resurfacing, Footway Elastomeric Bearing Replacement, and Removal of Side Tower Post Tensioned Cables) limiting any potential accumulative effects.

Assessments of the environmental effects

The FRB spans the Lower Forth Estuary, within the Mean High-Water Springs (MHWS), and as such 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 submitted and approved on 30th September 2021 (MS-00009380). The application, as submitted, included a Habitats Regulation Appraisal (HRA) of all projects scheduled to be undertaken on the FRB within the MHWS over the five year period. The list of schemes approved in Marine Licence (MS-00009380) include the projects being considered within this RoD. The HRA Screening concluded that the proposed works had the potential to result in Likely Significant Effects (LSE) to some of the qualifying features of the Firth of Forth SPA and Ramsar Site and Forth Islands SPA, as such an Appropriate Assessment was undertaken. The Appropriate Assessment concluded that within mitigation measures implemented there will be no adverse effects on site integrity for any of the qualifying features of the Firth of Forth SPA and Ramsar sites or for the Forth Islands SPA for the five-year duration. As such, a further HRA is not required.

As detailed in the Description of Main Environmental Impacts and Proposed Mitigation section, there are no significant effects anticipated on any environmental receptors as a result of the proposed works.

Statement of case in support of a Determination that a statutory EIA is not required

This is a relevant project in terms of section 55A(16) of the Roads (Scotland) Act 1984 as it is a project for the improvement of a road and the completed works (together with any area occupied by apparatus, equipment, machinery, materials, plant, spoil heaps, or other such facilities or stores required during the period of construction) are situated in whole or in part in the Firth of Forth SPA, Firth of Forth Ramsar and Forth Islands SPA, which are sensitive areas within the meaning of regulation 2(1) of the Environmental Impact Assessment (Scotland) Regulations 1999.

The project has been subject to screening using the Annex III criteria to determine whether a formal Environmental Impact Assessment is required under the Roads (Scotland) Act 1984 (as amended by The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017). Screening using Annex III criteria, reference to consultations undertaken and review of available information has not identified the need for a statutory EIA.

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

Characteristics of the scheme:

- All schemes are restricted to made-ground on the FRB and areas below the north and south viaducts.
- Where necessary, containment measures of the working area will be in place to prevent debris or pollutants from entering the surrounding environment.
- All schemes will be temporary and will either be localised or undertaken on a rolling programme.
- The schemes are not expected to result in significant disturbance to protected species that may be present in the wider area
- The risk of major accidents or disasters is considered to be low.
- Removal of any defects along the carriageways and improvements to access structures will provide improved stability and usability of the structure, which will result in safer conditions for road users.
- Any potential impacts of the works are expected to be temporary, short-term, not significant, and limited to the construction phase.

Location of the scheme:

- Historical consultation with the City of Edinburgh Council and Fife Council regarding maintenance works on the Category A listed FRB concluded that all maintenance work concerned with the FRB, that is undertaken on a like-for-like basis, does not require Listed Building consent.
- The Forth Islands SPA, the Firth of Forth SPA and Ramsar are spanned by the FRB, however an AA has been undertaken which has confirmed that the works will not result in AESI on the qualifying features providing mitigation measures are employed.
- The Firth of Forth SSSI (EU Site Code 169840) and Long Craig Island Site of SSSI (EU Site Code 169962) are spanned by the FRB. However, the works will not result in significant impacts on the qualifying features provide mitigation measures are employed.
- Schemes undertaken within the northern extents of the FRB are located within the Battle of Inverkeithing II Battlefield, however there is no requirement for excavations out with the existing carriageway boundary and as such there is negligible potential to impact the Battlefield.
- None of the schemes are located within any areas designated for landscape interests.
- Land use will not change as a result of the works.
- The works do not require any private land acquisition.
- None of the schemes are located within a densely populated area.

Characteristics of potential impacts of the scheme:

- The waste hierarchy will be followed to reduce waste to landfill for each scheme.
- With good practice pollution prevention measures implemented onsite, there is a negligible risk of a pollution event during the construction of each scheme e.g., the SEMP, Designer's Risk Register, and activity-specific method statements include plans to address environmental incidents.
- Any potential NMU impacts will be temporary, short-term, and limited to the construction phase.
- There will be limited consumption of materials and natural resources, and limited waste or generation associated with the each of the schemes. Measures will also be in place to ensure appropriate removal and disposal of waste.
- There is no change to the vulnerability of the road to the risk or severity of major accidents/disasters that would impact on the environment.
- No impacts on the environment are expected during the operational phase as a result of the works.

Annex A

"sensitive area" means any of the following:

- land notified under sections 3(1) or 5(1) (sites of special scientific interest) of the Nature Conservation (Scotland) Act 2004
- land in respect of which an order has been made under section 23 (nature conservation orders) of the Nature Conservation (Scotland) Act 2004
- a European site within the meaning of regulation 10 of the Conservation (Natural Habitats, &c.) Regulations 1994
- a property appearing in the World Heritage List kept under article 11(2) of the 1972 UNESCO Convention for the Protection of the World Cultural and Natural Heritage
- a scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979
- a National Scenic Area as designated by a direction made by the Scottish Ministers under section 263A of the Town and Country Planning (Scotland) Act 1997
- an area designated as a National Park by a designation order made by the Scottish Ministers under section 6(1) of the National Parks (Scotland) Act 2000.

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