



**TRANSPORT
SCOTLAND**
CÒMHDHAIL ALBA

Environmental Impact Assessment Record of Determination

A9000 Forth Road Bridge
(Vehicle Restraint Barrier and Grillage
Refurbishment Phase 1)

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Project Details

Description

BEAR Scotland has been commissioned by Transport Scotland to undertake a programme of works involving upgrading of the Forth Road Bridge (FRB) VRS, consisting of over 16km of barriers and parapets on the viaducts and suspended spans. A trial panel of the suspended span grillages configurations was installed by BEAR Scotland October 2022. The works recorded within this RoD will be the next phase of the project, Phase 1 and will be completed on the south side span, central grillage from panel point 10 to 23.

The general construction methodology for predominantly in-situ refurbishment of the grillage would be as follows:

- Implementation of traffic management with enough space for vehicle parking and on-site storage.
- Steelwork will be surveyed to confirm dimensions of bespoke steelwork to be replaced for fabrication. Standard components such as inclined infill bars will be fabricated and in stock for replacement as required. Fabricated steelwork (of sufficient size) will be painted with full three coats prior to installation on site as per the design drawings.
- Construction of temporary access and encapsulation across the length of the works. It is envisaged that length of the access shall be split into a blasting and painting zone for efficiency.
- Defective steelwork will be cut out on site.
- Steelwork will be blasted and mechanically prepared to standards.
- All fabricated steelwork will be welded and installed on site in accordance with construction drawings.
- Paint will be applied in accordance with SHW Series 5000 and relevant specification appendices.
- Following completion of the works, traffic management and temporary works access will be moved longitudinally to the next works area.

The general construction methodology for concrete repairs would be as follows:

- Implementation of traffic management with enough space for vehicle parking and on-site storage.
- Construction of temporary access and encapsulation across the length of the works.
- Hammer tap surveys will be undertaken to identify the areas of defect for the breakout and replacement of concrete.
- Mechanical breakout of all concrete defects taking care not to damage the existing rebar.
- Inspection of the concrete and rebar in breakout locations and further breakouts carried out as required.

- Concrete breakout locations repaired with cracking mesh or rebar as required by the design.
- Anti-carbonation coating / waterproofing applied to all accessible surfaces as required by the design.
- Following completion of the works, traffic management and temporary works access to be moved longitudinally to the next works area as per the above methodology for grillage refurbishment.

The works are currently programmed to be completed within the 2024/2025 financial year (April 2024 – March 2025 inclusive). The project will take approx. 8 months to complete (07:30 to 17:30). Weekend working may be programmed at the contractor's discretion to optimise weather and operational activities. The construction date has not yet been confirmed, but the aim is to commence May 2024 (exact date TBC).

Traffic management (TM) will be required as a dual fast lane closure across the length of the South Side Span. Additional traffic management barriers shall be required at the bullnose locations where these sections are removed, resulting in a squared grillage posing a hazard to passing vehicles. Traffic management may be increased in length longitudinally to provide onsite parking for vehicles, areas for storage, and welfare facilities. Night closures may be required for the construction, mobilisation, and removal of the temporary works structure to provide the space required for the installation of the ballast.

Location

The scheme is located on the Forth Road Bridge (FRB), which spans the Firth of Forth, connecting South Queensferry to North Queensferry (Figure 1 and Figure 2).

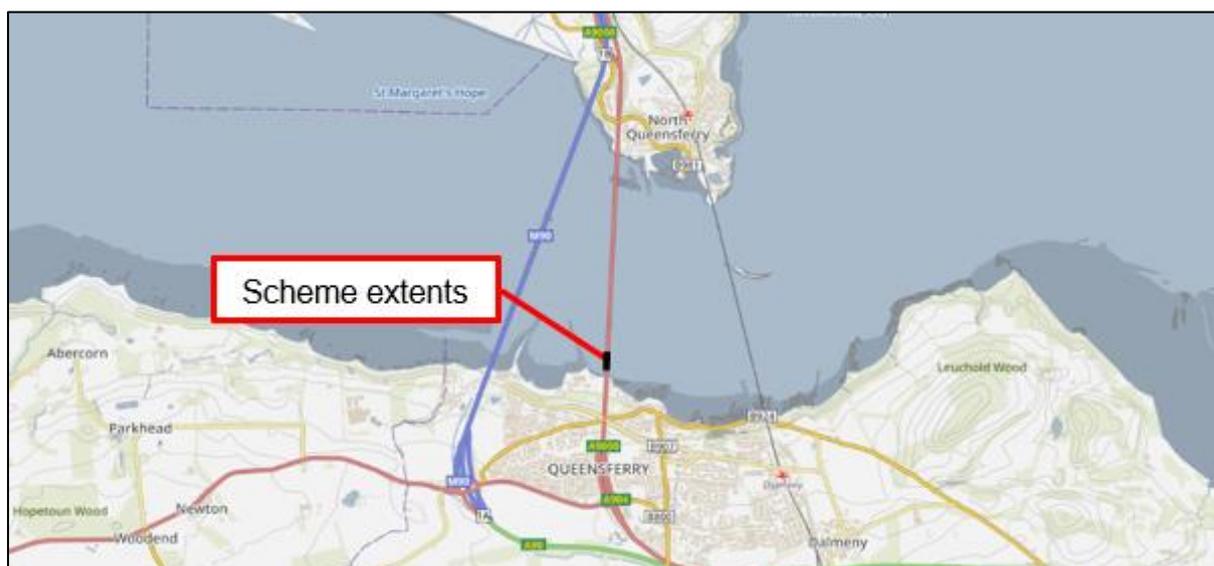


Figure 1. Extent of works on FRB. Source: Grid Reference Finder. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2022.

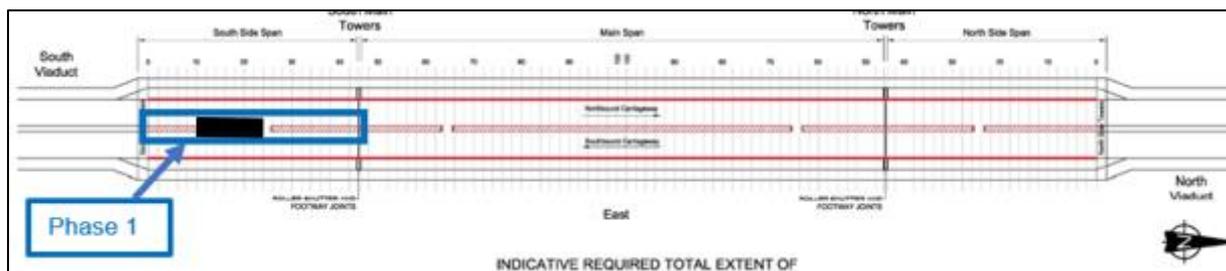


Figure 2. A90 FRB, highlighting Phase 1 scheme extents (Panel point-10 - 23, BLACK). Source: BEAR Scotland

Description of local environment

Air quality

The scheme is not located within an [Air Quality Management Area](#) (AQMA), and air quality monitoring sites in the wider area record 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 six Air Quality Management Areas (AQMA) and two AQMA within their administrative boundaries respectively. The nearest AQMA, 'Newton,' lies approx. 3.4km southwest of the scheme and has been declared for particulate matter <math><10 \mu\text{m}</math> (PM_{10}).

There are 11 sites registered on the Scottish Pollutant Release Inventory ([SPRI](#)) for pollutant releases to air within 10km of the scheme:

- Clapperton Poultry Complex, Broxburn, West Lothian - Intensive livestock production and aquaculture (10km south) which has been declared for ammonia (t), particulate matter PM_{10} and smaller and particulate matter total (t).
- Clifton Poultry Farm, Clifton Road, Newbridge - Intensive livestock production and aquaculture (8.9km south) which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Dalmeny Hound Point, South Queensferry - Energy sector (3.4km south) which has been declared for hydrochlorofluorocarbons (HCFCs) (kg), methane (t) and non-methane volatile organic compounds (NMVOs) (t).
- Elmbank Poultry Farm, Crossgates, Fife - Intensive livestock production and aquaculture (8.2km north) which has been declared for methane (t) and ammonia (t).
- Glendevon Poultry Farm, Wagon Rd, Dunfermline - Intensive livestock production and aquaculture (7.6km north) which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Gogarbank Poultry, Corstorphine, Edinburgh - Intensive livestock production and aquaculture (9.5km south) which has been declared for ammonia (t) and particulate matter PM_{10} and smaller.
- Hillwood Quarry, Ratho, Midlothian - Mineral industry (7.2km south) which has been declared for CO_2 and particulate matter PM_{10} and smaller.

- Muir Dean Coal Site, Drumcooper Farm Crossgate - Mineral industry (8.2km north) which has been declared for carbon dioxide (CO₂), methane (t) and particulate matter PM₁₀ and smaller.
- Progress Rail Services UK Ltd - Production and processing of metals (2.2km south) which has been declared for particulate matter PM₁₀ and smaller.
- Rosyth Dockyard, Dunfermline - Other activities (3.9km north) which has been declared for NMVOs (t).
- VION Food Scotland Ltd, Broxburn - Animal and vegetable products from the food and beverage sector (8km south) which has been declared for CO₂.

Baseline air quality in the study area is mainly influenced by vehicles travelling along the FRB. Secondary sources are derived from vehicles travelling along the local road network and urban activities within South Queensferry.

Cultural heritage

The [PastMap](#) and [Historic Environment Scotland](#) (HES) online mapping tools records that the FRB is a Category A listed building ('Forth Road Bridge, with Approach Ramps and Piers', LB47778/LB49165). Three additional listed buildings are found within 300m of the scheme, the closest of which is 190m southeast.

Queensferry Conservation area lies 150m south of the scheme extents.

Of lesser cultural heritage value, the FRB (including approach ramps and piers) is also recorded as a Canmore site and Historic Environment Record (HER) which are undesignated cultural heritage asset (UCHA). Four additional UCHAs of known interest are recorded within 300m of the scheme, none of which have connectivity to the FRB.

Landscape and visual effects

The scheme is located on the FRB, which spans the Firth of Forth, connecting South Queensferry to North Queensferry.

The scheme is not situated within a [National Park](#) (NP) or [National Scenic Area](#) (NSA).

There is no recorded Landscape Character Type (LCT) within the study area ([Scottish Landscape Character Types](#)).

[Land use](#) within 300m of the scheme is categorised into the following:

- Recreation area,
- Urban Area,
- Maritime installation.

The [national scale land capability for agriculture](#) has no classification for the land surrounding the scheme.

The scheme 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 Rail 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.

Approx. 6.3ha of native lowland mixed deciduous woodland and approx. 1.8ha of native hawthorn scrub (recorded on the [Native Woodland Survey of Scotland](#)) lie within 300m, found approx. 140m south of the scheme extents. There are no areas of woodland recorded on the [Ancient Woodland Inventory Scotland](#) within 300m of the scheme or any trees covered by a Tree Preservation Order (TPO) with connectivity to the scheme extents.

Biodiversity

The [NatureScot Sitelink](#) online mapping tools identifies the following sensitive areas in proximity to the works:

- Firth of Forth Special Protection Area (SPA) (Site Code: UK9004411) is spanned by the FRB within the scheme extents.
- Firth of Forth Ramsar (Site Code UK13017) is spanned by the FRB within the scheme extents (at nearest point).
- Forth Islands SPA (Site Code: UK9004171) lies 1.1km north of the scheme extents (at nearest point).
- [Long Craig Island SSSI](#) (Site Code 169962), lies 1.1km north of the scheme extents (at its nearest point), within the Firth of Forth estuary.
- The [Firth of Forth SSSI](#) (Site Code 169840), which is noted for its biological and geological features, is spanned by the FRB within the scheme extents.
- An unnamed Local Nature Conservation Site (LNCS) lies 150m south of the scheme. 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 species within 2km of the scheme (in last 10-years):

One invasive non-native species (INNS):

- Himalayan balsam (*Impatiens glandulifera*)

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

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

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

- Rosebay willowherb (*Chamerion angustifolium*).

The nearest record is found 1.7km north of the scheme extents which relates to all species detailed above recorded in 2020.

A search of the Asset Management Performance System (AMPS) records no invasive non-native species (INNS), injurious weeds (as listed under the Weeds Act 1959), or invasive native perennials (as listed in the Trunk Road Inventory Manual) on the FRB (within last 10-years).

Habitats within 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.

Geology and soils

The [Firth of Forth SSSI](#) (Site Code 169840), which is noted for its biological and geological features, lies 330m southwest of the scheme extents. 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, and is notified for:

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

The FRB within the scheme extents is not located within a [Geological Conservation Review Site](#) (GCRS), and there are no [Local Geodiversity Sites](#) (LGS) with connectivity to the scheme extents.

The [National Soil Map of Scotland](#) online mapping tool records no generalised soil type or major soil group beneath the scheme extents.

The [British Geological Survey](#) online mapping tool records no superficial geology underlying the scheme extents.

The bedrock geology within the scheme extents is recorded as:

- Hopetoun member – sedimentary rock cycles (Strathclyde group type).

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

Factor has no constraints that are likely to be impacted by the proposed works and has therefore been scoped out of further environmental assessment.

Material assets and waste

Materials used will consist of:

- Steel,
- Concrete,
- Grout,
- Paint.

The value of the scheme is greater than £350,000. As a result, a Site Waste Management Plan (SWMP) is required.

The main waste produced during the construction phase will be steel (European Waste Catalogue Code: 17 04 05), concrete (European Waste Catalogue Code: 17 01 01), plastics (European Waste Catalogue Code: 17 02 03) and wood (European Waste Catalogue Code: 17 02 01).

Noise and vibration

Works are not located within a [Candidate Noise Management Area](#) (CNMA) or [Candidate Quiet Area](#) (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 65 and 70 decibels at the nearest Noise Sensitive Receptor (NSR) (business premises) ([Scotland's Noise Scotland's Environment](#)). The night-time modelled noise level (Lnight) for the carriageway along the FRB ranges from 65 to 70 decibels, with levels dropping to between 50 and 55 at the NSR (business premises).

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 bridge abutments are subject to rhythmic low frequency noise caused by vehicles passing over bridge expansion joints.

Baseline noise and vibration in the study area is mainly influenced by vehicles travelling along the FRB. Secondary sources are derived from vehicles travelling along the local road network and urban activities within South Queensferry.

Population and human health

The scheme is located on the FRB, which spans the Firth of Forth connecting South Queensferry to North Queensferry. Residential properties and two business properties lie within 300m of the scheme extents. The closest residential properties lie 145m southeast of the bridge, including Castle Rock Edinvar sheltered housing. The properties in proximity to the FRB are positioned below the viaducts and are therefore somewhat screened from the FRB works.

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

The FRB is a dual carriageway with a 50-mph speed limit applying throughout. The Annual Average Daily Traffic (AADT) flow is low (555 (ID: 90004)) (2022 data) and is comprised of:

- 16 two wheeled motor vehicles,
- 167 cars and taxis,
- 238 bus and coaches,
- 129 Light Goods Vehicles (LGVs), and
- 5 Heavy Goods Vehicles (HGVs).

The AADT flow recorded for pedal cycles is 156 (2022 data).

There are no congestion issues noted on the FRB during the proposed working hours.

Road drainage and the water environment

The Scottish Environment Protection Agency (SEPA) [River Basin Management Plan](#) online mapping tool identifies that the FRB spans the Firth of Forth at the location of the Lower Forth Estuary transitional waterbody. The 38.6 km² 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' classification for fish migration.

There are no unclassified surface waterbodies spanned by, culverted beneath, or which share direct connectivity with the scheme extents.

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 records no groundwater classification within the scheme extents.

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 ([The Climate Change \(Scotland\) Act 2009](#)). The Act includes a target of reducing CO₂ 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 - gov.scot \(www.gov.scot\)](#)). 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 \(transport.gov.scot\)](#)).

Description of main environmental impacts and proposed mitigation

Air quality

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

However, grillage will be installed from the FRB deck and will be fully encapsulated. Therefore there will be a barrier to significant air quality impacts for pedestrians and cyclists utilising the bridge footways. Moreover, considering the nature, size, and scale of the scheme, and with implementation of mitigation detailed below, the proposed works impacts on local air quality levels during the construction period are assessed to be negligible adverse in magnitude.

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

Air quality mitigation measures:

- 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 (if 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 regarding consent requirements for maintenance works on the Category A listed FRB concluded that all

maintenance work concerned with the FRB, which is undertaken on a like-for-like basis, does not require Listed Building consent.

Construction of the FRB is likely to have removed any archaeological remains that may have been present. The potential for the presence of unknown archaeological remains in the study area has therefore been assessed to be low. Moreover, the works do not entail any earthworks or vegetation clearance, and people, ancillary plant, vehicles, NRMM and materials are restricted to the FRB. As such, there is negligible risk of disturbing or damaging previously undiscovered or unrecorded items of cultural interest.

Given the scheme does not require planning permission or consents, and with 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.

Cultural heritage mitigation measures:

- People, ancillary plant, vehicles, NRMM and materials will be restricted to the FRB.
- If during the works it is assessed that 'new' engineering works are deemed necessary to complete the scheme, consultation will take place with the City of Edinburgh Council / Fife Council to discuss requirements for listed building consent.

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.

Upon completion of the works, no residual impacts are anticipated e.g., the works are like-for-like replacement, and will have minimal visual impacts i.e. once complete, refurbished grillage and VRS will be the only discernible change.

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

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 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 submitted and approved on 30th September 2021 (MS-00009380). The application, as submitted, included a Habitats Regulation Appraisal (HRA) of all FRB cyclic, routine, and planned maintenance activities on the FRB as part of the Scottish Trunk Road Network Management Contract for the South East Scottish Trunk Road Unit (STRU). The list of schemes approved in Marine Licence (MS-00009380) include the works 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 implications for the conservation objectives 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.

All works are restricted to the FRB therefore no direct land take or site clearance is required, and the works will therefore not result in loss or function (e.g., habitat loss or species fragmentation) of any of the designated sites. Moreover, it is not anticipated that the works will result in any change to water quality provided pollution control measures outlined in the 'Road drainage and the water environment' section are followed.

A temporary short-term increase in noise levels may cause disturbance to local wildlife. The works will, for example, require a range of ancillary plant, vehicles and NRMM which will emit noise and create potential disturbance. The works will also require delivery of materials and the presence of personnel to facilitate vehicle barrier / grillage refurbishments and concrete repairs. Given the nature of the works, and the height of the FRB above the Lower Forth Estuary, no ground-borne vibration impacts are expected. Species are also likely accustomed to existing level of disturbance from traffic in on the Firth of Forth and the trunk road. Worst-case scenario noise and vibration will also be intermittent, temporary, and short-lived.

While works will not result in a direct impact on the Forth Islands SPA or Firth of Forth SPA/Ramsar, potential indirect risk exists. The proposed works will, for example, take place directly above the Lower Forth Estuary. Unmitigated any loss of containment e.g., a spill of fuel, oil, chemicals (i.e., hydraulic fluid) or debris from concrete breakout, could therefore have an Adverse Effect on Site Integrity (AESI). The severity of the AESI is contingent on the substance and quantity lost. With mitigation measures implemented, the accidental release of pollutants is extremely unlikely, given that the works will be fully encapsulated. Furthermore, pollution prevention measures will be strictly enforced onsite and SEPA's Guidance for Pollution Prevention (GGPs) will be strictly adhered to, mitigating a loss of containment.

Considering the nature, size, and scale of the scheme, and with implementation of mitigation detailed below, 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:

- All site personnel will be made aware of the protected status of the Forth Islands SPA and Firth of Forth SPA, Ramsar and SSSI and Long Craig Island SSSI.
- 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.
- To reduce the potential for light disturbance, standard construction hours as far as possible will be 07:30 -17:30 (Mon-Fri & weekend working at discretion of contractor). If any construction works are required outwith the agreed working hours, other than those activities necessary for the construction, mobilisation and removal of temporary works, BEAR Scotland's Environmental Team will be contacted to discuss.
- 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. Artificial lighting impacts are therefore not anticipated to be significant.
- 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 BEAR Scotland's 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 BEAR Scotland's Environmental Team can provide advice.

- The use of tool tethers will be implemented when working from suspended areas.
- Access platforms will be fully encapsulated during works, using debris netting/Envirowrap (or similar). Containment measures will be periodically checked during the construction to ensure they remain effect.
- 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 outwith the carriageway boundary and adjacent verge,
 - 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.

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 this scheme. 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.

Full encapsulation of the works area will ensure that all waste generated from the construction activities will be contained and controlled to minimise the risk of unwanted emissions of pollutants.

A Site Waste Management Plan (SWMP) template will be partially completed by the Design Engineer (design section) and then the Design Engineer will supply the Contractor with the SWMP to complete the contract delivery section. 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 UK legislation.

Upon completion of the works, no residual impacts are anticipated on materials or waste.

Material and waste mitigation measures:

- A Site Waste Management Plan (SWMP) will be completed by the Designer and Contractor as required.
- Good materials management methods (e.g., 'just-in-time' delivery) will be implemented 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. Material transfer notes and/or waste exemption certificates (if required) will also be completed and retained.
- Bulk material will be ordered/delivered to site, without packaging where possible.
- Where possible, material removed from site will be taken to a licensed recycling 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 the relevant waste regulations. Special waste will not be mixed with general waste and/or other recyclables.

Noise and vibration

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 etc. As a result, there is potential for noise and vibration effects.

However, the works are not located within a CNMA or CQA. While there are residential properties approx. 145m south, the majority of the works will also be completed utilising a daytime working programme, with only the installation / removal of temporary works structures being undertaken at night. Works with the potential to induce worst-case scenario noise and vibration (vehicle movements, material delivery, use of hand tools etc.) will also be intermittent, temporary, and short-lived. Given the nature of the works, no ground-borne vibration impacts have been forecast. The potential for disturbance will therefore be somewhat diminished.

Given the timing of the works, proximity to receptors, nature of the works, and in consideration of the mitigation below, the proposed scheme impacts on noise levels throughout the construction period are assessed to be temporary negligible adverse in magnitude.

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

Noise mitigation measures:

- 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 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.
- 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 have been 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 have temporary adverse impacts on local residents, vehicle travellers, and non-motorised users (NMUs). However, the construction works will also be undertaken utilising a day-time work pattern with only facilitation works i.e. the installation of temporary works being undertaken at night if necessary. The presence of a small workforce, and limited construction traffic, is therefore unlikely to cause significant disturbance in vicinity of the works.

Through access to NCN Route 1 and the Core Path (ID: CB) will be maintained at all times.

Considering the nature, duration, size and scale of the scheme, 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 works, no residual impacts are anticipated in relation to population and human health:

Population and human health mitigation measures:

- 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 etc.) will be initiated to keep local residents and/or businesses informed of the proposed working schedule, 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.
- Construction lighting will avoid illuminating surrounding properties as far as is possible to avoid a nuisance at night, and non-essential lighting will be switched off at night.

- 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 BEAR Scotland's social media platforms.
- 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.

Road drainage and the water environment

During construction, there is potential for temporary adverse impacts on the water environment. Potential changes in water quality e.g., from pollution events (either by accidental spillage of sediments, particulate matter, chemicals, fuels or by mobilisation of these in surface water caused by rain) during works have the potential to have a direct or indirect effect on surrounding waterbodies. There is also a risk that material and equipment could fall into the Lower Forth Estuary during the works.

However, considering the nature, size, and scale of the scheme, and with implementation of the mitigation detailed below, the proposed works impacts on the road drainage and water environment are assessed as temporary minor 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 water environment mitigation measures:

- No works will be permitted to take place within the Lower Forth Estuary.
- 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.
- Before works commence, debris netting/Envirowrap (or similar) will be installed to fully encapsulate the works to ensure no material can escape to the Lower Forth Estuary.
 - All encapsulation sheeting will be removed prior to winds in excess of 65mph.
 - Debris netting / encapsulation measures will be periodically checked throughout the works to ensure they remain effective.
- Pollution prevention measures will be enforced onsite with Guidance for Pollution Prevention (GPPs) being strictly adhered to.

- 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 must 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 must 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.
- Plant, fuel, oils, generators etc. will be banded 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 designated laydown area and work site (particularly 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 onsite will have been regularly maintained, paying attention to the integrity of oil tanks, coolant systems, gaskets etc. A checklist must 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 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. The grillage refurbishment works will also extend the maintenance intervals required for future works. In doing so, the service life of the structure is also extended.

During works 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 scheme, and the mitigation detailed below, the risk of significant impacts to climate are considered to be negligible adverse in magnitude.

Upon completion of the proposed scheme 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 gas 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 Major Accidents and Disasters

The FRB is not at risk of surface water flooding and there will be no change to the likelihood of flooding on the FRB within the scheme extents upon completion of the works.

Works are restricted to the existing FRB structure, with access to the FRB gained via local roads. TM will be required as a dual fast lane closure across the length of the South Side Span. Additional traffic management barriers shall be required at the bullnose locations where these sections are removed, resulting in a squared grillage posing a hazard to passing vehicles. Traffic management may be increased in length longitudinally to provide onsite parking for vehicles, areas for storage, and welfare facilities. Night closures may be required for the construction, mobilisation, and removal of the temporary works structure to provide the space required for the installation of the ballast. At least one cycleway/footway will remain open to pedestrians and cyclists throughout the works. As such, the proposed works impacts on road traffic accidents is assessed to be of negligible magnitude.

A Site Environmental Management Plan (SEMP) will be produced by BEAR Scotland 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 risks of major accidents and disasters is considered to be low.

Assessment cumulative effects

The proposed works are not anticipated to result in significant environmental effects. Due to the nature of the proposed works, no cumulative effects are anticipated with any other developments in the vicinity.

BEAR Scotland will be undertaking Phase 9 of the Suspended Span Under Deck Access (SSUDA) improvements on the FRB partly at the same time as Phase 1 of the grillage refurbishment works. SSUDA Phase 9 is proposed to be carried out between Panel Point 72 to 84 on the South Main Span, starting in May 2024 for approx. 6 months. Considering the minor maintenance of the schemes, the distance they are from each other, that no TM is required for the SSUDA Phase 9 and that the SSUDA works are restricted to below the FRB carriageway, it is unlikely that the proposed works will have a significant cumulative effect.

Any future BEAR Scotland schemes will be programmed to take into account already-programmed works and as such, any cumulative effect will be limited.

In addition, a search using [City of Edinburgh Council Simple Search](#) and [Fife Council Simple Search](#) identified that there are no planning applications within 300 m of the scheme.

Therefore, it is unlikely that the proposed works will have a significant cumulative effect with any other future works in the area.

Assessments of the environmental effects

The vehicle barrier / grillage refurbishments and concrete repair works are included within the existing five-year Marine Licence (MS-00009380) which was approved in September 2021. The Marine Licence included a HRA of all FRB cyclic, routine and planned maintenance activities as part of the Scottish Trunk Road Network Management Contract for the South East Scottish Trunk Road Unit. As such, a scheme specific HRA Screening and Appropriate Assessment 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/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 works are restricted to existing structure of the FRB.
- Works are not expected to result in significant disturbance to protected species that may be present in the wider area.
- There will be limited consumption of materials and natural resources or generation of waste associated with the works. Where possible, materials will also be derived from recycled, secondary, or re-used origin.
- Vehicle barrier and grillage refurbishment will improve the safety of the bridge and protect against future deterioration of the structure, thus minimising the extent of future works required at the FRB.
- Any potential impacts of the works are expected to be temporary, short-term, not significant and limited to the construction phase
- No in-combination effects have been identified.
- As the works are restricted to grillage refurbishment and VRS replacement, 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.
- 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.
- The risk of major accidents or disasters is considered to be low.

Location of the scheme:

- The works are taking place above the Lower Firth Estuary which supports the Firth of Forth SPA, Ramsar and SSSI along with the Forth Islands SPA and Long Craig Island SSSI. A HRA has been undertaken for the works on the FRB as a whole which has concluded that providing appropriate mitigation is in place there will be no adverse effects on site integrity (AESI) for the sites, either alone or in combination.
- Historical consultation with the City of Edinburgh Council regarding maintenance works on the Category A listed FRB concluded that all maintenance work concerned with the FRB, which is undertaken on a like-for-like basis, does not require Listed Building consent.
- The scheme is not 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.
- The scheme does not lie within any sites designated for geology or soils.
- The scheme is not located within a densely populated area.

Characteristics of potential impacts of the scheme:

- The waste hierarchy will be followed to reduce waste to landfill.
- 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 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 works. Measures will also be in place to ensure appropriate removal and disposal of waste.

References of supporting documentation

- Marine Licence (MS-00009380) (issued by Marine Scotland, 30th September 2021).

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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Published by Transport Scotland, April 2024

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