

ABERDEEN HARBOUR
EXPANSION PROJECT
November 2015

VOLUME 1
ENVIRONMENTAL STATEMENT
NON-TECHNICAL SUMMARY



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This document provides a Non-Technical Summary of the Environmental Impact Assessment (EIA) undertaken for the proposed Aberdeen Harbour Expansion Project (the development) in Nigg Bay, Aberdeen. It summarises the findings of the Environmental Statement (ES) undertaken by Fugro EMU and Waterman Infrastructure and Environment on behalf of Aberdeen Harbour Board.

Between 6 November and 17 December 2015, a copy of the complete Environmental Statement can be viewed at the following locations, during opening hours:

- **Aberdeen Maritime Museum, Shiprow, Aberdeen AB11 5BY**
- **Torry Library, Victoria Road, AB11 9NJ**

A copy is also available online at

www.aberdeen-harbour.co.uk.

Copies of the Environmental Statement may be obtained by applying in writing to Doig & Smith, Pursers House, Blaikies Quay, Aberdeen AB11 5PB (email: kmurphy@doigandsmith.co.uk) at a charge of £50 for a hard copy. A copy of the Environmental Statement on CD is available free of charge.



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An aerial photograph of a coastal city, likely Glasgow, Scotland. The image shows a harbor with several ships, including a large red and white vessel. The city is densely packed with residential buildings, many of which are multi-story tenement houses. There are also industrial buildings and a large green area that appears to be a golf course. The sea is visible in the background, and the sky is clear. The text '1 INTRODUCTION' is overlaid in the center of the image.

1 INTRODUCTION



1.1 ABERDEEN HARBOUR BOARD

Aberdeen Harbour is one of the UK's busiest ports, handling around 8,000 vessel arrivals and five million tonnes of cargo, valued at approximately £1.5 billion, for a wide range of industries. A world leading marine support centre, it is the principal port for the energy sector in Western Europe and serves a number of industries as the main commercial port in the North-East of Scotland with trading links to more than 40 countries worldwide.

Aberdeen Harbour is a Trust Port, and is therefore a statutory body run by an independent board. It is not controlled by a local authority and it is not a private business. Under the Aberdeen Harbour Order Confirmation Act 1960 (as amended), Aberdeen Harbour Board is responsible for the administration, maintenance and improvement of the harbour. As a Trust Port, all profits are invested into further developments, to ensure the continued prosperity of the harbour and its stakeholders.

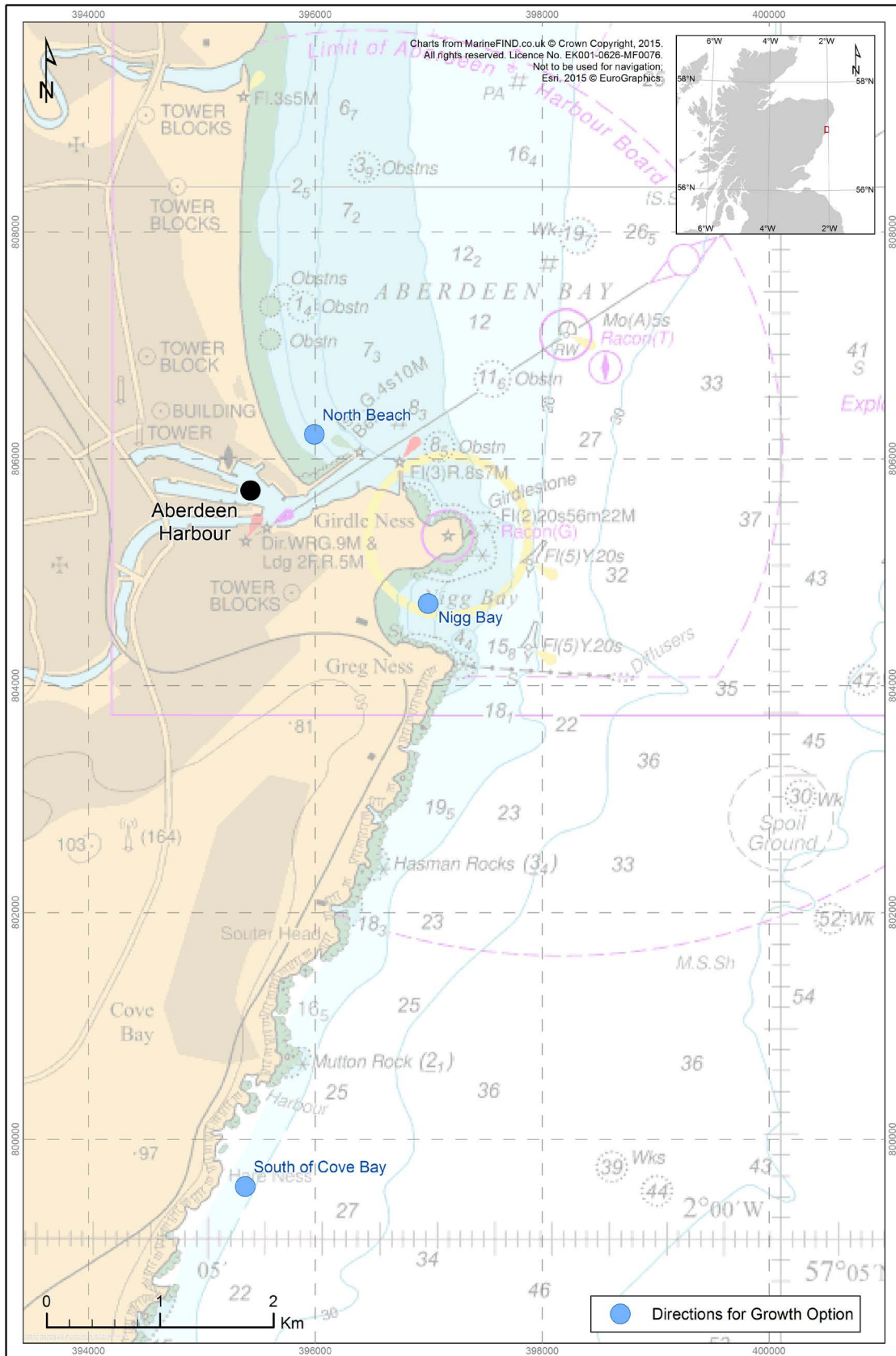
1.2 HARBOUR EXPANSION

Aberdeen Harbour has been operating at or near capacity for several years. Its location at the heart of the city means that there is limited capacity to handle rising vessel numbers. The growing trend for new, larger, multi-purpose vessels in the oil and gas sector and other industries has created a demand for deep water berthing which the current facilities cannot fully support. There is potential for new business streams such as larger cruise ships, supporting the renewables sector, and the decommissioning of small to medium size oil and gas industry infrastructure.

In 2012, Aberdeen Harbour Board commenced a feasibility study on the expansion of the harbour, which resulted in the publication of the 'Case for Growth' and 'Directions for Growth' reports. These reports addressed the need for the expansion of the harbour facilities, and the potential options for expansion, respectively. Both reports are available on AHB's website (www.aberdeen-harbour.co.uk).

In 2014, the Scottish Government published the National Planning Framework 3 (NPF3) which sets out the spatial strategy for Scotland's development over the next 20 to 30 years. The Aberdeen Harbour Expansion Project at Nigg Bay is recognised by the Scottish Government as one of only 14 infrastructure projects considered as having national significance. NPF3 recognises the importance of Aberdeen Harbour to the oil and gas sector, as well as acknowledging the need to expand the harbour to address capacity constraints, and to secure new business streams in the region.

Figure 1: Locations considered for expansion of Aberdeen Harbour



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1.3 PROJECT LOCATION AND ALTERNATIVES CONSIDERED

The city of Aberdeen has grown and prospered around Aberdeen Harbour. There is now a lack of land available within, or adjacent to, the harbour that will allow expansion.

During the feasibility study, Aberdeen Harbour Board considered a number of development options, which included continuing to develop the existing harbour as well as developing areas outside of the harbour limits.

The study led to Aberdeen Harbour Board identifying a number of locations that were potentially suitable for the expansion of the harbour. Of these, three locations demonstrated the physical capacity to accommodate new harbour facilities, as shown on **Figure 1**:

- Expanding the existing harbour
- North Beach immediately to the north of the existing harbour
- Nigg Bay immediately to the south of the harbour

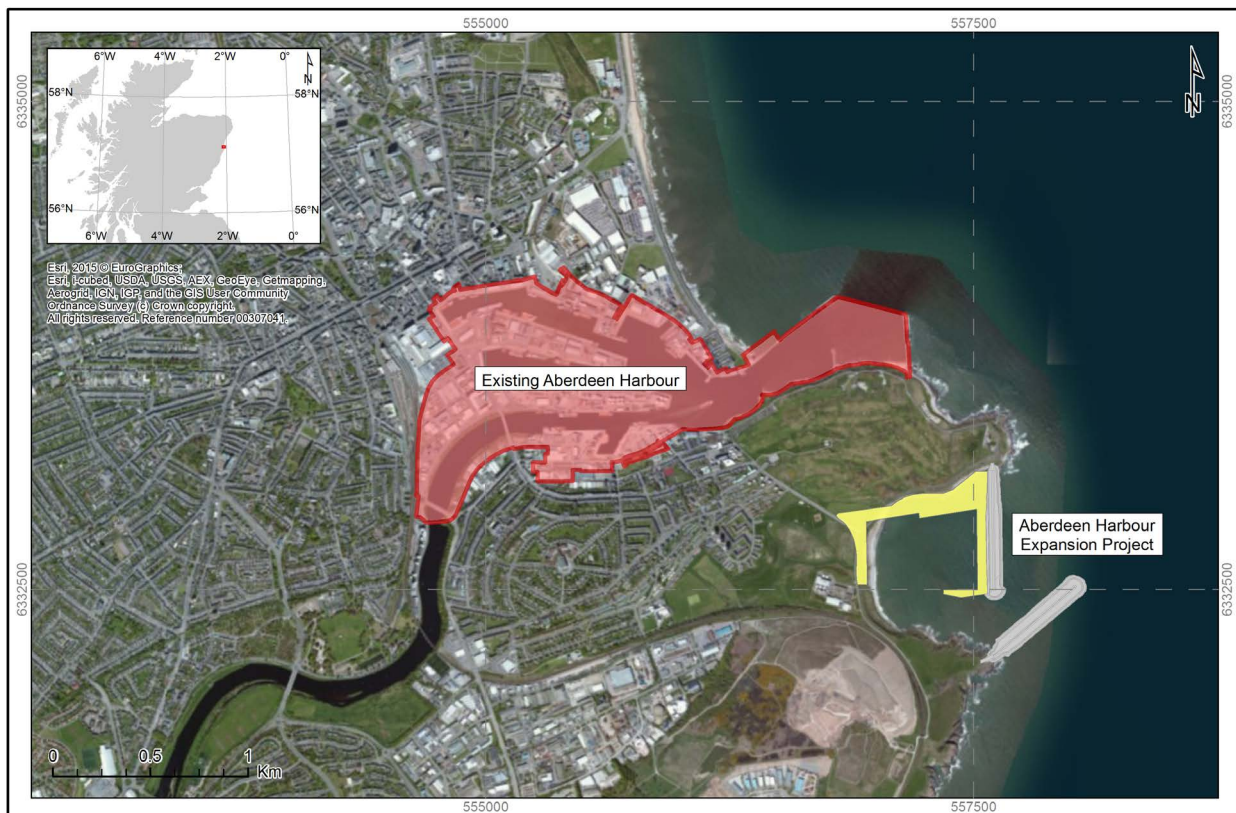
An area south of Cove Bay was also considered, but the straight, rocky coastline is lacking any natural shelter and would require uneconomical investment to enable the building of a protective breakwater structure.

The study concluded that:

- The existing harbour cannot offer scope for new facilities without compromising the current operational capacity
- North Beach offered greater operational scope than the existing harbour, but development would have a substantial adverse impact on the city centre amenity, would intensify transport issues, and be detrimental to local residents
- Nigg Bay was identified as the preferred option for expansion. There is scope to accommodate a deep-water facility. The facility could be constructed with little impact on existing harbour operations and would not increase pressure on the existing city centre transport network

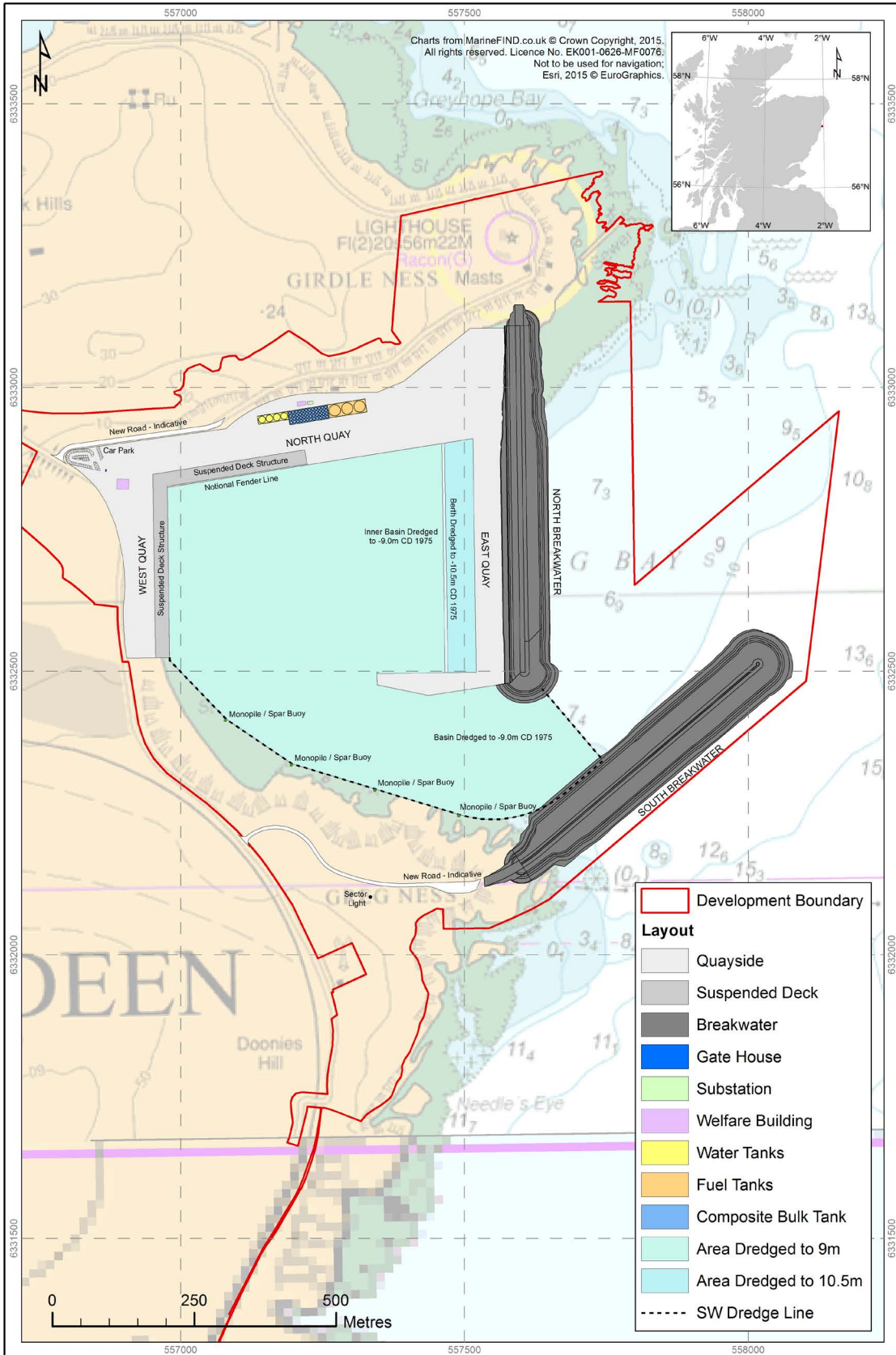
The location of Nigg Bay, relative to the existing harbour, is shown on **Figure 2**.

Figure 2: General location plan



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Figure 3: Proposed Harbour Layout, Infrastructure and Dredged Areas



1.4 THE PROJECT

The purpose of the project is to expand and diversify the capabilities of the existing harbour whilst maintaining its current operations. The expansion would allow Aberdeen Harbour Board to retain its existing customers while increasing capacity for larger vessels from a more diverse market than is currently possible.

The development would have a design life of 60 years and the construction would require the following activities:

- Dredging the existing bay to a depth of 9 metres, with additional dredge depth of 10.5 metres along the east quay and in the entrance channel
- Construction of new north and south breakwaters to form the harbour
- Land reclamation and construction of quays
- Off-site highway works
- Temporary road and coastal path diversions

The operational harbour will comprise:

- Two breakwaters each approximately 600 metres long
- Provision of approximately 1400 metres of new quays and associated support infrastructure along the eastern, northern and western edges of the harbour
- Car parking, gatehouse and two single-storey staff buildings
- Provision of commodities such as composite bulk, brine, fuel and water
- Harbour lighting to enable safe working
- Provision of navigational aids including a leading sector light

Figure 3 shows the proposed harbour layout, infrastructure and dredged areas.

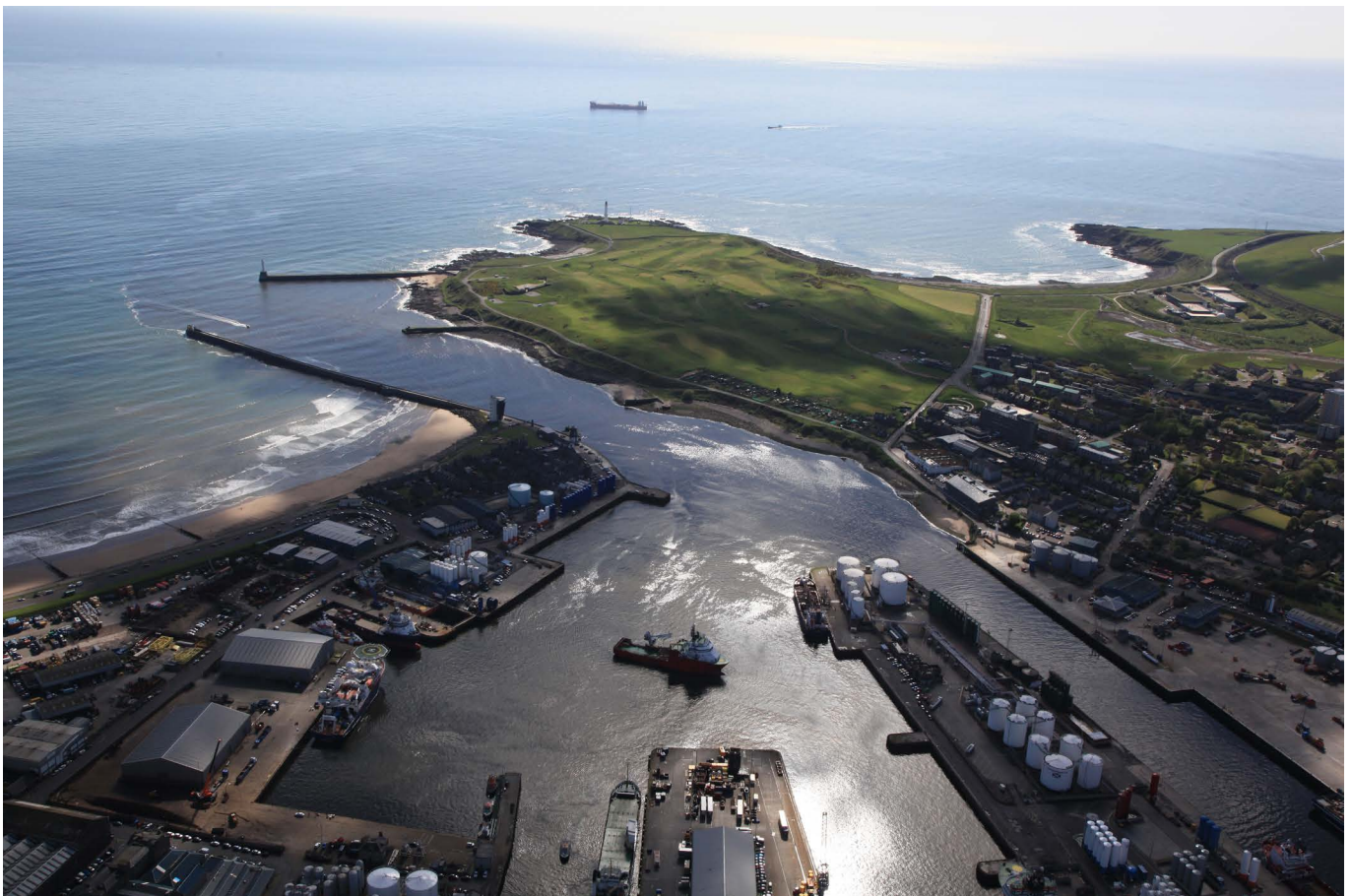
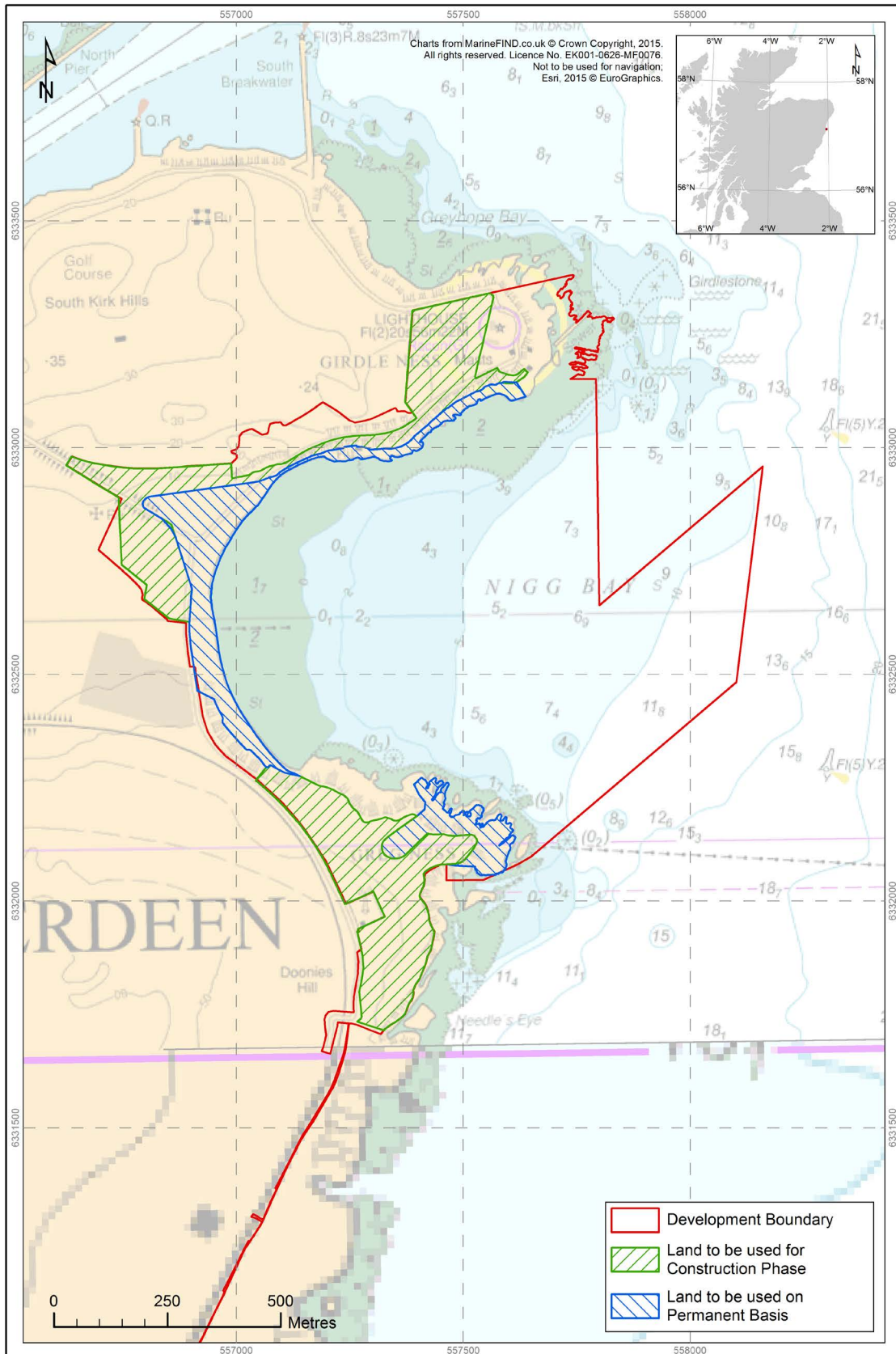


Figure 4: Location of development and associated boundaries



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1.5 REGULATORY CONSENTS

A number of regulatory consents and permissions are required before the development can be built. A list of the consents that Aberdeen Harbour Board has applied for are set out in **Table 1**:

1.6 PROJECT PROGRAMME

An indicative construction programme for the Project is provided below. This is based on the regulatory consents and permissions being granted by mid-2016, with construction starting in early 2017, although this is subject to change.

Table 1: Key legislation and consents required for the Aberdeen Harbour Expansion Project

Legislation	Requirement and Implications
Harbours Act 1964	A Harbour Revision Order will be required from Transport Scotland to empower Aberdeen Harbour Board to undertake the works and vary its existing harbour powers under Section 16 of the Harbours Act 1964.
Town and Country Planning (Scotland) Act 1997 (as amended)	Planning Permission for certain works is required from Aberdeen City Council under the Town and Country Planning (Scotland) Act 1997 (as amended). The onshore works are classified as a 'National Development' under the Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009 on the basis that they are specifically referenced as such in National Planning Framework 3.
Marine (Scotland) Act 2010	A Marine Licence is required from Scottish Ministers for activities listed under Part 4 of the Marine (Scotland) Act 2010, which includes proposals to construct, alter or improve any works within the Scottish marine area. The Marine Licence(s) will be issued by the Marine Scotland Licensing Operations Team on behalf of the Scottish Ministers.


Table 2: Indicative construction programme

Construction Activity	Start Date	Duration	Completion Date
Mobilisation/preparatory works/diversions	Q3 2016	6 months	Q1 2017
Temporary access roads	Q4 2016	3 months	Q1 2017
Intake and outlet diversions (as required)	Q3 2016	6 months	Q1 2017
Dredging (including drilling and blasting)	Q1 2017	19 months	Q4 2018
Casting and placing of concrete units	Q1 2017	21 months	Q4 2018
Breakwater construction	Q1 2017	21 months	Q4 2018
Quay piling operations	Q2 2017	23 months	Q2 2019
Quay construction and infilling	Q2 2017	31 months	Q4 2019
Ancillary accommodation and site infrastructure	Q2 2018	Over an 18 month period	Q4 2019
Harbour project complete and harbour fully operational	Q4 2019	Over a 5 month period	Q2 2020
Minor infrastructure works installed during operational phase, such as installation of water and fuel tanks etc.	Q2 2020	Up to 12 months	Q2 2021



An aerial photograph of a coastal town and harbor. The foreground shows a dense residential area with terraced houses and a large industrial facility with several large storage tanks. A harbor with a red and white ship is visible on the left. The middle ground features a mix of residential and commercial buildings. The background shows a large body of water, likely a bay or sea loch, with a green landscape and a bridge crossing a narrow channel. The text '2 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS' is overlaid in white, bold, sans-serif font in the center of the image.

2 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

An aerial photograph of a coastal area. In the foreground, a lighthouse stands on a rocky outcrop. To its right, a large green field is visible. In the background, there are several industrial buildings and a parking lot. The sea is on the left side of the image.

The purpose of EIA is to identify the potential environmental impacts from a development and then propose the means to avoid or reduce the significant impacts. This information is then presented within an Environmental Statement to assist regulators in the decision making process.

Assessments are made of the significance of an effect on a wide range of receptors, and mitigation measures are proposed to reduce any significant effects. Effects that remain after mitigation are reported as 'residual effects'.

2.1 CONSULTATION

Aberdeen Harbour Board have taken a proactive approach to consultation throughout the course of the project, beginning with the feasibility stage, the scoping exercise and the pre-application process. A summary of this consultation is presented below.

2.1.1 Feasibility study

Following completion of the pre-feasibility report, Aberdeen Harbour Board held workshops on transportation, planning and environmental considerations. The aim of these workshops was to allow consideration of the potential locations and options for development. Invitations were extended to the following statutory and non-statutory consultees:

- Aberdeen City Council
- Aberdeen City and Shire Strategic Development Planning Authority
- Scottish Natural Heritage
- Scottish Environment Protection Agency
- Marine Scotland
- Transport Scotland
- First Bus
- Stagecoach
- Network Rail
- NESTrans
- ARR Craib
- Scottish Water
- Royal Society for the Protection of Birds
- Scottish Dolphin Centre

The outputs from this phase of consultation are outlined within the Directions for Growth document produced by Aberdeen Harbour Board.

2.1.2 Scoping exercise

To determine the scope of the EIA, in 2013 Aberdeen Harbour Board produced a Scoping Report. Transport Scotland consulted the following organisations and coordinated the responses:

- Scottish Environment Protection Agency
- Marine Scotland including the Licensing and Operations and Science divisions
- Historic Environment Scotland
- Scottish Natural Heritage
- Maritime and Coastguard Agency
- Northern Lighthouse Board
- Dee District Salmon Fisheries Board
- Aberdeen City Council
- Royal Yachting Association
- Royal Society for the Protection of Birds
- The Whale and Dolphin Conservation Society (now Whale and Dolphin Conservation)

In January 2014, Transport Scotland produced a combined Scoping Opinion, which identified a range of key environmental matters to be assessed during the EIA.

2.1.3 Stakeholder engagement and regulator consultation

The key regulatory authorities were approached to discuss and agree the detail of the desk based assessments, survey design and sample analyses, modelling studies and impact assessments to be undertaken as part of the EIA. Further consultation with these organisations was ongoing throughout the development of the ES to ensure all sources were identified and incorporated.

2.1.4 Public consultation

Aberdeen Harbour Board has consulted widely with the local community, in the form of public information days, public exhibitions and a series of meetings with local Community Councils, all of which were held in Aberdeen. These events described the proposed development and gave an overview of the main environmental sensitivities. The dates and locations of the public information events are detailed in **Table 3**.

2.1.5 Data collection and surveys

To fully understand the nature and characteristics of the existing environment (physical, biological and human), Aberdeen Harbour Board commissioned a wide range of surveys, desk based studies and modelling studies.

Table 3: Public Consultation

Venue	Date
Torry Community Council	20 August 2015
Torry Community Council	15 October 2015
Cove and Altens Community Council	17 August 2015
Cove and Altens Community Council	26 October 2015
Tesco, Wellington Road	16 September 2015
Union Square Shopping Centre	17 September 2015
Tesco, Wellington Road	23 September 2015
Union Square Shopping Centre	24 September 2015



2.2 ENVIRONMENTAL IMPACT ASSESSMENT

2.2.1 Assessment parameters and 'Rochdale Envelope' approach

The appointment of contractors for the construction of the development will be concluded after the submission of the consent applications. The exact infrastructure design and construction techniques will be confirmed once a contractor has been appointed.

To ensure a robust EIA, a range of potential construction techniques and infrastructure designs have been considered, and the 'realistic worst case scenario' has been assessed for each parameter. This approach (referred to as the 'Rochdale Envelope') is well-established for large scale construction projects.

2.2.2 Assessment of environmental impacts and effects


There are three key steps to assessing environmental effects:

- Identify all potential impacts that may occur as a result of the development, and assess the likely 'magnitude' of each impact (ranging from negligible, to severe)
- Identify all of potential environmental receptors, and assess the 'value' of each receptor (ranging from negligible, to very high)
- Using an EIA matrix, combine the 'magnitude' and 'value' to determine the overall significance of each potential effect (ranging from negligible to major). Effects can be either beneficial or adverse

The level of effect significance is used to determine the mitigation that is required. Where there is the potential for moderate or major adverse effects, this is considered significant in EIA terms. So far as practicable, mitigation, including offsetting, should be identified that reduces the potential magnitude or significance of effects, or the likelihood of significant effects. Minor adverse and negligible effects would not usually require any action beyond standard good management practices.





An aerial photograph of a coastal town and harbor. The foreground shows a dense residential area with terraced houses and a large industrial complex with several large buildings and silos. A harbor with several ships is visible on the left. The background features a large body of water, likely a bay or estuary, with a bridge crossing it. The sky is blue, and the overall scene is captured from a high angle.

3 SUMMARY OF ENVIRONMENTAL EFFECTS



3.1 PHYSICAL ENVIRONMENT

3.1.1 Marine physical environment

The marine physical environment encompasses coastal and marine processes including waves, tides and tidal currents, sediment transport, suspended sediments and geomorphological processes. Construction of structures such as quays and breakwaters have the potential to influence and modify the flow of water and the characteristics of waves. This could alter coastal and seabed morphology and composition.

Nigg Bay is a high-energy coastal environment. The installation of the breakwater structures will significantly reduce wave and current activity within the bay. Temporary but significant increases in suspended sediments related to dredging and reclamation activities are also anticipated; however, due to the rocky nature of the coast south of Nigg Bay, significant changes to sediment transport are not expected.

No effects on the Nigg Bay Site of Special Scientific Interest (SSSI) are predicted. The only works that will take place within the SSSI are coastal re-profiling works along the southern coast of the bay, and stabilisation works on the beach in front of the cliffs. The presence of the breakwaters will reduce any potential erosion of the cliffs due to wave action.

To help achieve the management objectives for the SSSI, Aberdeen Harbour Board will work with Scottish Natural Heritage to agree a management programme for the SSSI, which will include including regular inspections and vegetative clearing.

3.1.2 Water and sediment quality

Water quality in the Nigg Bay area is generally good, although a number of pollutants have been detected in samples from burns and outfalls discharging into the bay or in its vicinity. Sediment quality in the bay is good, with no contaminants detected in the sediments tested above Marine Scotland Action Level 1.

Potential impacts on water and sediment quality during construction of the development include dredging works in the harbour basin and access channel, and disposal of the dredged sediment. During the operational phase of the development, elements such as the physical presence of the harbour, maintenance dredging, vessel and harbour operations, and the discharge of existing outfalls within the harbour may also affect water and sediment quality.

Of all the effects assessed, only the effects arising from potential releases or spills of contaminants were identified as having a potentially significant effect. An Environmental Management Plan (EMP) will be produced, which will set out the mitigation measures including the storing of materials in suitably designed containers, training staff in the appropriate disposal of chemicals, and development of a Spill Contingency Plan.

3.1.3 Flood risk and surface water

The development is unlikely to lead to significant effects on surface water or groundwater flood risk, or flood risk from artificial sources or foul drainage.

In the case of tidal and fluvial flood risk, the hydraulic modelling predicted a beneficial effect due to the presence of the breakwaters, which would reduce the extreme flood levels within the harbour. The proposed breakwaters would provide protection against extreme wave heights, thereby reducing flood risk.

3.1.4 Ground conditions and contamination

A desk based assessment was carried out to establish the potential for significant ground contamination at the site, and to assess the potential effects on human health and the environment.

The assessment identified that the majority of construction and operational activities would have a negligible effect on ground conditions and contamination.

The following activities may give rise to minor to moderate effects without mitigation:

- The possibility of dust being generated on windy days from exposed soils and stockpiled construction waste, which could lead to members of the public being temporarily exposed to contamination via the inhalation of contaminated dust
- Potential for spills or leakages of polluting substances, chemicals and other materials, which could impact upon the underlying soils and water receptors

To mitigate for these potential effects, the Environmental Management Plan (EMP) will include measures to minimise the exposure of workers and the public to potentially harmful substances. The EMP would also include measures on the use of suitable tanks and bunded areas for fuels, oils and chemicals, as well as procedures for management of materials, spillages and clean ups, and methods of dust suppression. These mitigation measures will minimise the potential for contamination of the underlying soils, water receptors and environment. The Scottish Environment Protection Agency's Pollution Prevention Guidelines will be adhered to.





3.2 BIOLOGICAL ENVIRONMENT

3.2.1 Nature conservation

There are a number of nature conservation sites surrounding the development that are designated under national and international legislation, as shown in **Figure 5**. Examples include the River Dee and Moray Firth Special Areas of Conservation (SAC), the Fowlsheugh Special Protection Area (SPA), the Montrose Basin RAMSAR site, the Nigg Bay Site of Special Scientific Interest (SSSI) and the Donmouth Local Nature Reserve (LNR).

Potential effects on designated sites have been assessed within the relevant technical chapters of the Environmental Statement, including possible cumulative effects with other projects. Sites which are designated under European Directives and international agreements, such as SACs and SPAs, have been considered within the Habitats Regulations Appraisal (HRA). The HRA concluded that there would be no likely significant effects on any protected habitats or species.

3.2.2 Terrestrial ecology

A number of ecological surveys were undertaken including breeding and wintering birds surveys, otter surveys and national vegetation classification surveys.

The assessment of potential effects on terrestrial ecology found that there could be minor adverse effects arising during the construction and operation of the development, including the loss of habitat from clearance of scrubland, habitat fragmentation/ degradation, loss of bird breeding habitats and disturbance to otters. Additionally, parts of the Balnagask to Cove Local Nature Conservation Site (LNCS) would be lost, as well as some amenity grasslands. Three protected plant species were identified as being potentially subject to major adverse effects at the site: curved sedge, oyster plant and sea pea.

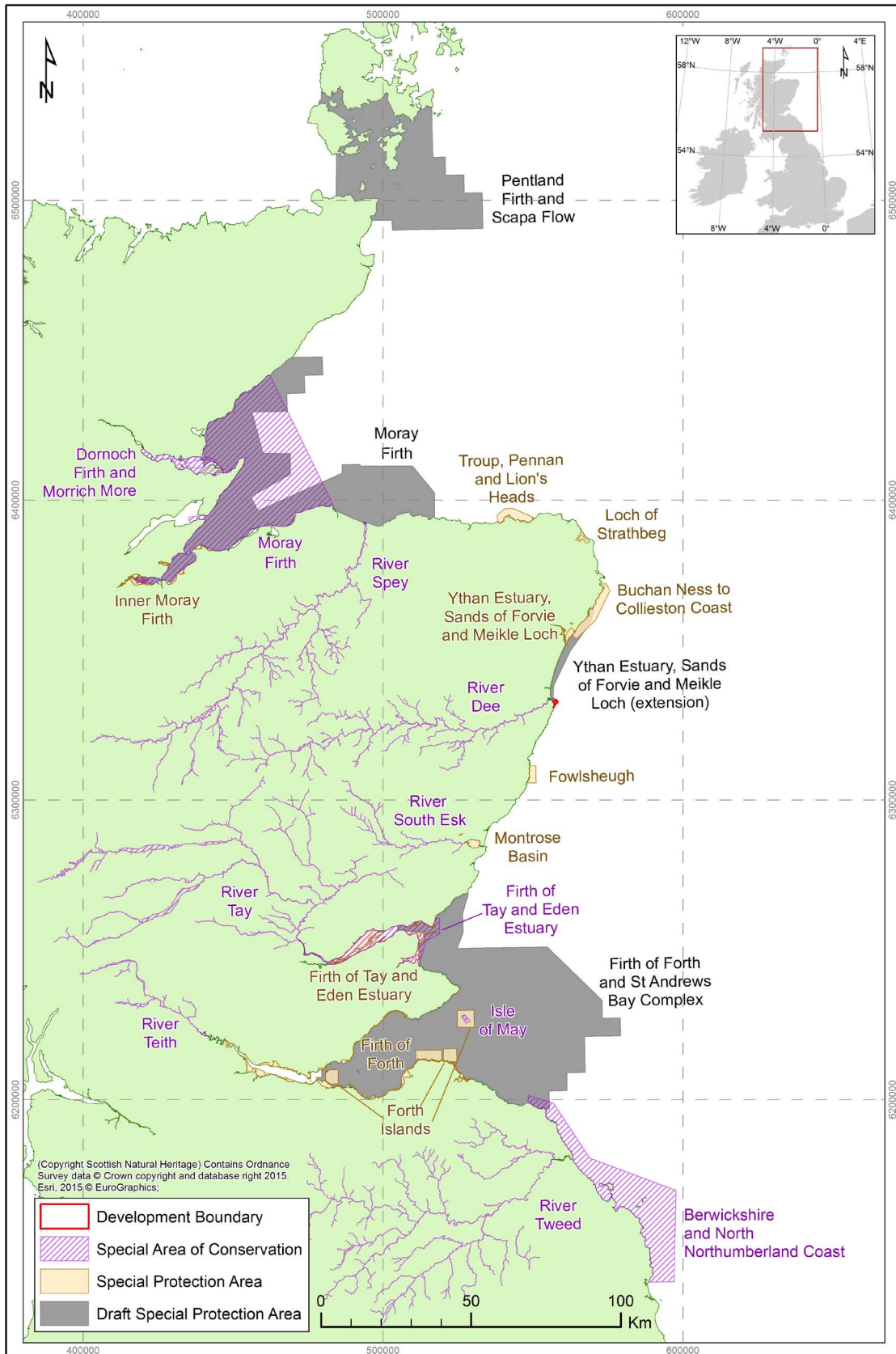
A series of mitigation measures are recommended during construction and operation activities. These include the development of an EMP, a Habitat Creation and Management Plan, an Otter Protection Plan, and adherence to Pollution Prevention Guidelines. Additional surveys for bats, otters and rare plants will be undertaken before construction commences.

Specific mitigation measures include:

- Translocation of seedbanks of valuable habitats, if habitat loss cannot be avoided
- Creation of new habitats through soft landscaping, including the replacement of trees and shrubs
- Limiting vegetation clearance to outside the bird breeding season
- Creating new feeding and nesting opportunities for birds (where possible)
- Marking and mapping out of working corridors to ensure that plant species are conserved

An Environmental Clerk of Works would be responsible for ensuring compliance with all mitigation measures. Subject to the adherence of mitigation measures it is considered that there would be a negligible effect on terrestrial ecology.

Figure 5: Nature conservation designations



3.2.3 Benthic ecology

Site-specific surveys were carried out including habitat mapping between the tides on foot, and remote sampling of the subtidal seabed from a small vessel. Recent data from survey work undertaken by Marine Scotland was also reviewed.

The headland areas in Nigg Bay are dominated by rock and much of the central area by mobile sand, with barren coarse shingle strips. Lichen habitats were found on rock in areas high on the shore, and the mid-shore rock is populated by barnacles, limpets and snails as well as some bladder wrack in more sheltered areas. Small shallow rock pools provide a home for red encrusting coralline alga.

The subtidal area is largely dominated by fine sand habitats, which are poor in both species and numbers of individuals, and characterised by catworms and other bristle worms.

The significance of the effects on benthic ecology during the construction and operation of the proposed development are considered to be negligible or minor adverse. The exception was the permanent loss of seabed habitat which was assessed as being of minor to major adverse significance. A total of thirteen species and habitats of conservation interest were considered to experience moderate adverse effects from the development.

Adherence to an EMP, as well as pollution prevention and contingency plans, were considered to reduce the likelihood of introducing marine invasive non-native species.

3.2.4 Fish and shellfish ecology

A baseline of marine fish and shellfish ecological conditions was established through desk based studies and site specific surveys using a small beam trawl. Information was also gathered from a review of commercial fisheries data provided by Marine Scotland.

Marine fish in the vicinity of Nigg Bay are characterised by several members of the cod family, flatfish and elasmobranchs including cod, haddock, whiting, plaice and dab, as shown on **Table 4**. These species tend to be seasonal residents, which gather within Nigg Bay and along adjacent coastal areas as juveniles during spring and summer, and then gradually move offshore as they mature and grow. Other permanent resident fish within Nigg Bay include sand goby, blennies and dragonets, together with crabs and whelks. Brown crabs inhabit local rocky substrata and are commercially fished. Brown shrimp occupy areas of sandy seabed within the outer bay. Sandeel were observed both within and outside Nigg Bay during the site-specific survey.

Migratory species such as Atlantic salmon, sea trout, lamprey and eel are present within Nigg Bay and the wider area, particularly during migration to and from Scotland's east coast rivers, the closest being the River Dee. Atlantic salmon and other salmonids such as sea trout are host to important fresh water pearl mussels found in the River Dee.

The coastal area surrounding Nigg Bay is regarded as a fish spawning and nursery area for various fish species including herring, sandeel, cod and whiting and is part of a much wider fish habitat across the region.

In general, impacts of the harbour construction and operation on fish and shellfish are predicted to be localised and temporary, and are not anticipated to have any significant adverse effects at the population level. No significant adverse effects on sandeel populations across the region are predicted, and no negative consequences for bird and marine mammal feeding are expected.

The use of impact piling during the construction phase will introduce underwater noise at levels which, in the absence of any mitigation, are predicted to have a moderate adverse impact on Atlantic salmon, including avoidance and alteration of migration behaviour. Noise from impact piling activity could cause a temporary barrier to the migration of salmon entering or emerging from the River Dee.

Proposed measures to mitigate the impacts of piling include restricting the use of impact piling at night time during periods of peak sensitivity for emerging salmon smolts between April and July. The residual effects of the development, with mitigation measures in place, would be of negligible to minor adverse significance. Detailed mitigation measures will be discussed and agreed with the regulatory authorities and incorporated within the EMP.

Table 4: Spawning activity for fish and shellfish species in the region of the study area

Scientific Name	Common Name	Seasonal Spawning Activity											
		J	F	M	A	M	J	J	A	S	O	N	D
Teleost													
Ammodytidae	Sandeel												
Callionymus lyra	Common dragonet												
Clupea harengus	Herring												
Gadus morhua	Cod												
Lophius piscatorius	Monkfish												
Merlangius merlangus	Whiting												
Microstomus kitt	Lemon sole												
Molva molva	Ling												
Pleuronectes platessa	Plaice												
Pollachius virens	Saithe												
Pomatoschistus minutus	Sand goby												
Scomber scombrus	Mackerel												
Sprattus sprattus	Sprat												
Elasmobranchs													
Raja clavata	Thornback ray												
Scyliorhinus canicula	Small-spotted catshark												
Galeorhinus galeus	Tope	Viviparous species (can be found gravid year round)											
Squalus acanthias	Spurdog	Viviparous species (can be found gravid year round)											
Shellfish													
Cancer pagurus	Brown crab												
Hommarus gammarus	European lobster												
Nephrops norvegicus	Norway lobster												
Pecten maximus	King scallop												

KEY

Spawning
 Peak Spawning
 Hatching

3.2.5 Marine ornithology

A twelve-month land-based survey was carried out to assess the usage of Nigg Bay by marine birds. A total of four vantage points were used, two on each of the headlands either side of the bay, as shown on **Figure 6**. This data was supplemented by walkover surveys and desktop data to understand the presence of bird species over a wider area.

The survey concentrated on the species of birds known to form sizable flocks in the area, both for feeding and resting, including sea ducks such as common eider and common scoter as well as other marine species such as red-throated diver. Other species of bird commonly identified during the surveys included tern, gull and auk species.

The following impacts were assessed:

- Disturbance due to construction traffic, including dredgers
- Disturbance due to construction activities, including drilling, piling, rock placement and general construction of breakwaters and harbour infrastructure

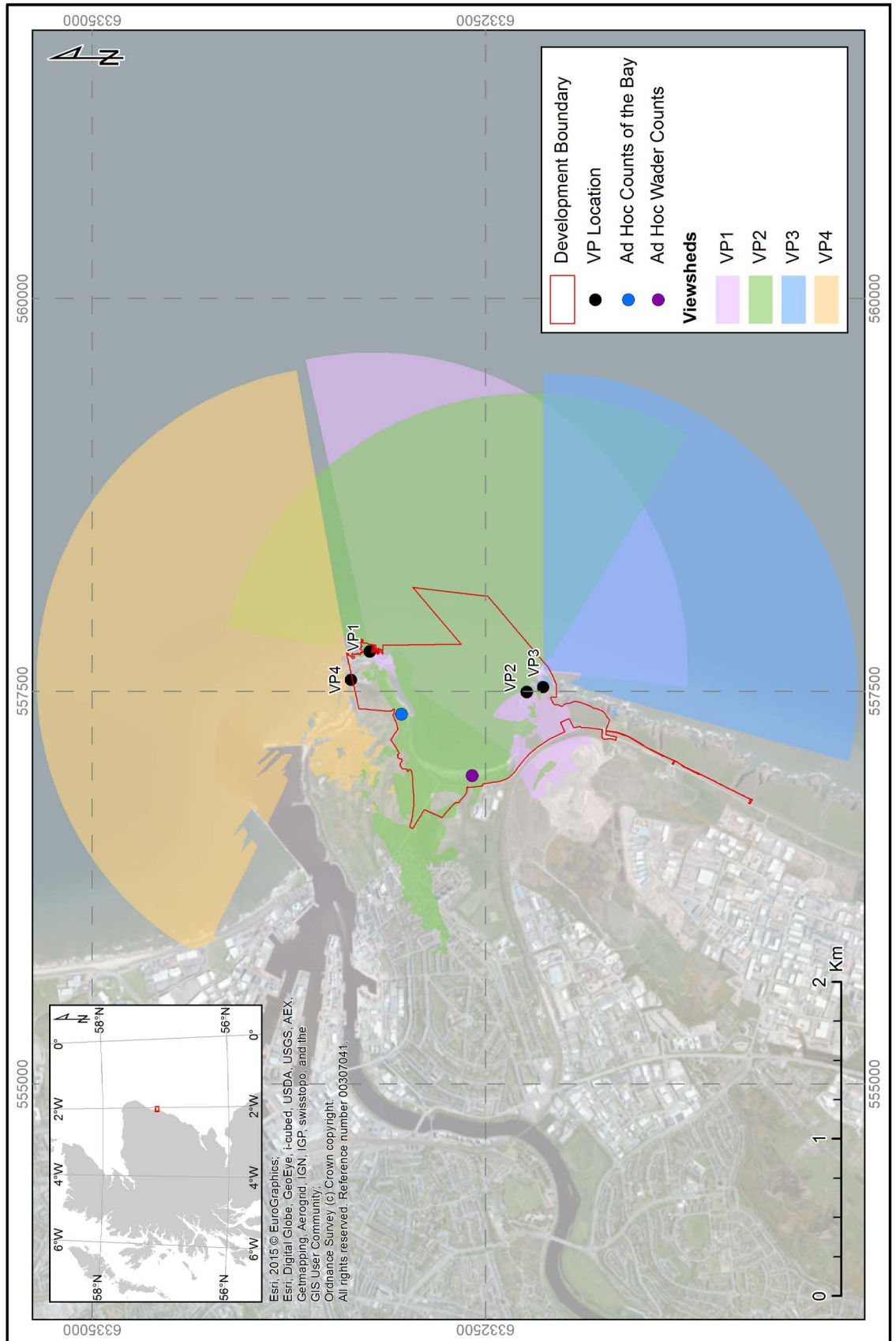
During the operational phase of the development there will be permanent habitat loss from the dredging of the seabed within the bay, and potential disturbance and displacement of birds due to vessel traffic, although this is an area that is already subject to regular vessel movements.

The development is likely to cause permanent displacement of a number of species although, as evidenced by the existing harbour, some species will become habituated to disturbance. The birds that may be displaced are present along a much wider area of the coastline. Whilst there will be local displacement from the development area, any changes to the regional marine bird species will be temporary and within natural population fluctuations.

In general, the effects on birds have been judged to be of negligible or minor adverse significance. In order to further protect birds, a Pollution Prevention Plan will be developed and incorporated into the EMP.



Figure 6: Extent of the vantage point (VP) surveys (VP1 and VP2 specifically for birds)



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3.2.6 Marine mammals

To establish a baseline of marine mammals in the vicinity of the development, a desktop study was undertaken, together with twelve months of land-based vantage point surveys at four locations around the development area (as shown on **Figure 6**). Twelve months of Passive Acoustic Monitoring (PAM) data was also collected to monitor the presence of marine mammals in the wider area, specifically cetaceans. The PAM devices detect the click noises made by cetaceans, and provide information on their presence within an area. Two PAM devices were deployed in Nigg Bay.

The assessment focused on the following species due to their likely presence within the study area:

- Bottlenose dolphin
- Harbour porpoise
- White-beaked dolphin
- Minke whale
- Risso's dolphin
- Grey seal
- Harbour seal

Table 5 summarises the activity of each of these species month by month.






A range of potential effects on marine mammals have been considered in the assessment. These include noise from construction activities such as drilling, blasting, rock dredging and piling; collision with vessels; and disturbance effects. Whilst the majority of effects on marine mammals were considered to be of minor adverse significance, such as collisions with vessels and changes in suspended sediment concentration, some impacts were predicted to give rise to moderate or major significant effects. These typically relate to effects arising from underwater noise. Although the range of impact is small, major adverse effects are predicted to occur during blasting operations.

To reduce the moderate and major adverse effects, a range of mitigation measures are proposed. These include the development of a Marine Mammal Protection Plan within the EMP. Specific mitigation measures include:

- A restriction on impact piling at night-time
- Use of 'soft-start' procedures for impact piling activities
- Adherence to the JNCC guidelines for piling and blasting activities, including the use of trained marine mammal observers to survey the area for marine mammals prior to certain construction operations commencing
- Investigate the feasibility and practicality of using acoustic barriers, such as bubble curtains, during impact piling activities to absorb significant proportions of the sound emissions

Table 5: Marine mammal species identified and their monthly importance

Species	Usage	Monthly importance											
		J	F	M	A	M	J	J	A	S	O	N	D
Cetaceans													
Harbour porpoise	Resident/regular	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate
Bottlenose dolphin	Resident/regular	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate-High	Moderate	Moderate	Moderate
White beaked dolphin	Seasonal	Likely to be absent	Likely to be absent	Likely to be absent	Lower	Lower	Moderate-High	Moderate-High	Moderate-High	Moderate	Lower	Lower	Moderate
Risso's dolphin	Occasional/Seasonal	Lower	Lower	Lower	Lower	Lower	Moderate	Moderate	Moderate	Moderate	Lower	Lower	Likely to be absent
White-sided dolphin	Occasional	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Moderate	Moderate	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Minke whale	Seasonal	Likely to be absent	Lower	Lower	Lower	Moderate	Moderate-High	Moderate-High	Moderate-High	Moderate	Lower	Lower	Lower
Killer whale	Rare	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Long-finned pilot whale	Rare/Occasional	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Fin whale	Rare	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Humpback whale	Rare	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Sperm whale	Rare	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent	Likely to be absent
Pinnipeds													
Grey seal	Resident/regular	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Harbour seal	Resident/regular	Moderate-High	Moderate-High	Moderate-High	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate-High	Moderate-High

KEY		Likely to be absent		Moderate Importance		Moderate-High Importance (Peak Months)
		Likely to be absent although rare records exist		Lower Importance		

3.3 HUMAN ENVIRONMENT

3.3.1 Socio-economics and recreation

An assessment has been made of the potential socio-economic effects. Over a 20-year period, the development is estimated to generate £383 million Gross Value Added (GVA) per year for the Scottish economy, of which £354 million is estimated to be retained within the Aberdeen City and Shire region. The development is also predicted to support an additional 3,020 jobs, of which 2,470 could be in the Aberdeen City and Shire area/region.

The construction phase is estimated to generate approximately £74 million GVA for the Scottish economy, with £11 million generated in the local area. It is estimated to support 1,215 'man years' of construction-related employment in Scotland, of which 175 could be in Aberdeen City and Shire. During the operational phase, over a 20-year period, the development could contribute a total of £5.3 billion additional GVA to the Scottish economy, with almost £5 billion retained within the Aberdeen City and Shire.

The proposed development will accommodate cruise ships and other larger vessels that cannot use the existing harbour. Up to 33 cruise ships would visit each year, and this is predicted to generate approximately £4.4 million per year across Scotland, with approximately £3.9 million of this predicted to remain in the Aberdeen City and Shire region.

It will be necessary to temporarily, and in some areas permanently, divert parts of the core path network. However, a continuous path will remain open at all times.

Nigg Bay is one of many locations in the area to watch wildlife. During construction and operation of the development, the opportunities to watch wildlife from within Nigg Bay itself will be limited. The Girdle Ness and Greg Ness headlands, which provide better vantage points for wildlife watching in the area, would be unaffected during the operational phase.

Marine recreational users of the bay would no longer be able to do so due to the presence of the harbour. Due to the close proximity of nearby alternative sites, coupled with the relatively low usage of Nigg Bay, a negligible effect is predicted on marine recreational users.

3.3.2 Seascape, landscape and visual effects

The seascape, landscape and visual impact assessment has considered the potential effects arising from the development on the character and visual amenity of the surrounding area. The sites selected for assessment and the compilation of photomontages were agreed in consultation with Scottish Natural Heritage. These locations offer representative views of the proposed development, and an example is provided in **Figure 7**.

The development is a major infrastructure development and, as such, will inevitably alter the characteristics of the area in which it is located. Given its orientation and scale there are considered to be limited opportunities for effective soft landscape screening.

During the construction phase, a number of significant permanent and temporary adverse effects are predicted on the local seascape and landscape character and on visual amenity. These include fixed and mobile construction plant such as cranes and excavators, site clearance and preparation works, and safety lighting. Similarly, during the operation phase, significant permanent adverse effects are predicted resulting from the breakwaters to the north and south of the bay, vessels entering, docking and exiting the harbour, and areas of hard standing quays. An example photomontage is provided in **Figure 8**. Due to natural screening by the surrounding landscape, the development will not obstruct views of the city centre's townscape or landmarks.

The operation of the development will significantly affect recreational users of the local area, particularly the coastal path network around the site. These effects, however, would be for short stretches of the overall route, and are not considered likely to erode the character or function of the Green Space Network within this particular area of Aberdeen.

It is unlikely that mitigation measures would significantly reduce any adverse effects arising from the development. During construction, careful siting of plant and machinery would avoid any unnecessary intrusion. Screening with vegetation is not likely to be an effective measure to reduce any adverse visual effects. Temporary working areas would be reinstated and replanted; however, it is anticipated that such measures would not change the pre-mitigation assessment of effects.

Figure 8: Photomontage from the SLVIA taken from St Fittick's Road



3.3.3 Traffic and transport

A comprehensive Transport Assessment has been carried out, in consultation with Aberdeen City Council. Four road links were identified as the basis for the traffic and transport assessment:

- Coast Road/ Main Site Access
- Coast Road/ St. Fittick's Road/ Greyhope Road
- Vitoria Road/ St. Fittick's Road
- Coast Road/ Hareness Road

During construction, the designated route for Heavy Goods Vehicles (HGVs) to and from the site would be south along Coast Road and Hareness Road, through the Altens Industrial Estate, and onto Wellington Road. The Coast Road has sufficient capacity to absorb the predicted increase in traffic levels, which are estimated at an additional 436 HGV journeys per day during the peak construction period. Minor adverse effects are predicted on traffic during the construction period.

As no construction traffic would travel along St Fittick's Road through Torry and Balnagask there will be negligible effects on cyclists and pedestrians along this route (Core Path 104). However, to allow construction vehicles to access the northern breakwater it will be necessary to partially close Greyhope Road on a temporary basis, between Coast Road and Girdleness Lighthouse. This route would be opened following construction. Cyclists using National Cycle Network (NCN) Route 1 will be diverted via St Fittick's Road. Access to the lighthouse and other car parks, such as the one at Greyhope Bay, would remain accessible via Greyhope Road on the northern side of the Girdle Ness headland.

During the operational phase, HGVs would continue to be routed via the Coast Road, which has sufficient capacity to accommodate the predicted increases in traffic flows.

A Construction Traffic Management Plan is proposed which would give details of the mitigation measures to assist in the control of traffic, and ensure that control procedures are enforced.

3.3.4 Air quality

The construction and operation of the development has the potential to affect local air quality, for example:

- Dust from earthworks during construction
- Increased release of pollutants such as Nitrogen Dioxide (NO₂) due to changes to traffic flows along the local road network
- Emissions from ships using the harbour and any cargo handling equipment such as forklifts or tankers

The site is considered to be a medium risk site for dust effects and therefore mitigation measures will be required. An EMP will be implemented to minimise the release of dust entering the atmosphere and being deposited on nearby receptors. The EMP would include measures such as dampening of surfaces during dry weather, restricting drop heights on to lorries and other plant, and ensuring a road sweeper is used to clean mud and other debris from roads and footpaths.

Construction vehicles and plant operating at the development have the potential to increase local pollutant concentrations, particularly Nitrogen Dioxide (NO₂) and particulate matter (PM₁₀). It is predicted that there would be a minor adverse effect on local air quality during the construction period. The assessment identified that any emissions from equipment and machinery operating on the development site during these works would be relatively small.

Comparison of baseline levels of pollutants at a number of sensitive receptor sites indicates that there would be negligible effect on concentrations of pollutants such as NO₂ and PM₁₀, during the operational phase of the development.

Aside from emissions from additional road traffic, the development will also include potential sources of air pollution from vessels using the harbour and cargo handling equipment. Vessels which are cruising, manoeuvring or berthed in the harbour will have different energy consumptions and thus varying emissions patterns. Cargo handling equipment includes mobile cranes, tankers and forklifts. Such emissions are considered unlikely to significantly affect nearby residents due to the predominant prevailing wind conditions at the site and the distance from the site.

Measures to control construction traffic would be detailed in the Construction Traffic Management Plan. The most effective mitigation measure is to ensure that construction traffic does not pass along sensitive roads such as residential streets.

3.3.5 Terrestrial noise and vibration

A desk based study was carried out, in conjunction with a walkover survey, which identified 'sensitive receptors' for noise and vibration. Whilst no sensitive receptors adjacent to the site were identified, three were identified nearby which had the potential to be affected by the construction and operation of the development. These were:

- Doonies Rare Breeds Farm, Coast Road;
- Residential dwellings at Girdleness Lighthouse, Greyhope Road; and
- Balnagask residential area, St. Fittick's Road.

Differing 'worst case scenarios' were assessed for the construction and operation phases of the project at different times of the day.

Due to the distance between the site and Doonies Rare Breeds Farm it is considered that there would be negligible noise and vibration effects arising from construction activities at all times. At the residential dwellings at Girdleness Lighthouse and Greyhope Road, effects range from negligible to major adverse during daytime, increasing to major at night, whilst at Balnagask residential area, minor to major effects are predicted at night time, with negligible to minor effects predicted at other times. Activities predicted to give rise to major adverse effects include construction of the breakwaters.

During the operational phase of the development, fixed plant is predicted to generate moderate adverse effects on all the sensitive receptors at night time, with the residential dwellings at Girdleness Lighthouse and Balnagask residential area considered to experience minor adverse effects during daytime.

When assessing possible effects of operational noise, two scenarios were considered; a worst case scenario where the source of the noise is as close to the sensitive receptor as possible within the site boundary; and a more typical operating scenario for the development.

The levels of impact vary depending on the time of day or night. The severity of the effects ranges from negligible to major adverse, with activities such as operation of cranes and other machine plant considered to lead to the greatest adverse effects. As a result of these predictions, mitigation measures are recommended.

A Traffic Management Plan would seek to minimise temporary and intermittent adverse impacts that may arise from construction traffic. Additional mitigation measures include a restriction on impact piling activities at night time, siting of noisy equipment such as generators away from sensitive receptors wherever possible, and use of noise control methods such as barriers, enclosures or silencers where practical. Whilst these mitigation measures are considered likely to reduce the significance of some of the predicted effects, some residual effects are likely to remain after mitigation.



3.3.6 Shipping and navigation

A desk-based assessment of shipping activity analysed four months of seasonal Automatic Identification System (AIS) data, which identified vessel types, numbers and sizes in the vicinity of Nigg Bay.

The majority of shipping and navigational activities in the vicinity of Nigg Bay were found to occur during summer months from vessels associated with the offshore industry. Little vessel activity was recorded within Nigg Bay itself, with the majority occurring during the summer months. Recreational vessels were also identified within the survey area, with the majority occurring in the summer.

A maritime incident report indicated that an average of 0.98 incidents occurred per 1,000 vessel movements within the existing harbour. The most frequently occurring incidents relate to berthing.

Future shipping levels were modelled to assess the collision risk during the operational phase of the development. It was estimated that an incident would occur once every 59 years per vessel, based on the projected future traffic. Expansion of the Vessel Traffic Service (VTS) coverage, already in operation at Aberdeen Harbour, is expected to further reduce any potential risk.

The types of risks identified for both the construction and operational phases of the development are similar in nature, except that during the construction phase, additional risks would apply to due to increased numbers of vessels and potential underwater obstructions such as partially completed breakwaters and quaysides.

A variety of mitigation measures are recommended to minimise effects on shipping and navigation:

- Advanced warning of vessel presence and movements in the area, such as Notice to Mariners and/or radio warnings;
- Appointment of dedicated Construction Marine Coordinator to liaise with VTS;
- Processes for direct liaison between VTS and any marine contractors (planned vessel movements);
- Compliance with Aberdeen Harbour Board procedures and byelaws; and
- Liaison with local commercial fishermen.

The implementation of these mitigation measures would reduce the probability of incidents occurring to a level at which no significant effects on the safety of shipping and navigation were predicted, during either the construction or operational phases of the development.

Cumulative impacts arising from the development and other projects were considered, specifically the Peterhead Harbour expansion and a number of offshore wind farms. Likely impacts include an increased number of vessels with the potential to cause a corresponding increase in the risk of collisions between construction vessels. It is considered that the cumulative effects would be negligible.

3.3.7 Commercial fishing

A baseline of commercial fishing activity within Nigg Bay and the surrounding area has been undertaken, using publically available fisheries data and consultation with fishermen's organisations and direct with local fishermen.

Crab and lobster are consistently the two most valuable catches, with scallop and squid more variable year to year. There has been a general trend of increased landings by weight and value over the last 5 years. However, within the variance between years this is not a significant trend.

Vessel Monitoring System (VMS) data and digitised information collected by ScotMap were gathered to understand spatial trends. VMS data showed that Nigg Bay is of no particular significance for commercial fishing; however, ScotMap data indicates an importance for smaller lobster and crab pots. This data correlates well with local consultation which identified Nigg Bay as of local importance for fishermen targeting crab and especially lobster.

Nigg Bay is of importance to local creel fishing which targets rocky outcrops along the coast to the south of Aberdeen, and minor adverse effects are predicted on these fishermen. The effects on other fishing activity are considered to be negligible. In terms of regional and national importance, the development area is considered to be of negligible importance and the displaced effort sufficiently low as to be absorbed within that of the wider area, where significant year to year variation is seen.

3.3.8 Other users

Consideration has been given to the potential for 'other users' in the area, including oil and gas activities, marine renewable developments, sea disposal operations and military activities, to be affected by the development. There are relatively few other industries operating within the development area that have the potential to interact with or be impacted upon.

There are considered to be no adverse effects on other users of the area as a result of the development. There is limited or no overlap between the development and the infrastructure or operation of these other industries. Throughout the project there will be ongoing consultation and engagement to ensure that other users are kept informed of the progress of the development.

3.3.9 Archaeology and cultural heritage

A desk based study and assessment of site-specific geophysical and geotechnical survey data was carried out to identify potential archaeological and cultural heritage assets that may be affected by the development. This included historical assets such as St. Fittick's Church and the Girdleness Lighthouse, as well as the potential for submerged artefacts, wrecks and other coastal remains in the marine environment.

The assessment considered physical impacts on assets during the construction of the quaysides and breakwaters, and impacts on the setting of heritage assets. Although a number of terrestrial historical assets were identified, the assessment concluded that the majority of these will not be directly impacted by the development. An undesignated historical slipway was identified in the northern section of the site, which will be permanently buried during construction of the harbour. A number of potential unknown buried archaeological assets were identified. Any negative effects on these would be permanent.

In terms of effects on setting, the majority of historical assets are not considered to be affected due to natural screening by the surrounding landscape. Minor adverse effects are predicted on the setting of Girdleness Lighthouse and major adverse effects are predicted on the setting of St. Fittick's Church.

To reduce the predicted effects a range of mitigation measures are proposed. These include the avoidance, where possible, of any historical assets. In cases where avoidance is not possible, however, such as the undesignated historical slipway, the establishment and adherence to a Written Scheme of Investigation will allow such features to be surveyed and recorded in situ. Screening around the landward periphery of the site may assist in reducing effects on the setting of St. Fittick's Church, however, it is recognised that this is unlikely to significantly reduce the predicted effects.

3.3.10 Summary of the Habitats Regulations Appraisal (HRA)

An appraisal of the predicted effects of the proposed development on European protected sites has been undertaken. The HRA process considered the potential for the development to have a 'Likely Significant Effect' on designated sites, either alone or in combination with other plans or projects.

A total of six Special Areas of Conservation and one draft Special Area of Conservation were considered as part of the appraisal. Potential effects include increased levels of underwater noise from piling activities, loss of seabed due to the construction of the breakwater structures, and disturbance effects. It is concluded that for the Special Areas of Conservation considered in the appraisal there would be no adverse effect on site integrity for any of the qualifying interests of those sites.

A total of eleven Special Protection Areas and four draft Special Protection Areas were considered as part of the appraisal. Examples of the likely impacts arising from the development, and their effects on protected sites, include:

- Disturbance effects
- Permanent loss of habitat and feeding grounds resulting from the construction of the breakwaters
- Changes in prey availability

It is concluded that for Special Protection Areas considered in the appraisal there would be no adverse effect on site integrity for any of the qualifying interests of those sites.

As part of the appraisal the potential for cumulative and in combination effects arising from the development and other plans or projects was considered. It was concluded that there would be no cumulative or in combination effects which would give rise to an adverse effect on site integrity.

3.3.11 Mitigation measures and monitoring

The Environmental Statement contains an outline Environmental Management Plan (EMP) to guide Aberdeen Harbour Board and their contractors during the construction and operational phases of the development, and to ensure that the commitments to mitigation, management and monitoring are adhered to.

A Construction Environment Management Plan (CEMP) and an Operational Environment Management Plan (OEMP) will be part of the overarching EMP. The CEMP will be submitted to the relevant regulators for approval prior to construction commencing and the OEMP will be submitted for approval prior to completion of the construction works. The plans will be 'live' documents and will be updated periodically to manage change.

Prior to commencement of construction, AHB will appoint an Environmental Clerk of Works (ECoW) who will be on site during construction activities to monitor compliance with the CEMP and have the authority to halt works if necessary.

The CEMP will include:

- Marine Non-native Invasive Species Plan
- Pollution Prevention Plan
- Written Scheme of Investigation Protocol for Archaeological Discovery
- Marine Mammal Protection Programme
- Vessel Management Plan
- Otter Protection Plan
- Piling Management Protocol
- Noise and Vibration Management Plan
- Fish Species Protection Plan
- Habitat Management Plan
- Traffic Management Plan
- Transport Management Plan
- Waste Management Plan

The OEMP will include:

- Marine Non-native Invasive Species Plan
- Marine Mammal Protection Plan
- Pollution Prevention Plan
- Waste Management Plan


The final structure and content of the EMP will be developed during the detailed design stage of the development.





An aerial photograph of a coastal town and harbor. The town features a mix of residential buildings, including terraced houses and larger apartment blocks, and industrial areas with warehouses and storage tanks. A harbor is visible on the left with several ships docked. The town is bordered by a large body of water on the right and a green, hilly landscape on the left. The text '4 SUMMARY' is overlaid in the center in a large, white, sans-serif font. There are also several large, semi-transparent blue circles overlaid on the image, primarily in the upper left and lower left areas.

4 SUMMARY

An aerial photograph of Aberdeen, Scotland, showing the city built on a hillside overlooking the sea. The Aberdeen Harbour is visible, filled with numerous ships and boats. In the foreground, there are green fields and a road. The image is split vertically, with the left side being a darker, more shadowed view of the same scene.

Aberdeen Harbour Board are proposing the development of a new harbour at Nigg Bay which would represent an expansion to the existing Aberdeen Harbour, providing increased shipping capacity and the capability to accommodate larger vessels. The expansion of Aberdeen Harbour has been identified as a 'national development' by the Scottish Government in the National Planning Framework 3, which recognises the requirement for the expansion of the harbour to address its capacity constraints.

An independent Environmental Impact Assessment (EIA) has been undertaken to identify the potential for the development to cause significant effects on a range of physical, biological and human receptors, and the results are presented in the Environmental Statement which accompanies the consent applications. Where the EIA has identified significant adverse effects on the environment, mitigation measures are proposed to reduce the significance of the effects. An Outline Environmental Management Plan has been produced, which summarises the mitigation measures proposed during construction and operation of the development. Detailed mitigation measures will be agreed with the regulatory authorities before construction commences.



