Tay Road Bridge Pier Collision Protection Works

Environmental Statement

Non Technical Summary

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PREFACE

This document is the Non-Technical Summary of the Environmental Statement. Copies of the ES and further information on the proposed Scheme may be obtained from the Dundee City Council address below.

A printed copy of the Environmental Statement with Technical Appendices costs £100. In addition, all documents are available (as PDF) on CD/DVD for £10. Further copies of the Non-Technical Summary are also available free of charge.

The public can view the Environmental Statement during normal office hours at:

Dundee City Council
Tayside House
28 Crichton Street
Dundee
DD1 3RB
Telephone: (01382) 433109

Newport Library
Blyth Hall
3 Scott Street
Newport-on-Tay
Fife
DD6 8DD

If you consider that you may suffer an adverse effect as a result of the proposed Scheme described in this Environmental Statement you are entitled to object. Objections should be lodged with Marine Scotland and sent in writing to:

Marine Scotland
1st Floor
Victoria Quay
Edinburgh
EH6 6QQ
INTRODUCTION

Background

This Non-Technical Summary (NTS) summarises the Environmental Statement which accompanies an application to Marine Scotland for a licence under the Food and Environment Protection Act (FEPA) 1985 and consent under Section 34 of the Coast Protection Act (CPA) 1949 for pier collision protection works to the Tay Road Bridge.

The Tay Road Bridge comprises a 2,245 metre long, forty two span, twin deck box girder bridge that carries the A92 across the Lower Tay Estuary, connecting the City of Dundee to Newport-on-Tay, Fife. The Tay Road Bridge Joint Board has responsibility for the operation, management and maintenance of the Tay Road Bridge under powers transferred under the Tay Road Bridge Order Confirmation Act 1991.

The aim of the Scheme is to protect three piers (31-33) in the event of shipping collision. Piers 31-33 are located in the open estuary channel below the low water mark at a distance of approximately 450m metres from the Fife shoreline and 1550 metres from the Dundee shoreline. The location of the bridge and proposed works is illustrated in the Figure below. It is anticipated that the construction period will commence in July 2011 and last approximately 18 months with completion by the end of 2012.

![Diagram of the Tay Road Bridge and proposed works](image-url)
Environmental effects of the Scheme have been studied and the results are presented within the Environmental Statement and summarised in the NTS. These documents inform readers of the nature of the proposed Scheme, likely environmental effects and measures proposed to protect the environment during both construction and operation.

ENVIRONMENTAL IMPACT ASSESSMENT

Under the Marine Works (EIA) Regulations (the EIA Regulations) 2007, Marine Scotland cannot grant a licence under FEPA without EIA consent. Certain projects subject to regulation under FEPA and Section 34 require Environmental Impact Assessment (EIA) in instances where works are carried out below Mean Low Water Springs and application for planning permission is not required. Under the EIA Regulations, for those projects listed in Annex I to the European Commission (EC) EIA Directive (85/337/EEC as amended) EIA is mandatory and, for those listed in Annex II, the need for EIA is determined either on a case by case basis or against pre-determined thresholds.

The majority of the permanent works are scheduled to take place below Mean Low Water Springs and, whilst not directly referred to in Annex II, the Scheme is considered comparable with projects described in Annex II paragraph 10 (k). These projects are those relating to: ‘Coastal work to combat erosion and maritime works capable of altering the coast through the construction, for example, of dykes, moles, jetties and other sea defence works, excluding the maintenance and reconstruction of such works’.

Due to the situation of the Scheme within a marine Special Area of Conservation it passes legislative significance thresholds requiring EIA. The Applicant has consequently undertaken an assessment into the impact of the Development on the environment and findings of this process are presented in the Environmental Statement (ES).

Environmental effects have been assessed to identify any that may be significant in the context of the EIA Regulations. Mitigation is proposed where possible to prevent or reduce significant effects occurring.

In accordance with EIA Regulations, the assessment has considered ‘cumulative effects’. By definition, these are the effects that result from incremental changes caused by past, present or reasonable foreseeable actions together with the proposed Scheme.

PROPOSED SCHEME AND ALTERNATIVES

Need for the Scheme

Between 2002 and 2008, a series of reports were commissioned by Tay Road Bridge Joint Board to assess the risk of bridge collapse as a result of vessel collision. Conclusions from these reports indicated that the return period for vessel collision loading events does not meet the recommendations of available guidance. The pier collision protection scheme proposals have been developed following the recommendations of the 2008 Report.

The scheme design is required to protect a number of bridge piers from impacts resulting from a 3,000 tonne dead weight (3,000 DWT) vessel (the maximum likely size of those travelling between Dundee and Perth), prevent local scour from the...
Pier Collision Protection works and have no adverse effect on the existing bridge substructure.

**Alternatives Considered**

A pier protection feasibility study was conducted in 2005 which examined six alternative conceptual design solutions and scored them against six parameters to assess their relative merits. These parameters included those relating to cost, effectiveness, buildability, aesthetic and environmental impact along with implications with regards to health and safety.

The preferred design solution was selected as it was considered to offer best overall value and aesthetically it was evaluated as having less of an impact that any other of the solid barrier pier protection options considered. Minimal environmental impacts were also anticipated through this concept and other options were assessed as having the potential to cause greater noise and vibration.

Further evaluation established a range of different options for the development of the design of the proposed Scheme including options for the protection of three or seven piers. The bridge works are required to protect a minimum of three piers (31-33) against the impact of vessels travelling to and from Perth Harbour whilst also minimising effects on navigation, prevent local scour from collision protection scheme components and have no adverse effects on the existing bridge substructure.

**The Proposed Scheme**

The Scheme is based on two possible options: robust or sacrificial protection. The robust option will have a smaller footprint but greater risk and conversely the sacrificial protection option has a larger footprint but smaller risk. Both options are being considered however it is unlikely that the robust protection scheme option would be built as this would potentially have greater environmental impact than a sacrificial scheme.

The robust protection scheme comprises an independently supported reinforced concrete piled ‘dolphin’ enclosing the existing piers. The approximate dimensions of the concrete structure surrounding the piers are 64 metres long and up to 5 metres deep.

The lateral dimension either side of a pier is likely to be in the region of five metres (equating to a total reduction in navigable width of up to 14 metres between adjacent piers). The dolphins’ pilecaps are supported by a number of large diameter tubular steel raking piles driven through alluvial deposits, to be founded in bedrock.

The diagram below illustrates the preliminary design for the sacrificial option.
Ground Investigations work is required prior to construction to establish a range of geological parameters and are expected last around 12 weeks.

A temporary compound and batching plant will be located on land for the duration of construction works. These are anticipated to be situated on land within the Port of Dundee. The temporary compound will be the subject of an application for planning permission once the exact location is confirmed, and any environmental impacts will be assessed separately.

The EIA has been undertaken based on the outline design provided. The Scheme is to be progressed under an Early Contractor Involvement (ECI) contract. The first phase of the contract will involve development of the detailed design for the pier collision protection works in partnership with the appointed Contractor. Construction will be undertaken in the second phase. The terms of the contract and contract management arrangements will ensure that the detailed design of the Scheme, including environmental mitigation, will be implemented in compliance with this ES.

**LEGAL AND POLICY FRAMEWORK**

As a consequence of the works occurring below estuarine Mean Low Water Springs and so not within the jurisdiction of a local authority, the Scheme is not subject to planning permission and is not directly referenced within planning and policy.
documents. A review of relevant plans and policies has however been conducted as part of the EIA process as best practise. The plans and policies chapter in the Environmental Statement sets out planning policy and guidance of relevance to the Scheme.

**SCOPING AND CONSULTATION**

**Scoping**

Scoping is undertaken at the outset of the assessment process to ensure that the Environmental Statement contains all information necessary to evaluate the likely significant effects of the Scheme in accordance with Schedule 4 of the EIA Regulations.

A Request for a Scoping Opinion was submitted to Marine Scotland by the Tay Road Bridge Joint Board in July 2009. This report provided an outline description of the proposed Scheme and its location, set out the likely environmental effects that could result from the pier collision protection works and the assessment process by which these issues would be evaluated.

The submitted Scoping Opinion identified the following environmental issues to be addressed in the Environmental Statement:

- Planning;
- Water Resources;
- Ecology (terrestrial and estuarine);
- Sediment, Geology and Contamination;
- Noise and Vibration; and
- Landscape and Visual Amenity.

The Environmental Statement has been prepared on the basis of this Scoping Opinion.

**Consultation**

The process of consultation is critical to the development of a comprehensive and balanced Environmental Statement. A range of statutory bodies and non-statutory consultees were consulted as part of the EIA process to provide input into the environmental assessment undertaken and the progression of the Scheme. Those consulted during both Scoping and the Environmental Statement process included:

- Marine Scotland;
- Scottish Natural Heritage (SNH);
- Scottish Environment Protection Agency (SEPA);
- Fife Nature Records Centre (FNRC);
- Fife Council Environmental Health Officer (EHO);
- Association of Dundee Pilots;
- Port of Dundee Ltd; and
- Scottish Government Transport Directorate Ports and Harbours.

A Scoping Opinion was received on 22 December 2009 with a schedule of the main consultation responses detailed in the Environmental Statement.
IMPACTS OF THE PROPOSED SCHEME

Water Resources

The water environment study was undertaken through a desk-based assessment including the development of the baseline and potential impacts to the water quality of the Tay Estuary. A scour assessment was also conducted which aided in the identification of potential impacts to the water environment.

The Lower Tay is considered high sensitivity based on the Water Framework Directive information held by the Scottish Environment Protection Agency’s (SEPA), various EC and other designated sites in the vicinity, and information on tidal and sediment regimes within the estuary.

The estuary bed at the Tay Road Bridge is thought to be relatively stable as surveys undertaken since construction of the bridge indicate a relatively small increase in scour depth and a negligible increase in extent.

The majority of potential impacts were identified to occur during the construction phase of the Scheme including the potential release of suspended sediments and mobilisation of bed sediments into the water column, potential spillage and leakage of oils, fuels, chemicals and concrete and localised bed scour around the bridge piers.

Measures will be implemented to reduce the risk of adverse impacts on the water environment during construction in accordance with SEPA requirements for pollution control. It is not thought that there would be any significant effects on the water environment post-construction.

Terrestrial Ecology

Several designated sites are present within 5km of the study area. These include one Special Protection Area (SPA); one Special Area of Conservation (SAC); one Ramsar site; six Sites of Special Scientific Interest (SSSIs), one of which is designated for its geological importance; one National Nature Reserve (NNR); two Local Nature Reserves (LNRs); and one urban nature reserve run by the Scottish Wildlife Trust.

Two habitats of ecological interest are present: woodland and inter-tidal habitats. Both semi-natural and plantation woodland present have predominately young trees and a low diversity of ground flora. These are considered to be of low local ecological value and so were not considered in the impact assessment.

The inter-tidal zone is divided into sections of shingle, boulder and rock and mudflats below an area of shingle / rock. A small patch of short sward coastal grassland exists adjacent to the coastal footpath and to the west of the Tay Road Bridge. The intertidal zone of the Firth of Tay and Eden Estuary SAC is considered to be of international ecological value whereas the coastal grassland is of less than local level ecological value.
Protected species identified within 5km of the Scheme include otter, bats, badger, red squirrel, water vole, birds and amphibians. Twelve of the birds are found on the Annex I listed EC Birds Directive species and 16 are WCA listed Schedule 1 (part 1) species.

Habitats of badgers, water voles and red squirrels are not likely to be affected by the proposed Scheme and therefore were not taken into account within the impact assessment. Seven bird species were selected for assessment including the cormorant, curlew, goldeneye, herring gull, house sparrow, red-breasted merganser and redshank. This was based on an evaluation of authority area level ecological value or higher.

Impacts during construction are varied and, without mitigation, may involve temporary loss of intertidal and amenity grasslands habitats in addition to effects of noise and vibration from machinery and vehicles and lighting for security and night working purposes on otters and bird species. This, along with the continual presence of human activity, can adversely affect otter behaviour. Waterborne pollution as a result of construction works may result in long term damage to productivity and diversity of the estuarine ecosystem.

There are not thought to be any significant impacts to bats during either construction or operation.

Mitigation measures have been proposed to alleviate or minimise impacts of habitat loss / fragmentation, mortality, disturbance and pollution during the construction phase of the Scheme. Such measures include (amongst others):

- Development of a Construction Ecological Management Plan (CEMP);
- Construction work will be undertaken in such a way that animals will continue to be able to move along the Firth of Tay shore throughout the works period;
- Where night-time working is unavoidable, mitigation measures to minimise the impact of the specific works involved will be agreed between the Site manager/client and with the ECoW; and
- All construction and security lighting will be undertaken in accordance with the BCT Bats and Lighting Guidance (BCT, 2008) and to BS 5489.

No residual impacts to terrestrial ecology are envisaged if all mitigation measures are implemented.

Aquatic Ecology

An aquatic ecological assessment was undertaken of the proposed Scheme on aquatic species and habitats within the Firth of Tay.

The Firth of Tay is home to 14 whale and dolphin species such as the bottlenose dolphin and harbour porpoise amongst others. It is also an important breeding ground for the common seal, a qualifying feature for the designated Special Area of Conservation (SAC). Grey seals are also frequently found in the estuary.

Benthic flora, organisms living on or in the bottom of the estuary, was also identified through the assessment. Twenty macrofaunal organism groups were found to be
present, typical of tidal swept, sandy sediments. None were found to be of specific conservation importance. There were 35 species of fish identified within the upper and lower reaches of the estuary. Of those 35 species, the majority are resident within the estuary and found throughout the year. Several have conservation value including migratory salmon, river lamprey and sea lamprey, all associated with the SAC designation.

The potential impacts on marine communities during construction of the Scheme are associated with the pier installations, dolphin installation and general construction activities. These activities potentially affect communities through noise and vibrations, habitat loss, pollution (release of sediment-bound contaminants, nutrients, shipping pollutants and possible spills), hydrodynamic alteration and increased vessel activity. The most significant effect on fish and marine mammals is noise and vibrations stemming from the construction activities which may alter or halt migration for salmon and cause various behavioural responses from marine mammals such particularly avoidance behaviour away from the noise source.

Generic measures which will be implemented during construction to reduce impacts on aquatic habitats and species include:

- Plant and personnel will be constrained to a prescribed working corridor through the use of temporary barriers, thereby minimising damage to habitats and potential direct mortality and disturbance to species;
- Suitably constructed structures including access roads/bridges with fencing and visual screens will be created on intertidal commuting corridors where applicable;
- An Ecological Clerk of Works (ECoW) to be present on site to monitor construction works as required to suit specific site operations;
- Development of a Code of Construction Practice (CoCP), incorporating industry Best Practice; and
- Adherence to SEPA pollution prevention guidelines e.g. PPG1, PPG2, PPG5, PPG7, PPG8, PPG13, PPG21 and PPG26.

Other specific mitigation measures a range of specific mitigation measures are proposed to avoid or reduce potential impacts on marine mammals and fisheries mainly from noise and potential pollution.

**Sediment, Geology and Contamination**

There are no sites or designated features of geological or geomorphological interest present in the study area. A review of existing data sources, consultation responses and the results of previous ground investigations and recent sediment sampling allowed for the identification of baseline conditions.

Marine alluvial deposits were encountered throughout the study area whilst glacial deposits were encountered beneath these in three boreholes during previous ground investigations.

The Tay Road Bridge is underlain by strata of the Lower Devonian age comprising both volcanic and sedimentary rocks belonging to the Dundee Formation and Ochil Volcanic Formation. The South Tay Fault lies roughly 200m from the south
abutment of the bridge coinciding approximately with the position of pier no.39 and trends in an ENE-WSW direction.

Concentrations of contaminants in the estuary sediments were assessed to identify any risks to ecology, the water environment and construction workers. Although levels were generally low, mitigation measures based on best practice to control the effects on the receiving environment are proposed. These include the requirement for the contractor to develop health and safety procedures and to refer to construction material guidance documents to ensure protection is maximised.

The residual impacts of the proposed Scheme are assessed as being of negligible significance in terms of the EIA Regulations.

**Noise and Vibration**

Noise can have a significant effect on the environment and quality of life enjoyed by individuals and communities. Noise will be emitted during the construction phase particularly during the piling works. The greatest noise and vibration emissions are expected when the piling hammer is driving the pile tube through the alluvial deposits and into the rockhead.

To determine the baseline situation, a noise survey was undertaken at five strategic locations in the vicinity of the bridge. The main sources of noise stemmed from road traffic on the bridge, aeroplanes, pedestrians and birdsong.

Piling operations are considered to present the greatest potential noise and vibration impacts. On the basis that the relevant threshold values are not exceeded for the worst case construction works, no significant impacts are deemed to occur. No operational noise and vibration impacts are anticipated.

Mitigation is in line with best practice and current guidance. Work should only be contracted during normal working hours. If work is required to be undertaken outside these hours e.g. weekends, Bank Holidays or overnight, this should be limited to operations with lower noise emissions in accordance with local authority noise limits. Noise / vibration limits as set out by the local EHO will be adhered to. Where necessary, the works will be programmed to ensure no noisy work out of hours. Also, mitigation measures will be installed where appropriate e.g. noise baffle boards etc. When piling operations begin, noise and vibration monitoring would be undertaken to determine that levels are acceptable at the nearest sensitive receptors to the works.

**Landscape and Visual Amenity**

The study area encompasses the Firth of Tay, its banks and the valley slopes on both sides, including the city of Dundee to the north and Newport-on-Tay and rural land to the south.

To the north of the firth, the Tayside area is characterised by the urban development of Dundee, which is spread across several coastal hills that run down to the former industrial waterfront.

The upland farmland of Fife to the south of the Tay covers the majority of the coastal hills around the small town of Newport-on-Tay which is situated on the coast opposite Dundee. The Firth of Tay itself forms a large expanse of intertidal and maritime landscape.
The landform to the north of the River Tay includes a flat coastal area rising up gentle slopes to a series of minor hills formed by glacial erosion. The main hills in the areas are Balgay Hill and Dundee Law within the centre of the city. Several minor burns run through Dundee and discharge into the Tay.

The Firth of Tay is the main waterway in the area and runs from Perth in the west to the North Sea in the east, with the River Tay fed by seven other significant rivers along its catchment, including the Earn, Almond, Tummel, Garry and Isla.

To the south of the Tay, the rolling coastal topography at the eastern end of the Ochil Hills, with the landform largely defined by glacial erosion. Several minor watercourses run across the north facing slopes and discharge into the Tay, including the Scotscairn Burn and Motray Water, with numerous ponds and small lochs scattered across the rolling hills.

Potential impacts are thought to result from vehicles and barges moving machinery to and from the site, the temporary site compound and batching plant, presence on site of a jack-up barge and temporary lighting associated with working. Following the completion of the works, it is thought that impacts would stem from the larger fenders at the base of the bridge piers and the navigation lights.

There are no mitigation measures provided due to the minor and temporary nature of the impacts. With respect to this, the residual impacts are identified in the following paragraphs.

In terms of effects on the landscape, slight negative impacts were thought likely to the Firth of Tay, Newport-on-Tay Urban, Fife Coastal Farmland, Craig Law Upland Wooded Farmland and A92 Road Corridor Landscape Character Areas. Negligible impacts are deemed likely once works are completed.

Visually, during construction the only built receptors which would notice a change in views would be dwellings on Craig Head, Newport-on-Tay due to their position directly adjacent to the works. The majority of the outdoor receptors would receive slight to negligible adverse impacts due to the unusual appearance of the jack-up barge in their views across the Firth of Tay.

Once works are complete, it is not thought that there would be any significant visual effects.

**Cumulative Impact Assessment**

The cumulative impact assessment provides an overview of the combined impacts of the proposed Scheme and also includes potential impacts from other proposed development in the area.

The greatest residual effect is to six properties on Craig Head, Newport-on-Tay which are thought to experience slight to moderate adverse visual impacts during the construction phase of the Scheme. All other environmental effects are considered to be of negligible to slight significance.
and interactions between receptors are unlikely to lead to any additive cumulative effects.

Several developments are proposed in the vicinity of the Tay Road Bridge. The main development of interest is the Dundee Waterfront Development including the V&A at Dundee development. This will comprise a 7,000 sq. metre building due to open in 2014. Other developments include a Park and Ride site southwest of Northfield Farm and south of the existing car park adjacent to the bridge in Fife. This is development is currently at feasibility stage. Dundee Renewable Energy Plant in the Port of Dundee is to be operational by 2014 and the Port of Dundee Wind Turbine development by 2012.

The assessment of cumulative impacts has concluded that, with regards to the potential for effects in conjunction with other proposed developments, there are unlikely to be any significant cumulative effects and therefore no further mitigation measures were proposed.

**SUMMARY**

Environmental constraints and considerations have been taken into account in the development of the proposed Scheme design which has enabled some potentially significant effects to be avoided. Further measures to prevent or reduce any remaining significant environmental effects are described within each environmental discipline chapter.

Mitigation measures, as detailed in the specialist chapters of the Environmental Statement and recorded within the Schedule of Environmental Commitments chapter, have been identified to protect the environment during construction and / or completion of the works. Many of the mitigation measures proposed relate to eliminating or reducing potential impacts during the construction phase of the proposed Scheme.

With the acceptance of mitigation, it is not envisaged that there will be any remaining significant effects resulting from the Scheme, either during the construction phase or in operation.