Peterhead - Smith Quay Extension

European Protected Species Risk Assessment

Peterhead Port Authority

Date: 25 November 2025

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Rev.no.	Date	Description	Prepared by	Verified by	Approved by
01	04 Jul 2025	First Release	MERO	JUSU	ACW
02	25 Nov 2025	Updates following consultation	IGP	AATH	ACW

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1 Introduction

1.1.1 This European Protected Species (EPS) Risk Assessment has been prepared by NIRAS Group UK Ltd on behalf of Peterhead Port Authority (PPA). The document aims to assess the risk of potential impacts of planned construction works on EPS.

1.1.2 This EPS Risk Assessment considers the available Marine Directorate guidance on the protection of marine EPS from injury and disturbance for Scottish inshore waters (Marine Scotland, 2020). Following Environment Impact Assessment (EIA) screening consultation, NatureScot advised that an EPS licence should be considered for minke whale and bottlenose dolphin, particularly relating to underwater noise generated from construction activities.

1.1.3 Smith Quay is a 120 m long suspended deck quay with a separate berthing dolphin at its western end and reclamation behind the quay. It is a westward extension of the existing outer harbour quays at Peterhead. PPA now proposes an up to 85 m extension to the western end of the quay. The Port is used by many industries, such as the pelagic fishing sector, renewable energy, oil and gas decommissioning, subsea construction and maintenance industry, and ship repair facilities. The proposed extension will provide vital additional berthing capacity and deck space with adjacent laydown area for this busy port. A number of alternatives were considered including the construction of a new quay and extensions to other facilities; however, these were deemed to be unviable.

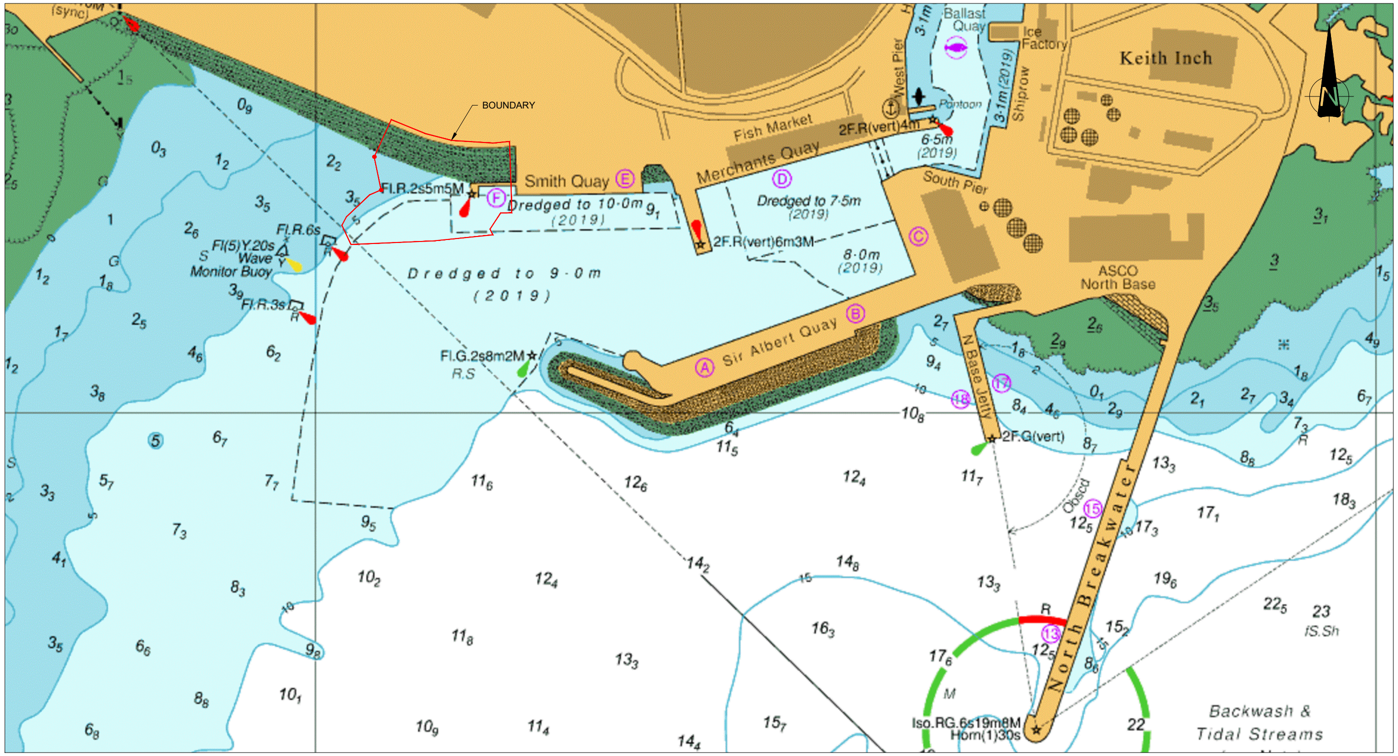
2 Proposed Works

2.1 Introduction

2.1.1 PPA propose an up to 85 m extension to the western end of the existing 120 m long Smith Quay (Figure 2.1). The works planned for this extension include:

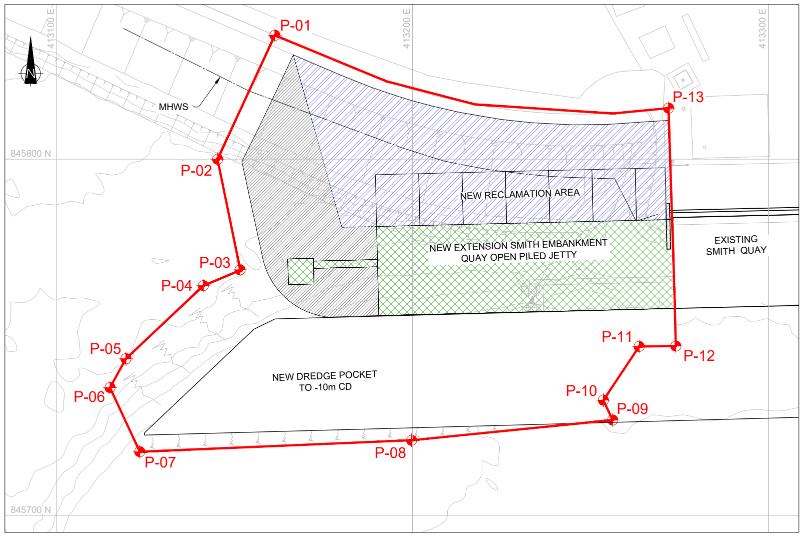
- Demolition of the concrete deck of an existing berthing dolphin, with the dolphin's supporting tubular steel piles cut-off at bed level and removed;
- Partial demolition of a concrete wing wall at the west end of the existing quay;
- Removal and re-use of revetment rock armour adjacent to the west end of the existing quay;
- Quay extension comprising a concrete deck supported on tubular steel piles;
- Rock revetment beneath the quay extension;
- New mooring dolphin comprising a concrete deck supported on tubular steel piles;
- New/repurposed steel access bridge spanning between quay extension and new dolphin;
- Deck furniture;
- Area of reclamation;
- Capital dredging to enlarge the existing berth pocket.

2.1.2 These works are detailed below. The approximate 67 week construction programme with an anticipated construction start date of March 2026, and completion in August 2027 is further detailed in Section 2.7. The final schedule is subject to receipt of necessary approvals.



GENERAL PLAN; SCALE 1:2500

0 50 100 150 200m 250m



LOCATION PLAN; SCALE 1:750

0 10 20 30 40 50 60 70 75m

COORDINATES POINTS - WGS84		
Point No.	Longitude	Latitude
P-01	001° 46.922' W	57° 30.152' N
P-02	001° 46.939' W	57° 30.133' N
P-03	001° 46.932' W	57° 30.116' N
P-04	001° 46.943' W	57° 30.114' N
P-05	001° 46.964' W	57° 30.103' N
P-06	001° 46.986' W	57° 30.099' N
P-07	001° 46.961' W	57° 30.089' N
P-08	001° 46.884' W	57° 30.090' N
P-09	001° 46.828' W	57° 30.093' N
P-10	001° 46.830' W	57° 30.096' N
P-11	001° 46.820' W	57° 30.105' N
P-12	001° 46.810' W	57° 30.105' N
P-13	001° 46.812' W	57° 30.141' N

NOTES

1. ALL LEVELS TO CHART DATUM.
2. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.
3. ALL COORDINATES TO WGS84.
4. TIDE LEVELS AS FOLLOW:
   - MEAN HIGH WATER SPRINGS (MHWS) +3.80m CD
   - MEAN LOWER WATER SPRINGS (MLWS) +0.50m CD

LEGEND

BOUNDARY LIMIT

P1	21-11-25	FOR INFORMATION	ACW

PRELIMINARY

Client :

PETERHEAD PORT AUTHORITY

Title :

Figure 2.1 Proposed extension of Smith Quay.

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Drawn Checked Scale (at A1):

Date:

2.2 Dredging Operations

2.2.1 The first activity to be undertaken on site will be dredging generally to -10 m CD, to form an enlarged dredged pocket, including the dredging of the locally rock trench for toe of the new revetment (Figure 2.2). Both the rock trench and dredge pocket are anticipated to be completed using a backhoe dredger, plough dredging may be necessary on completion. If necessary, pre-treatment using underwater hydraulic attachment and/or Cardox1 rock breaking, may be applied.

2.2.2 Dredging works are expected to take approximately 7 weeks to complete. Pre-treatment, including rock breaking, may be required during the first 5 weeks, although it is possible that rock breaking will not be required if the material proves to be sufficiently friable to be excavated directly.

2.2.3 Sea disposal of dredge arisings at a licenced site is anticipated (application will be completed separately). The rock trench is required to be dredged prior to the pile installation, to eliminate the risk of pile damage from dredging the trench.

Figure 2.2 Proposed backhoe dredging of rock trench, berthing pocket, and approach.

2.3 Site Clearance and Demolition

2.3.1 Demolition will include the removal of an existing berthing dolphin, footbridge and rock armour and the partial removal of the west wing wall.

2.3.2 Rock armour which requires to be removed, will be left in-situ for as long as possible to minimise the period of exposure of the un-armoured length of revetment to wave action. The rock armour removed will be set aside for re-use in the works.

2.3.3 Following removal of sufficient rock armour adjacent to the west wing wall, the wing wall will be partly demolished down to a level necessary to avoid obstructing construction of the

[1] Cardox is a non-explosive rock-breaking technology that uses pressurized carbon dioxide (CO_2) to fracture rock. The system consists of a steel tube filled with liquid CO_2 and a small heating element. When activated, the CO_2 rapidly expands into gas, creating a pressure wave that breaks the surrounding material. This is a high-pressure gas expansion rather than a shockwave, making its safer and more predictable than explosives.

extension structure immediately adjacent to the wing wall, using combination of concrete coring equipment, wire saws and hydraulic breakers.

2.3.4 The existing steel footbridge will be removed in one piece by a land based crane.

2.3.5 The existing berthing dolphin will be demolished in situ, using a combination of a barge mounted crane or long reach excavator with hydraulic breaker, supported by a shore based crane. The concrete deck will be broken into smaller sections and recovered to land for processing. Where concrete sections drop onto seabed, these will be recovered from the seabed and transferred to land for recycling or disposal.

2.4 Piling & Revetment Works

Pile installation

2.4.1 There will be up to 85 No. 1.1 m diameter tubular steel piles in total (seaward and landward piles) in the quay extension and new mooring dolphin. An indicative arrangement is shown in Figure 2.3. Some temporary piles and structural steel bracing members may be necessary to support the initial pile installation works in the temporary condition and will be removed on completion of the works

2.4.2 To achieve the required deck load capacity of 10 tonnes/m^2, the piles will be up to 1100 mm in diameter and will be embedded into sockets up to 10 m long drilled in rock and then concreted (interior of each pile filled with concrete).

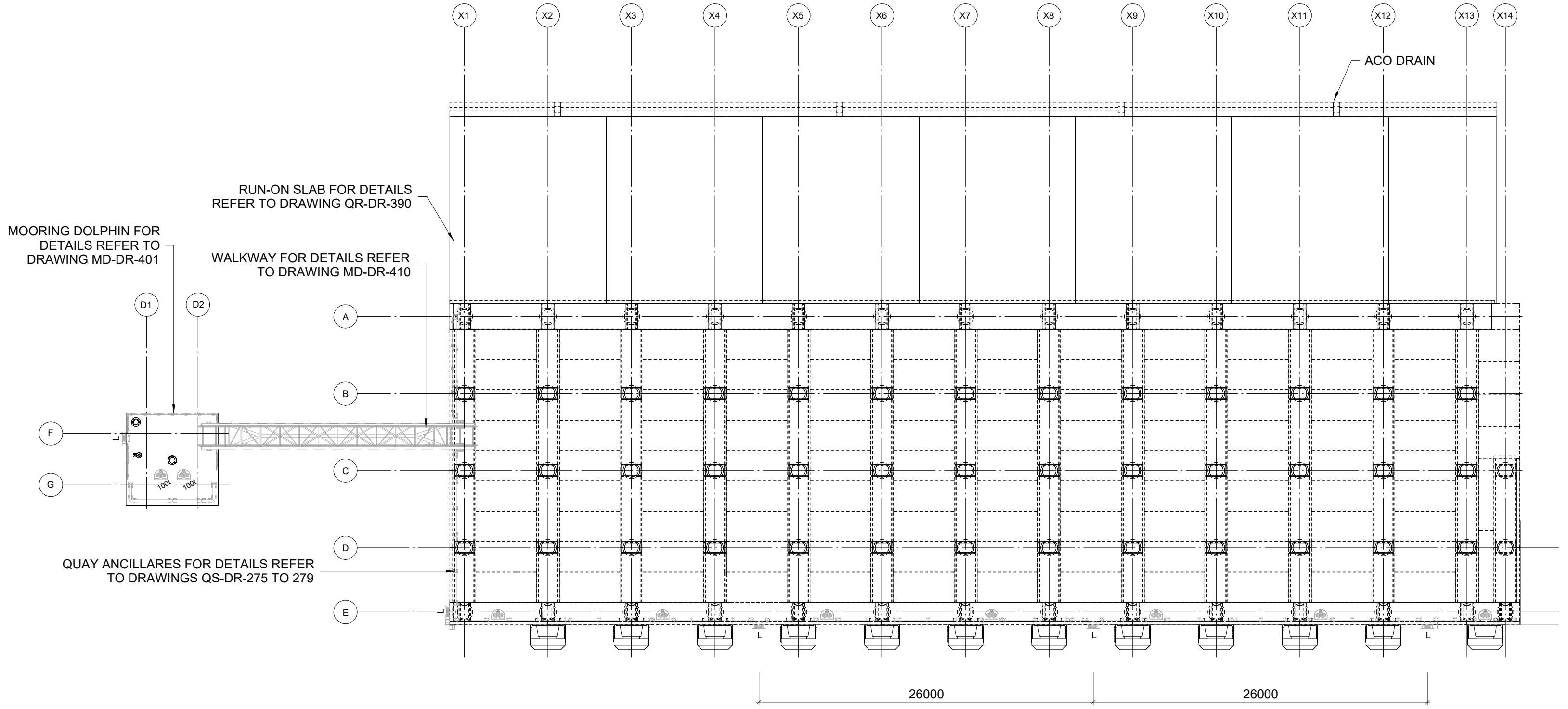
2.4.3 All piles will require a combination of rock drilling and driving to achieve the required embedment depth and capacity. The expected method of piling is termed ODEX piling. The term "ODEX" stands for Overburden Drilling EXcentric, referring to the technique's ability to drill through overburden (loose soil, gravel, or weathered rock) before reaching solid bedrock. ODEX piling is a percussive drilling technology where the excentric drill bit swings out creating a hole with a diameter greater than that of the steel casing. This allows the steel casing to traverse down behind the drill bit without having to first remove the drill bit in order to insert the casing. The hammer is driven by air. The percussion rate by the hammer is 1235 blows per minute at a pressure of 17 bar. This high rate of percussion means that the noise produced by the source is continuous rather than impulsive and therefore similar to vibratory piling.

NOTES

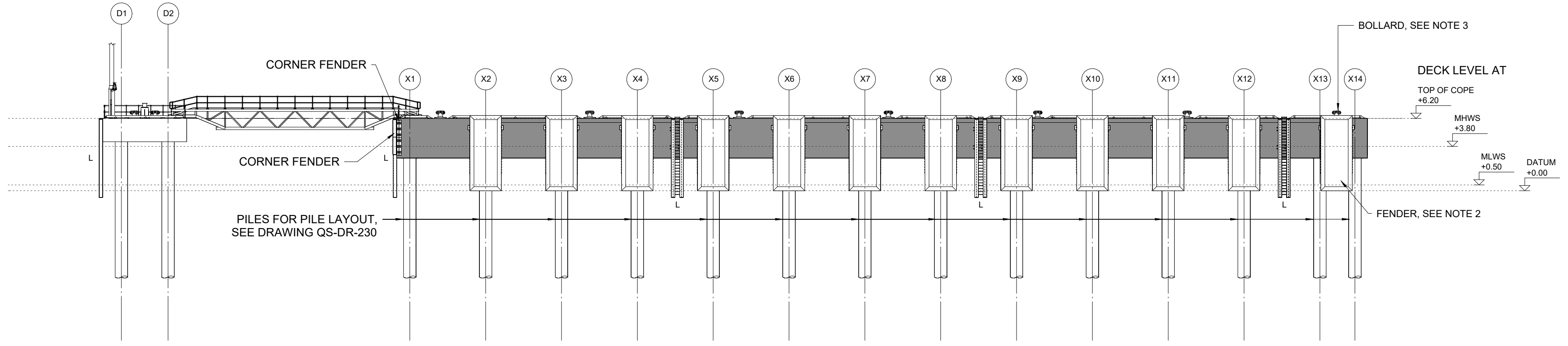
1. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. FOR FENDER DETAILS SEE DRAWING PHSQ-NIR-QS-DR-270, 272, 273.
3. FOR BOLLARD DETAILS SEE DRAWING PHSQ-NIR-QS-DR-271, 274.
4. FOR LADDER DETAILS SEE DRAWING PHSQ-NIR-QS-DR-275.
5. FOR SECTIONS THROUGH GRIDLINES A AND E, REFER QS-DR-253, 254.
6. FOR SECTIONS THROUGH GRIDLINES B AND D, REFER QS-DR-257, 258.

LEGEND

L LADDER



GENERAL ARRANGEMENT
SCALE 1 : 200



FRONT ELEVATION
SCALE 1 : 200

SCALE 1:200
0 5 10 15 20m

Rev	Date	Description	App'd
P2	30-10-25	QUAY UPDATED	KLO
P1	19-08-25	FOR INFORMATION	ACW

PRELIMINARY

Client: PETERHEAD PORT AUTHORITY

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Figure 2.3 Smith Quay General Arrangement showing proposed pile layout.

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Drawn	Checked	Approved	Scale (at A1): 1 : 200
			Date: Aug 2025

Drawing No: PHSQ-NIR-QS-DR-252

Rev. P2

2.4.4 The pile installation sequence and methodology outlined below will be subject to further development and is indicative at this stage.

2.4.5 For the purposes of this assessment it is assumed that pile installation will occur on approximately 50% of days over the anticipated 23 week programme for this phase of work (i.e. pile installation on approximately 81 days). Each pile is expected to require approximately 4 hours of drilling, followed by a short period (minutes) of impact piling to seat the pile.

Seaward Bearing Piles

2.4.6 The three seaward pile rows may be installed first, with the drilling rig located on the existing Smith Quay. Primary and underlayer rock armour will be removed in advance using a long-reach excavator working from the existing Smith Quay. A crawler crane will pitch the pile into the pile gate, the drilling rig will then place the tooling inside the tubular pile and advance the drill head to achieve the required rock socket depth.

2.4.7 A reinforcement cage or structural steel member will then be placed prior to concrete filling the rock sockets and piles. The crawler crane will either be land based or mounted on a barge as shown in Figure 2.4, which illustrates both the initial pile installation process and the removal of the existing dolphin's concrete deck.

Figure 2.4 Initial pile install working from Smith Quay.

2.4.8 Following installation of the first 3 piles, the drill rig will be transferred onto the jack-up barge or temporary works platform and secured in position. The crawler crane will be located on a spud leg barge or temporary works platform, which will be used to transport piles from the quay to the pile location (Figure 2.5). The crawler crane will pitch the piles into the pile gate, cantilevered over the edge of the Jack-up barge / temporary works platform. The drill rig will then advance the rock socket, prior to concrete filling the rock sockets and piles.

2.4.9 The pile install method will continue along the full length of the works.

Figure 2.5 Pile installation from jack-up barge.

Revetment Works

2.4.10 The revetment construction sequence and methodology is outlined below.

2.4.11 With the seaward piles sufficiently progressed, existing primary rock armour will be removed using a long reach excavator and stored on site for reuse in the permanent works. Rock core material will then be imported to site by road and placed in front of the existing rock core to advance the new revetment structure. Core material will be placed using a long reach excavator, working from the Smith Quay Embankment, initially placing material adjacent to the existing Smith Quay and working westward.

2.4.12 The placed revetment core material may be utilised as a working platform to install the landward two rows of piles. With the revetment core progressed, primary armour will be placed along the extent of the revetment to provide protection from wave action. The primary armour will be placed along the revetment slope, keeping the rear berm clear to allow pile installation through the revetment core.

2.4.13 While the rock armour is being placed, the piling equipment will be utilised to install the mooring dolphin piles working from the jack-up barge / temporary works platform.

Landward Bearing Piles

2.4.14 The pile installation sequence and methodology outlined below will be subject to further development and is indicative at this stage.

2.4.15 The landward pile rows may be installed using land-based equipment. The new revetment core material will be used as a temporary working platform, with the platform raised above MHWS to allow pile installation during all states of the tide. The drill rig and crawler crane will be mobilised onto the core material. The crawler crane will pitch piles into the piling gate and the drill rig will then advance the drill head to achieve the required rock socket depth. The rock sockets and piles will then be concrete filled. Pile heads will be cut to required level using burning equipment. The process will be repeated for subsequent pile installations. Figure 2.6 illustrates the installation of these piles.

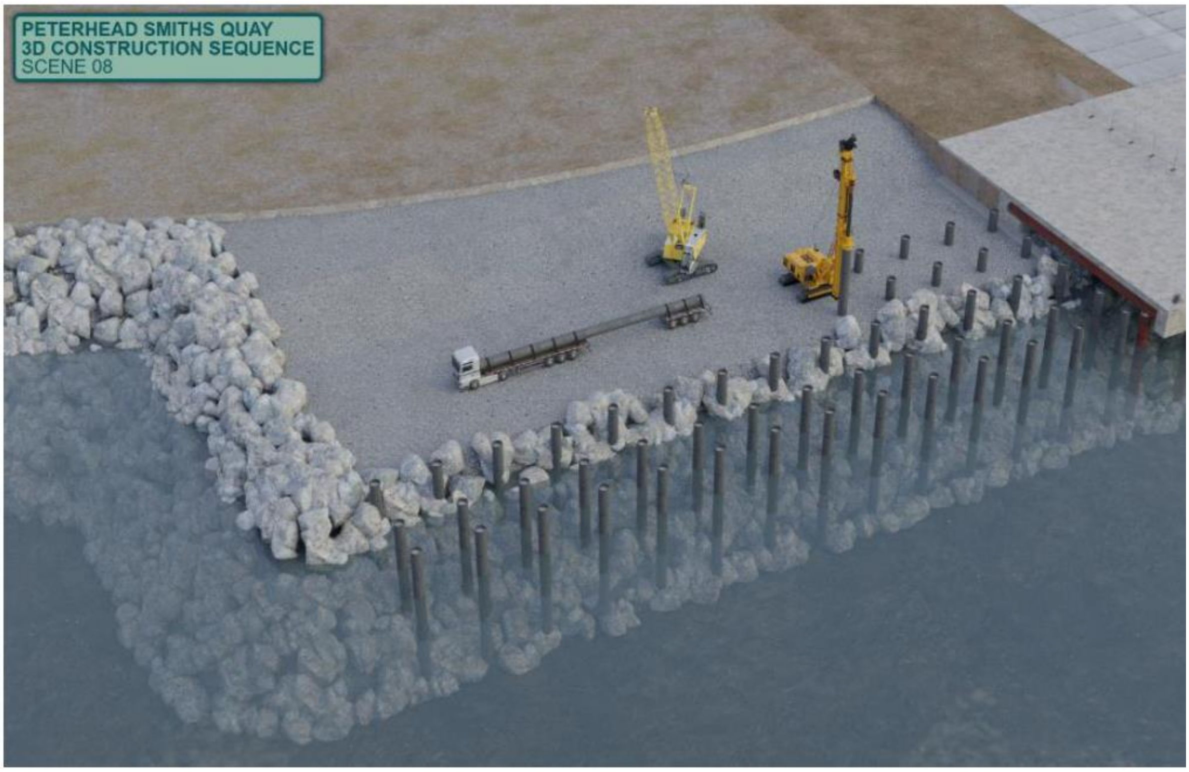

Figure 2.6 Install of pile rows A & B using land-based equipment.

Seaward Piles and Landward Piles - Alternative Methodology

2.4.16 As a potential alternative to the pile installation methodology outlined above, a "land-based" piling method which does not require marine plant is currently being explored and is dependant on final Contractor award.

2.4.17 The alternative would enable all piles to be installed from a temporary platform supported on two of the rows of permanent piles. The piles and platform would progressively extend westwards "hand over hand" from the existing quay. Installed piles would be used to support a temporary working platform, allowing the pile drilling equipment to transverse and install subsequent piles, as illustrated in Figure 2.7. Both installation methods will be progressed in parallel.

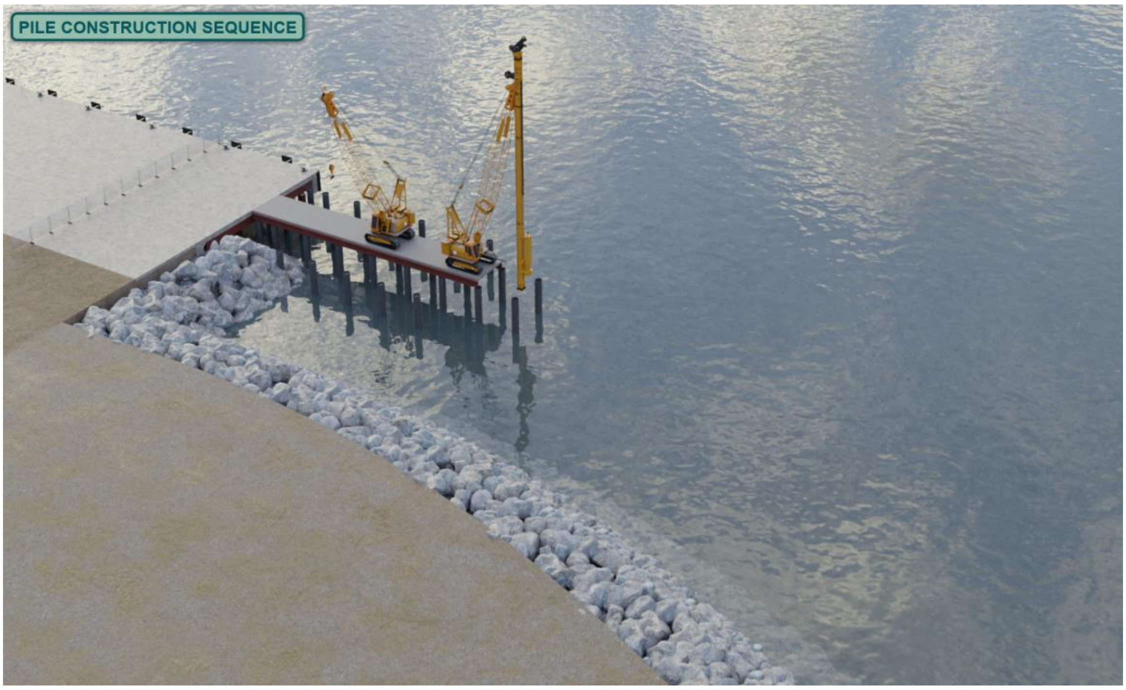

Figure 2.7 Pile installation from temporary working platform.

2.4.18 A similar alternative installation methodology for the new mooring dolphin piles is currently being developed. This method would require the temporary platform to be extended west of gridline X1 using temporary piles, which would be extracted upon completion of the new build dolphin works.

2.5 Concrete Backseat

2.5.1 Following installation of the piles and cutting of the pile heads to the correct level, precast concrete elements will be placed to form quay beams and deck. Precast beam elements will be installed in sequence, with cope beam and rear downstand beam installed, prior to transverse beams being placed in between. The beams will be placed in sections and will consist of pre-cast concrete 'U-shaped' troughs supported on the permanent piles and infilled with in-situ reinforced concrete. The connection between the beams and supporting piles will made by reinforcement protruding from the top of the concrete filled piles into the in-situ part of the beams. The process will be completed along the length of the structure, installing cope beam, rear downstand beam and transverse beams in sequence.

2.5.2 As the transverse beams are constructed and the in-situ concrete in them has developed the required strength, pre-cast concrete planks will be placed, spanning between the transverse beams. The planks will be pre-cast with protruding stirrups made from reinforcing bars, to ensure that the planks act compositely with the in-situ concrete to be placed on top of them.

2.5.3 A mat of reinforcement will be fixed on top of the beams and planks and in-situ concrete slab constructed. Figure 2.8 demonstrates the general sequence of works working west from the existing Smith Quay.

Figure 2.8 Placement of trough beams and precast deck planks.

2.5.4 Ducts will be incorporated within the deck structure to allow for future install of quayside services, such as power and water. On completion of the deck structure, quay furniture including ladders, grab chains, bollards and fenders will be installed.

Mooring Dolphin and Footbridge

2.5.5 A pile installation method similar to that for the quay extension method may be used to install the vertical piles for the new mooring dolphin, using the drilling rig working from the jack-up barge or an alternative land-based approach. Temporary support piles may be required to facilitate installation.

2.5.6 Once the rock-socketed piles are installed, temporary works would be constructed as falsework and formwork to support the in-situ concrete pour which will be the deck of the new dolphin.

2.5.7 Quay furniture including bollards, ladder and handrailing will be installed, including reinstatement of navigation aids and lighting.

2.5.8 Following completion of the dolphin structure, the walkway will be reinstated providing access from Smith Quay to the dolphin.

2.6 Operational and Decommissioning Phase

2.6.1 The planned operation of the site involves the same vessel movements and site operations allowed under the current Harbour Revision Order, including the passage of vessels over 1,350 tonnes. No deviation from this is expected.

2.6.2 An expected timeline for the quay's operational phase can be estimated as 50 years for a project of this type. Assessments on the decommissioning impacts will need to be undertaken within an appropriate period before any decommissioning commences. Accordingly, only construction activities and their effects will be considered in this assessment.

2.7 Programme

2.7.1 The construction programme is summarised in Table 2.1, as based on a Pre-construction Services Delivery Agreement Contract Award of 01 April 2025. This assumes Engineering Construction Contract award in January 2026. Site access is scheduled for March 2026. The final schedule is subject to receipt of necessary approvals.

Table 2.1 Estimated Construction Schedule.

Activity	Duration	Start	Finish
Detailed Design	9 months	January 2025	October 2025
Consents	18 Months	October 2024	March 2026
Procurement	9 Months	January 2026	September 2026
Construction	16 Months	April 2026	August-December 2027

2.7.2 A high-level construction sequence, and indicative timings, is provided below. These activities will not necessarily be carried out consecutively and may be undertaken partially or wholly in parallel:

- Dredging and demolition: 11 weeks (dredging 7 weeks, of which 5 weeks could include rock breaking)
- Revetment works: 12 weeks
- Suspended Jetty: 44 weeks, which includes:
  - Marine & land based piling: 23 weeks (around 4 hours of drilling and a few minutes of piling every other day- piling on approximately 81 days)
  - Concrete works: 20 weeks
- Quay furniture and footbridge: 8 weeks
- Dolphin works: 30 weeks (in parallel to suspended jetty works)

2.8 Expected Noise Levels

2.8.1 During construction, the following activities are considered in relation to their potential to generate underwater noise at levels which might affect EPS:

- Dredging;
- Piling;
- Rock breaking; and
- Rock breaking using non-explosive (Cardox) blasting (if required).

2.8.2 Noise modelling was undertaken by DHI (Annex 1 Noise Modelling Report) to investigate the impact of noise generated from the above activities on the environment surrounding Peterhead Harbour. This modelling and expected noise levels from activities is discussed further in Section 5.

3 Legislative Background

3.1 Introduction

3.1.1 The regulations relevant to EPS are the Conservation (Natural Habitats, &c.) Regulations (1994) (referred to as the Habitats Regulations) and the Convention on the Conservation of European Wildlife and Natural Habitats (also known as the Bern Convention). These are described further below.

3.2 Habitats Regulations

3.2.1 The EU Habitats Directive (92/43/EEC) provides the foundation for protecting marine mammals, specifically cetaceans (whales, dolphins, porpoises), as EPS.

3.2.2 In Scotland, this directive is implemented through the Conservation (Natural Habitats, &c.) Regulations 1994, commonly referred to as the Scottish Habitats Regulations. These regulations make it an offence to deliberately capture, kill, or disturb EPS, or to damage or destroy breeding sites or resting places.

3.3 Bern Convention

3.3.1 The Convention on the Conservation of European Wildlife and Natural Habitats is an international treaty aiming to protect and conserve Europe's wildlife and natural habitats.

3.3.2 The convention requires member states to take appropriate measures to protect marine mammals and their habitats including establishing marine protected areas and regulating activities that may pose a threat to the health and well-being of marine mammals. The Bern Convention is transposed into Scottish law through The Nature Conservation (Scotland) Act 2004, and The Wildlife and Countryside Act 1981 (as amended).

4 Baseline Information

4.1 Protected Sites

4.1.1 Information on protected sites which support the conservation of certain EPS is provided here in relation to understanding the baseline environment to inform the risk assessment for these EPS. The Report to Inform Appropriate Assessment and Marine Protected Area Assessment (NIRAS, 2025a) should be referred to for the assessment of the potential for impacts with respect to the integrity of these protected sites.

4.1.2 The following protected sites which support EPS (i.e. EPS are designated features) were screened into the Environmental Appraisal and/or RIAA and MPA Assessment. Figure 4.1 presents designated sites within 15 km of the Proposed Works. Given the distance, the Moray Firth SAC is not represented.

4.1.3 The closest protected area to the Proposed Works with EPS designated features is the Southern Trench NCMPA. This site supports the conservation of minke whale, and is approximately 4 km via land from the location of the proposed works at its closest point, and around 5 km over water. The most important area for minke whale, which are understood to visit to feed during summer months, is to the west of Fraserburgh. The southern part of this NCMPA, off Peterhead, supports relatively low densities of minke whale in comparison (Figure 4.2).

4.1.4 The Moray Firth SAC (106 km distant) supports the conservation of bottlenose dolphin, an EPS species. While clearly distant, the site was screened in because animals which are associated with this site are known to range down the coast towards, and beyond, Peterhead.

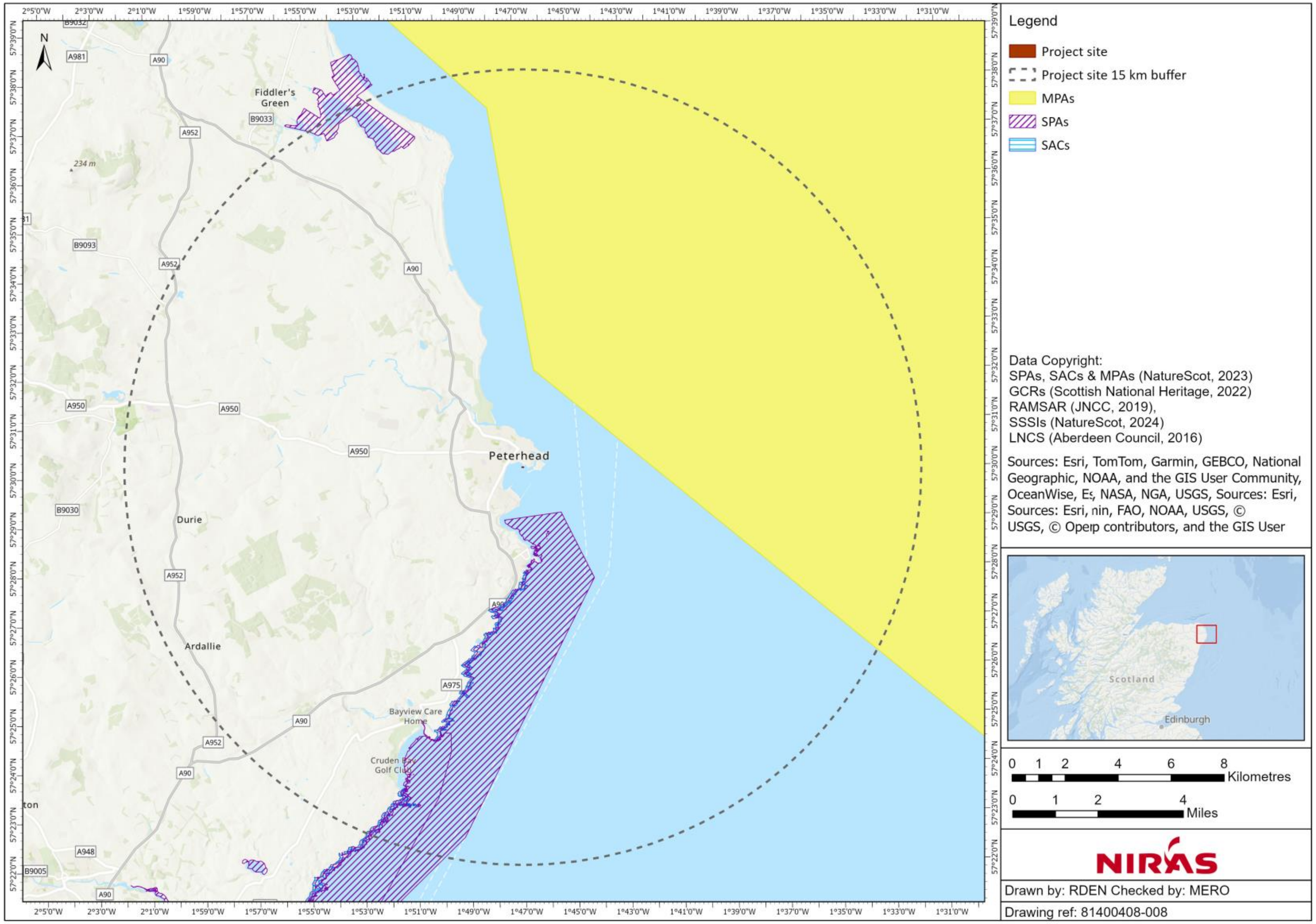

Figure 4.1 Designated sites within 15 km of the Smith Quay Extension at Peterhead.

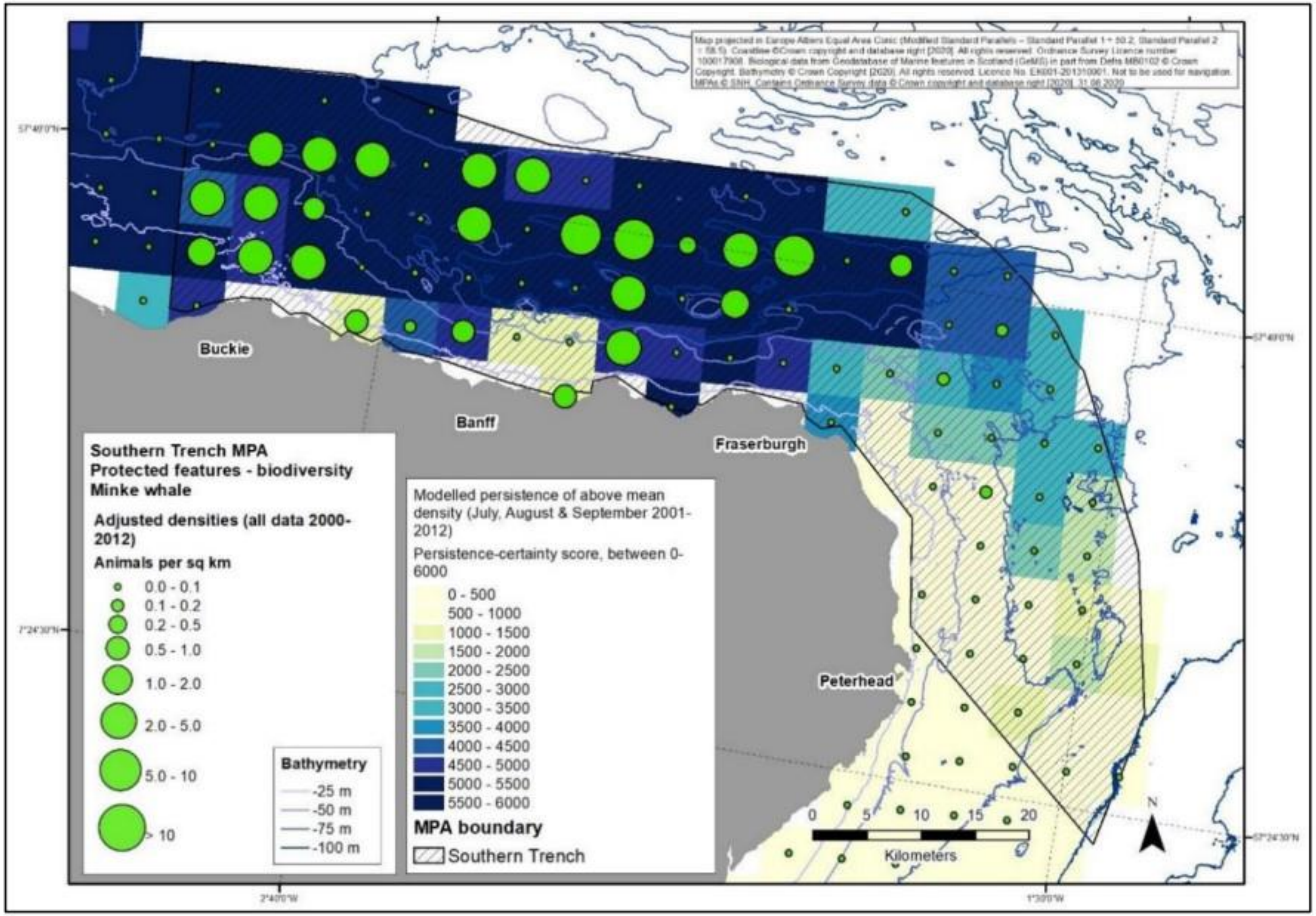

Figure 4.2 *Minke whale densities and predicted persistence of above mean densities in the Southern Trench NCMPA. From NatureScot, 2020*

4.2 Protected Species

Cetaceans

4.2.1 All cetacean species in Scottish inshore and offshore waters are deemed EPS of Community Interest and in need of strict protection under Annex IV of the Habitats Directive. Additionally, harbour porpoise (*Phocoena phocoena*) and bottlenose dolphin (*Tursiops truncatus*) are listed in Annex II as species of Community Interest whose conservation requires the designation of SACs.

4.2.2 The most common species in Scottish waters are harbour porpoise, bottlenose dolphin, white-beaked dolphin (*Lagenorhynchus albirostris*), common dolphin (*Delphinus delphis*), Risso's dolphin (*Grampus griseus*), minke whale (*Balaenoptera acutorostrata*), and killer whale (*Orcinus orca*).

4.2.3 Peterhead Harbour falls within Block NS-D of the most recent SCANS surveys (SCANS-IV; Gilles et al., 2023). Abundances and densities of species monitored as part of the SCANS-IV survey within survey Block NS-D are presented in Table 4.1. Species that are monitored, but were not sighted during SCANS surveys in this block, are included in the table but have no displayed density or abundance. Abundances for cetacean Management Units (MUs) that overlap the study area are also included (IAMMWG, 2023). MU abundances provide a reference for population-level impact assessments of proposed plans (and cumulative impacts with other projects).

Table 4.1 Cetacean distribution from SCANS-IV (Gilles et al., 2023) and IAMMWG, 2023.

Species	Abundance in SCANS IV Block NS-D	Density (animals/km^2) in SCANS IV Block NS-D [adopted value, see text]	Abundance by UK portion of Management Unit (MU)** (IAMMWG, 2023)
Harbour Porpoise ***Phocoena phocoena***	38,577	0.599	159,632 (NS)
Bottlenose Dolphin* ***Tursiops truncatus***	None recorded	[0.197*]	224 (CES) 1,885 (GNS)
White-beaked Dolphin ***Lagenorhynchus albirostris***	5,149	0.08	34,025 (CGNS)
Atlantic white-sided Dolphin	None recorded	[near zero: may occasionally occur in very low numbers through	12,293 (CGNS)

Species	Abundance in SCANS IV Block NS-D	Density (animals/km^2) in SCANS IV Block NS-D [adopted value, see text]	Abundance by UK portion of Management Unit (MU)** (IAMMWG, 2023)
Lagenorhynchus acutus		summer]	
Minke Whale ***Balaenoptera acutorostrata***	2,702	0.04 [0.1, see Figure *4.2*]	10,288 (CGNS)
Common Dolphin ***Delphinus delphis***	None recorded	[0.01, based on Caledonia OWF DAS (Ocean Winds, 2025)	57,417 (CGNS)
Risso's Dolphin ***Grampus griseus***	None recorded	[0.04, based on SCANS III density surface (Gilles et al., 2025)]	8,687 (CGNS)
Orca ***Orcinus orca***	None recorded	[near zero: occasional visitor]	No recorded MU
Striped Dolphin ***Stenella coeruleoalba***	None recorded	[near zero: rare visitor]	No recorded MU
Long-finned Pilot Whale ***Globicephala melas***	None recorded	[near zero: occasional visitor]	No recorded MU
Beaked Whale sp. **Family Ziphiidae**	None recorded	[near zero: rare visitor]	No recorded MU
Fin Whale ***Balaenoptera physalus***	57	0.0009	No recorded MU

* There were no bottlenose dolphin sightings in block NS-D during the SCANS IV survey and therefore SCANS IV density values for bottlenose dolphins within this block are not available (Gilles et al., 2023). The Berwick Bank marine mammal technical report (SSE Renewables, 2022) reviewed and analysed ECOMASS data to provide an estimate of the density of coastally distributed BND. Assuming even distribution of 50% population of bottlenose dolphin between Peterhead and the Farne Islands, excluding the outer Firth of Tay, a density of 0.197 animals per km^2 was calculated. This value is rather higher than the estimate based on SCANS-III data of 0.005 – 0.010

animals per km^2 provided by Lacey et al (2022) for waters immediately off Peterhead, or the density estimates referred to in relation to the Caledonia Offshore Wind Farm of between 0.002 and 0.142 animals per km^2 (Ocean Winds, 2025), but is adopted here as a reasonably precautionary value.

**NS = North Sea; CES = Coastal East Scotland; GNS = Greater North Sea; CGNS = Celtic & Greater North Sea

4.2.4 Minke whale and bottlenose dolphin were identified by NatureScot as EPS that should be assessed as part of the Proposed Works (NatureScot, 2024). However, this risk assessment additionally considers harbour porpoise, which are abundant around the Scottish coast and regularly seen near Peterhead, and other EPS for which density estimates provided in Table 4.1.

Basking Shark

4.2.5 Basking sharks (*Cetorhinus maximus)* are listed as Endangered on the IUCN Red List of Threatened Species (Rigby *et al*., 2023) and are the largest fish species found in UK waters. They are protected under Schedule 5 of the Wildlife and Countryside Act which prohibits the killing, injuring, or taking by any method of those wild animals listed on Schedule 5 of the Act. The Nature Conservation (Scotland) Act 2004, Part 3 and Schedule 6 make amendments to the Wildlife and Countryside Act, strengthening the legal protection for threatened species to include 'reckless' acts, and specifically makes it an offence to intentionally or recklessly disturb or harass basking sharks. A basking shark licence is therefore required for activities which could disturb this species.

4.2.6 Their distribution in the UK is seasonal: in the summer months, basking sharks feed on plankton in the coastal surface waters near tidal fronts (Sims & Quayle, 1998; Doherty *et al*., 2017). Summer sightings are concentrated around the southwest coast of England, throughout the Irish Sea, and off the west coast of Scotland (Witt *et al*., 2016; Shark Trust, 2022). Recent sightings have been confirmed off the northeast Scottish coast, but at a much-reduced density compared to western coastlines (Sims, 2008; Evans *et al*., 2011; Hebridean Whale and Dolphin Trust, 2023). In winter, basking sharks in the northeast Atlantic inhabit the waters of continental shelf and shelf edge, but do not hibernate or exhibit prolonged movements into open-ocean regions (Sims *et al*., 2008).

4.2.7 It is extremely unlikely that any interaction between basking sharks and the proposed construction activities will occur. Nonetheless, mitigation set out in Section 5.3.

4.2.8 Table 5.5 will be applied additionally to basking shark, in the unlikely event that this species is present when works take place.

5 Risk Assessment

5.1 Evaluation of activities

5.1.1 The assessment is undertaken to establish whether the proposed works could present risk of a breach of the legal protection afforded to EPS, e.g. via injury or disturbance. The following impact pathways have been identified as requiring evaluation in this regard:

- Vessel collision;

- Underwater noise from construction activities; and,
- Disturbance from increased vessel traffic.

5.1.2 These impact pathways are evaluated with the aid of information from the Environmental Appraisal (NIRAS, 2025b) to help understand the level of risk, and informed where relevant by underwater noise modelling. With respect to the latter, the underwater noise modelling was completed prior to confirmation of final installation methods for key activities including rock breaking and pile installation. As a result, the noise modelling is considered highly conservative (i.e. precautionary). This is explained further where relevant below.

Vessel Collision

5.1.3 Collisions with construction or equipment delivery vessels ('ship strikes') have the potential to injure or kill marine animals. Cetaceans are at particular risk when their core habitats overlap with areas of dense, fast-transiting vessel traffic. Large, slow-moving cetaceans are particularly at risk.

5.1.4 The severity and frequency of collisions is species specific and can be divided into effects to larger, less agile species e.g. minke whale and smaller species, e.g. harbour porpoise. The risk also varies with the size, speed, and time needed to change course of the vessels.

5.1.5 Collision with marine vessels can result in injury or death. Vessels that are more than 80 m in length or travelling at more than 14 kn are the most likely to cause severe or lethal injuries (Laist *et al.*, 2001). Where speeds are reduced to less than 10 kn, the probability of lethal injury from a collision may be lowered to below 50% (Vanderlaan and Taggart, 2007). The coastal waters off Aberdeenshire are exposed to high vessel traffic, and it is expected that marine mammals present will be accustomed to the presence and movements of vessels in the area.

5.1.6 Marine mammals are able to detect and avoid vessels; however, collisions may still occur while animals are engaged in other activities such as foraging, surfacing to breath, interacting, or as a result of their inquisitive nature (Wilson *et al.*, 2007). Harbour porpoise are the most abundant species within the area (Table 4.1) and have been shown to exhibit an avoidance response to vessel sound (e.g. Benhemma-Le Gall *et al.*, 2023).

5.1.7 The proposed construction works will increase the number of vessels in the immediate area, but the increase over baseline levels will be negligible. Peterhead Harbour is semi-enclosed with navigation rules limiting vessel speeds. Within Peterhead Port, Byelaw 9 directs that the speed limit for vessels in the Bay Harbour is 5 kn over the ground, with the exception of some recreational vessels, or where it is not safe for the vessel to travel at low speeds (PPA, 2020). The risk of collision within the harbour area is extremely low because of the low speed of vessels and the very low likelihood of EPS occurring within the inner harbour.

5.1.8 Any risk of collision exists primarily in relation to vessels which are transiting to or from the works. As stated in Section 5.3, all vessels will be required to adhere to guidance provided by the Scottish Marine Wildlife Watching Code, combined with awareness raising of the need to be vigilant for marine wildlife via the project Construction Environmental Management Plan

(CEMP). Construction and delivery vessels will be slow moving vessels and the likelihood of collision is very low.

5.1.9 The likelihood of an injury or mortality to EPS is assessed as a negligible. It is therefore concluded that there an EPS licence is not required in relation to this activity.

Underwater Noise from Construction Activities

5.1.10 Impacts to EPS are considered in terms of the potential for injury or disturbance to occur. The threshold for injury assumed here is hearing damage, termed Auditory Injury (AUD INJ). As a descriptive term, AUD INJ replaced Permanent Threshold Shift (PTS) in the most recent NMFS guidelines (NMFS 2024a) to describe permanent hearing loss after noise exposure. Temporary threshold shift (TTS) is referred to also, but is considered to lie below the threshold for injury.

5.1.11 Disturbance is considered as behavioural changes, such as avoidance.

5.1.12 Cetaceans are acoustic specialists and rely on vocalisations and hearing to communicate, navigate, and forage for prey. Consequently, they are known to be potentially sensitive to underwater noise generated by construction activities. Sensitivity varies between species and for the purpose of risk assessment, cetacean species can be categorised into several 'hearing groups' (Table 5.1).

Table 5.1 Functional cetacean hearing groups present near Peterhead Harbour which are being assessed. From NMFS, 2024a.

Hearing Group	Species	Auditory Range
Very High Frequency (VHF) cetaceans	Harbour Porpoise	275 Hz – 160 kHz
High Frequency (HF) cetaceans	Bottlenose and other dolphin species	150 Hz – 160 kHz
Low Frequency (LF) cetaceans	Minke and fin whale	7 Hz – 35 kHz

5.1.13 Increases in underwater noise have the potential to cause AUD INJ in marine animals, which includes PTS. The sound levels at which injury may occur differs across species and across different cetacean hearing groups. In cetaceans, the onset thresholds for AUD INJ due to impulsive noise (piling and rock breaking using Cardox) used in this assessment are based on NMFS (2024a) criteria. For behavioural effects, NMFS criteria were applied for the low (LF) and high (HF) frequency cetacean groups. For harbour porpoise, the behavioural response threshold was based on Tougaard (2021). These thresholds are summarised in Table 5.2.

Table 5.2 Impulsive noise exposure criteria for function hearing groups.

Hearing Group	Species	Effect	Sound Type	SEL dB re 1 µPa²s	SPL_{peak}/SPL_{125ms}/RMS dB re 1 µPa²s
Very High Frequency (VHF) cetaceans*	Harbour porpoise	AUD INJ	Cumulative	159 (VHF-weighted SEL)	202 SPL_{peak}
		TTS	Cumulative	144 (VHF-weighted SEL)	196 SPL_{peak}
		Behavioural**	Single Strike	-	103 VHF-weighted SPL_{125ms}
High Frequency (HF) cetaceans*	Bottlenose and other dolphin species	AUD INJ	Cumulative	193 (HF-weighted SEL)	230 SPL_{peak}
		TTS	Cumulative	178 (HF-weighted SEL)	224 SPL_{peak}
		Behavioural	RMS	-	160 (RMS)
Low Frequency (LF) cetaceans*	Minke and fin whale	AUD INJ	Cumulative	183 (LF-weighted SEL)	222 SPL_{peak}
		TTS	Cumulative	168 (LF-weighted SEL)	216 SPL_{peak}
		Behavioural	RMS	-	160 (RMS)

*NMFS (2024a) **Tougaard (2021)

5.1.14 For marine mammals, to model the hearing impairment effects (Aud INJ) due to non-impulsive (continuous) noise (e.g. drilling and dredging), the NMFS 2024 criteria were used. In case of the behavioural reaction of LF and HF cetaceans, NMFS guidelines were also applied. For the harbour porpoise the Southall *et al*. 2007 study was considered, from which the criterion for adverse behavioural reaction (fleeing) was used. These thresholds are summarised in Table 5.3.

Table 5.3 Non-impulsive (continuous) noise exposure criteria for function hearing groups.

Hearing Group	Species	Effect	Threshold Level
Very High Frequency (VHF) cetaceans*	Harbour porpoise	AUD INJ	181 dB re 1 µPa²s (weighted SEL) -24 h

Hearing Group	Species	Effect	Threshold Level
		TTS	161 dB re 1 μPa²s (weighted SEL) -24 h
		Adverse behavioural (fleeing)**	140 dB re 1 μPa (RMS)
High Frequency (HF) cetaceans*	Bottlenose and other dolphin species	AUD INJ	201 dB re 1 μPa²s (weighted SEL) -24 h
		TTS	181 dB re 1 μPa²s (weighted SEL) -24 h
		Behavioural	120 dB re 1 μPa (RMS)
Low Frequency (LF) cetaceans*	Minke and fin whale	AUD INJ	197 dB re 1 μPa²s (weighted SEL) -24 h
		TTS	177 dB re 1 μPa²s (weighted SEL) -24 h
		Behavioural	120 dB re 1 μPa (RMS)

*NMFS (2024a) **Southall *et al.* (2007)

Dredging

5.1.15 Dredging operations are associated with the production of continuous noise, resulting from several separate sources, the loudest of which is typically the impact sound of the bucket on the seabed with a reported source level of 179.4 dB re 1 μPa SPL (Reine *et al.* 2012).

5.1.16 Noise modelling was undertaken to simulate the expected noise propagation from dredging during the works (Annex 1 Noise Modelling Report). The modelling results indicate that injury risk is limited to very close range, up to a maximum of 0.24 km (LF cetaceans) which is entirely within the inner harbour and immediate vicinity of the works. Behavioural effects could occur over greater range, up to 1.46 km and slightly beyond the harbour limits for LF cetaceans such as minke whale and HF cetaceans (dolphin species), but over a shorter range (max. 0.68 km) and within the harbour limits for VHF cetaceans (harbour porpoise).

5.1.17 Mitigation would be in place to reduce the risk of injury to negligible levels (Section 5.3) and this would also serve to reduce the practical risk of disturbance to EPS; however, marine mammal observer ability to cover waters beyond the immediate harbour entrance area will be limited and therefore the risk of disturbance cannot be ruled out for LF and HF cetaceans. The number of animals potentially at risk of disturbance is considered in Section 5.2.

Table 5.4 Impact ranges for all hearing groups for noise generated from dredging.

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
VHF ceta-ceans	Behavioural	0.04	0.303	0.68	0.44
	TTS_{SEL}	0.04	0.168	0.34	0.11
	AUD INJ_{SEL}	0.02	0.021	0.04	0.001
HF ceta-ceans	Behavioural	0.04	0.52	1.46	1.47
	TTS_{SEL}	0.02	0.039	0.06	0.005
	AUD INJ_{SEL}	0.02	0.02	0.02	0.001
LF ceta-ceans	Behavioural	0.04	0.52	1.46	1.47
	TTS_{SEL}	0.04	0.396	1.16	0.81
	AUD INJ_{SEL}	0.04	0.153	0.24	0.08

Piling

5.1.18 The assumed parameters used to estimate the source level are given in Table 5.5. Full details are provided in the Noise Modelling Report (Annex 1).

5.1.19 The modelled noise levels are much higher than those which will result from ODEX piling. This is a percussive technique, but the high rate of percussion means that the noise generated is defined as non-impulsive, continuous sound. The hammer is driven by air pressure at around 17 bar, meaning that relatively low energy levels are used in the piling. There is limited empirical evidence for associated underwater noise levels but estimates are of the order of 188 dB re µPa2s SEL_{peak} (Amey, 2017) and very much lower than the noise levels modelled here. Only a short period of impact piling, after completion of percussive drilling, will be required to set each pile; therefore, the predicted impact ranges presented below are highly conservative, especially compared to the assumed 3,000 strikes for noise modelling.

Table 5.5 Piling parameters and assumed broadband source levels.

Parameter	Value
Pile diameter	1.067 m
Water depth	~10 m
Pile driver energy	200 kJ
Ram mass	14,000 kg

Parameter	Value
No. of strikes to drive a single pile	3,000
Sound Exposure Level (SEL)	206.8 dB re μPa^{2}s
SEL_{cum}	241.6 dB re μPa^{2}s
SEL_{peak}	231.8 dB re μPa^{2}s
SEL_{rms}	215.8 dB re μPa^{2}s

5.1.20 The results of noise modelling (Table 5.6) indicate that injury risk extends up to a maximum of 0.16 km (VHF cetaceans) for SEL_{peak} noise. The cumulative sound exposure injury range of up to 1.16 km for HF and LF cetaceans is considered to be excessive on the basis that there would only be a few minutes of impact piling and no animal would be expected to remain within the area of impact without fleeing.

5.1.21 Behavioural effects could occur over greater range, up to 4.54 km and beyond the harbour limits for VHF cetaceans (harbour porpoise), and up to 1.16 km for LF cetaceans such as minke whale and HF cetaceans (dolphin species) which extends to the harbour entrance area.

5.1.22 Mitigation would be in place to reduce the risk of injury to negligible levels and will also reduce risk of disturbance to any LF or HF cetaceans present immediately around the harbour entrance (Section 5.3).

5.1.23 With mitigation in place there is concluded to be no risk of injury to any EPS. The risk of disturbance cannot be ruled out for harbour porpoise, but would be expected for low frequency cetaceans and dolphin species only if animals are present immediately around the harbour entrance which is not anticipated and can reduced to negligible levels with mitigation. The number of animals potentially at risk of disturbance is considered in Section 5.2.

Table 5.6 Impact ranges for all hearing groups for noise generated from piling.

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
VHF cetaceans	Behavioural	0.04	1.049	4.54	10.02
	TTS_{SEL}	0.04	0.456	1.18	1.09
	$TTS_{SELpeak}$	0.04	0.226	0.42	0.21
	AUD INJ_{SEL}	0.02	0.251	0.72	0.33

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
	AUD INJ$_{SELpeak}$	0.04	0.109	0.16	0.04
HF ceta-ceans	Behavioural	0.04	0.436	1.16	0.96
	TTS$_{SEL}$	0.04	0.477	1.18	1.19
	TTS$_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ$_{SEL}$	0.04	0.37	1.16	0.76
	AUD INJ$_{SELpeak}$	0.02	0.02	0.02	0.001
LF ceta-ceans	Behavioural	0.04	0.436	1.16	0.96
	TTS$_{SEL}$	0.04	0.842	3.24	5.49
	TTS$_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ$_{SEL}$	0.04	0.464	1.16	1.1
	AUD INJ$_{SELpeak}$	0.02	0.02	0.02	0.001

Rock Breaking (mechanical)

5.1.24 The assessment, and supporting noise modelling (Annex 1) assumes that a range of different equipment could be used for rock breaking during the construction work, including:

- Ripper;
- Diesel driven hydraulic power unit;
- Rock wheel;
- Rock breaker (e.g. RAMMER 9033E).

5.1.25 In the case of the ripper, hydraulic power unit, and rock wheel the noise generated is either similar to dredging noise (ripper and rock wheel), or generally above water noise (hydraulic power unit) i.e. airborne.

5.1.26 The rock breaker RAMMER 9033E is a hydraulic hammer with a minimum weight of 7,400 kg, an input power of 138 kW and an impact rate of up to 645 strikes per minute. It may operate completely submerged or directly on the substrate. It may potentially emit considerable noise from its casing or via the substrate it is acting on; however, no measurements for un-derwater deployment are available. Noise modelling assumed down-the-hole (DTH) pile drilling as a proxy, resulting in the source levels detailed in Table 5.7.

Table 5.7 Rock breaking parameters and resulting broadband source levels.

Parameter	Value
Assumed operational time per day	24 hr
Impact rate	645 bpm
SEL	173.7 dB re μPa^{2}s
SEL_{cum}	233.4 dB re μPa^{2}s
SEL_{peak}	193.7 dB re μPa^{2}s
SEL_{rms}	185.7 dB re μPa^{2}s

5.1.27 Injury risk associated with rock breaking (Table 5.8) is predicted to exist for up to a few tens of metres in relation to instantaneous injury risk (SEL_{peak}) for all hearing groups, and up to a maximum of 1.16 km for LF cetaceans in relation to cumulative exposure risk, which is limited to within the harbour area and entrance.

5.1.28 Behavioural effects are predicted within a range of up to 1.16 km for harbour porpoise, i.e. within the harbour limits, and to only some few tens of metres for other species.

5.1.29 Mitigation would be in place to reduce the risk of injury to negligible levels (Section 5.3).

5.1.30 With mitigation in place there is concluded to be no risk of injury to any EPS. This will also reduce the practical risk of disturbance to EPS to extremely low levels, given that disturbance effects are restricted to the harbour area.

Table 5.8 Impact ranges for all hearing groups for noise generated from rock breaking.

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
VHF ceta-ceans	Behavioural	0.04	0.371	1.16	0.76
	TTS_{SEL}	0.02	0.055	0.1	0.01
	$TTS_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ_{SEL}	0.02	0.02	0.02	0.001
	AUD $INJ_{SELpeak}$	0.02	0.02	0.02	0.001
HF	Behavioural	0.02	0.066	0.08	0.02

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
cetaceans	TTS_{SEL}	0.04	0.08	0.1	0.02
	$TTS_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ_{SEL}	0.02	0.034	0.04	0.004
	AUD $INJ_{SELpeak}$	0.02	0.02	0.02	0.001
LF ceta-ceans	Behavioural	0.02	0.066	0.08	0.02
	TTS_{SEL}	0.04	0.568	1.6	1.86
	$TTS_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ_{SEL}	0.04	0.369	1.16	0.75
	AUD $INJ_{SELpeak}$	0.02	0.02	0.02	0.001

Rock Breaking (Cardox)

5.1.31 Cardox use has been termed a 'silent' non-explosive method of rock breaking (ABPmer, 2023); however, no evidence has been found to substantiate this assertion and the underwater noise modelling (Annex 1) referred to experimental analysis by Ke *et al.* (2019) to assume that a single Cardox blast releases the equivalent energy of approximately 0.030 kg TNT, which was used to define the source level.

5.1.32 Explosive sounds form a separate category of impulsive noise, characterised by a near-instantaneous pressure rise time and a very high peak pressure level, followed by a rapid pressure decay creating a shock wave (Dall'Osto *et al.* 2023). Threshold values applied for explosive sounds are provided by NMFS guidelines for cetaceans (NMFS 2024b).

5.1.33 It is further assumed that each blasting event would involve Cardox use in up to 20 boreholes, with a time delay of 25 milliseconds between the blasting of each.

5.1.34 The assumed source levels are:

- SEL = 201.1 dB re 1 $\mu Pa^2 s$;
- Peak Sound Pressure Level (SPL_{peak}) = 254.7 dB re 1 μPa.

5.1.35 Based on the modelling results (Table 5.9), noise generated from the use of Cardox presents risk of injury to EPS up to a maximum range of 0.2 km (VHF cetaceans) and would result in a behavioural response up to a range of 1.16 km for LF and VHF cetaceans and 0.16 km for HF cetaceans, which are all within the inner harbour area (injury risk for all groups, HF disturbance) or harbour entrance (LF and VHF cetacean disturbance).

5.1.36 With mitigation in place (Section 5.3) there is concluded to be no risk of injury to any EPS. This will also reduce the practical risk of disturbance to EPS to extremely low levels, given that disturbance effects are restricted to the inner harbour and harbour entrance area.

Table 5.9 Impact ranges for all hearing groups for noise generated from Cardox use.

Hearing Group	Effect	Impact Range (km)			Impact Area (km^2)
		R_{min}	R_{mean}	R_{mac}	
VHF cetaceans (harbour porpoise)	Behavioural	0.04	0.373	1.16	0.76
	TTS_{SEL}	0.04	0.364	1.1	0.72
	$TTS_{SELpeak}$	0.04	0.194	0.34	0.15
	AUD INJ_{SEL}	0.04	0.081	0.16	0.02
	AUD $INJ_{SELpeak}$	0.04	0.133	0.2	0.06
HF cetaceans (dolphin species)	Behavioural	0.04	0.106	0.16	0.04
	TTS_{SEL}	0.04	0.063	0.08	0.01
	$TTS_{SELpeak}$	0.02	0.02	0.02	0.001
	AUD INJ_{SEL}	0.02	0.02	0.02	0.001
	AUD $INJ_{SELpeak}$	0.02	0.02	0.02	0.001
LF cetaceans (minke and fin whale)	Behavioural	0.04	0.371	1.16	0.76
	TTS_{SEL}	0.04	0.339	0.9	0.597
	$TTS_{SELpeak}$	0.02	0.039	0.06	0.005
	AUD INJ_{SEL}	0.02	0.07	0.08	0.0016
	AUD $INJ_{SELpeak}$	0.02	0.02	0.02	0.001

Underwater Sound from Vessel Traffic

5.1.37 Underwater sound from vessels is continuous and non-impulsive and typically falls between 165 to 180 dB re 1µPa (RMS) with most energy below 1 kHz, for vessels between 50 to 100m in length (OSPAR 2009). Sound emissions from vessels are unlikely to cause physical injury in terms of hearing impairment (e.g. AUD INJ) or mortality, but may result in behavioural changes, such as displacement of some cetaceans from the affected area (Benhemma-Le Gall *et al.*, 2021), or reduction in foraging activity (Wisniewska *et al.*, 2018).

5.1.38 Underwater sound generated by ship traffic is primarily low-frequency in nature (10-100Hz), leading to a rise in ambient sound in many areas of the global ocean (Erbe *et al.*, 2019; Sinclair *et al.*, 2021). Marine species whose hearing ranges overlap with frequencies of sound produced by vessel traffic have the potential to experience an impact, potentially resulting in negative behavioural responses, stress, masking of species vocalisations, and temporary or permanent shifts in hearing threshold (TTS and PTS, now known as AUD INJ) (Erbe *et al.*, 2019; Duarte *et al.*, 2021). However, recovery following displacement from a site due to anthropogenic activities may be as short as several hours and does not always equate to utilisation of lower-quality habitats (Thompson *et al.*, 2013). In some cases, vessel displacement may even reduce impacts of other, more damaging, anthropogenic underwater sound (Benhemma-Le Gall *et al.*, 2023).

5.1.39 The construction works, and therefore construction vessels, are limited to Peterhead Harbour, other than for transit to and from site. This limits the area of impact due to the breakwaters, which limit noise transmission seawards. It also limits the speed at which vessels can travel (less than 5 kn as per PPA Byelaws), which itself is a mitigation measure against generating underwater noise and will be in place alongside adherence to the Scottish Marine Wildlife Watching Code and awareness raising via a CEMP. The semi-enclosed nature of the harbour area limits the number of individual cetaceans that could be present during construction works.

5.1.40 Background vessel traffic levels are high. Peterhead and Aberdeen are major ports frequented by high numbers of vessels, in some areas reaching over 250,000 routes/0.1 km^2 /year (Marine Traffic, 2023). Extensive and established shipping routes link these areas, thus existing vessel traffic in the area is high. It is not expected that the limited number of additional vessels associated with the proposed works will be significant above this background variability.

5.1.41 Given that Peterhead Harbour and adjacent waters are areas of high vessel activity, and cetaceans do not ordinarily enter the inner harbour area, there is considered to be negligible risk that that additional underwater noise from the small number of vessels required for construction works, including delivery of materials where sea transport is used, will contribute significantly to disturbance of EPS.

Summary

5.1.42 Table 5.10 summarises the outcome of the EPS risk assessment.

Table 5.10 Summary EPS risk assessment for construction activities at Smith Quay.

Activity (Injury (I) / Disturbance (D))	Mitigation (Section 5.3)	EPS Licence to be sought? (estimated numbers in Section 5.2)
Vessel collision (I)	Harbour bylaw limiting speed. Adherence to Scottish Marine Wildlife Watching Code. Awareness raising via CEMP.	No
Dredging (I)	MMO (500 m mitigation zone around works)	No
Dredging (D)	MMO (minimise risk of LF and HF cetaceans being present within 1.5 km of works)	No (VHF cetaceans) Yes (LF and HF cetaceans)
Piling (I)	MMO (500 m mitigation zone around works)	No
Piling (D)	MMO (mitigation zone to harbour entrance for LF and HF cetaceans, minimise risk of VHF cetaceans being present within 4.5 km of works)	No (LF and HF cetaceans) Yes (VHF cetaceans)
Rock breaking (mechanical) (I)	MMO (500 m mitigation zone around works, extended to harbour entrance for LF cetaceans)	No
Rock breaking (mechanical) (D)	MMO (mitigation zone to harbour entrance for VHF cetaceans)	No
Rock breaking (Cardox) (I)	MMO (500 m mitigation zone around works)	No
Rock breaking (Cardox) (D)	MMO (mitigation zone to harbour entrance for LF and VHF cetaceans)	No
Vessel underwater noise (D)	Harbour bylaw limiting speed. Adherence to Scottish Marine Wildlife Watching Code. Awareness raising via CEMP.	No

5.2 Estimation of the number of animals potentially affected

5.2.1 Based on the risk assessment above, the number of EPS animals predicted to be subject to disturbance is detailed in Table 5.11. No EPS animals are expected to be at risk of injury, taking into account mitigation measures that will be in place, as referred to in the evaluation of activities in Section 5.1 and detailed in Section 5.3.

5.2.2 Cetacean species included are those for which density estimates (Table 4.1) indicate potential occurrence in the area of works, i.e. included in SCANS data and density estimate available or adopted from other sources.

5.2.3 The estimates of the number of animals subject to disturbance is relatively conservative (precautionary) for several reasons: the precautionary nature of the noise modelling, especially in relation to ODEX piling; the assumed area of impact which is based on the maximum modelled range in all cases and includes only a nominal deduction (1 km^2) to represent the area of the inner harbour within which the occurrence of EPS is unlikely, and will be reduced to negligible levels by the use of marine mammal observers; and, the extension of marine mammal observer effort into waters around and beyond the harbour entrance to further reduce the chance of interactions.

Table 5.11 Estimated number of EPS animals subject to potential disturbance.

Activity	Species (Hearing Group)	Density (N/km^2) (Table 4.1)	Area of impact (km^2)*	Activity days	Total
Dredging	Minke whale (LF)	0.1	0.47 (Table 5.4)	49 (Section 1.1)	2.3
Dredging	Fin whale (LF)	0.0009	0.47 (Table 5.4)	49 (Section 1.1)	0.02
Dredging	Bottlenose dolphin (HF)	0.197	0.47 (Table 5.4)	49 (Section 1.1)	4.5
Dredging	White-beaked dolphin (HF)	0.08	0.47 (Table 5.4)	49 (Section 1.1)	1.8
Dredging	Common dolphin (HF)	0.01	0.47 (Table 5.4)	49 (Section 1.1)	0.2
Dredging	Risso's dolphin (HF)	0.04	0.47 (Table 5.4)	49 (Section 1.1)	0.9
Piling	Harbour porpoise (VHF)	0.599	9.02 (Table 5.6)	81 (Section 2.4)	437.6

* Area of impact = modelled area of disturbance, less area of inner harbour (rounded down to 1 km^2)

5.3 Mitigation Measures

5.3.1 Planned mitigation measures are outlined below and will be detailed in the CEMP.

Marine Mammal Observer

5.3.2 To reduce the risk of injury to EPS to negligible levels, and to minimise disturbance, a marine mammal observer (MMO) will be deployed during the following activities:

- Dredging
- Piling
- Rock breaking (mechanical)
- Rock breaking (Cardox).

5.3.3 Statutory Nature Conservation Agency Protocol for Minimising the Risk of Injury to Marine Mammals from Piling Noise (JNCC, 2010) will be applied and adapted to the specific requirements of the works to achieve effective mitigation.

5.3.4 A 500 m mitigation zone (MZ) will be implemented for all stated activities, irrespective of the range to which injury risk is calculated to exist. In all cases injury risk is less than 500 m.

5.3.5 For dredging, piling and mechanical rock breaking the MMO will also monitor in the direction of the harbour entrance (to distances noted in Table 5.10) in order to minimise the risk of disturbance to EPS. This extended MZ will be treated in the same manner and the 500 m MZ with respect to mitigation protocols.

5.3.6 Because the likelihood of EPS occurring in the inner harbour is very low a single MMO is considered to represent proportionate mitigation. The MMO will be located in a position to optimise ability to monitor both the works area and seaward direction, for example by being located towards the end of Albert Quay, between the works area and harbour entrance (Figure 5.1). The MMO will liaise directly with the works contractor and an individual within the contractor team will be nominated to support the implementation of mitigation protocols and supplement surveillance of the MZ where required.

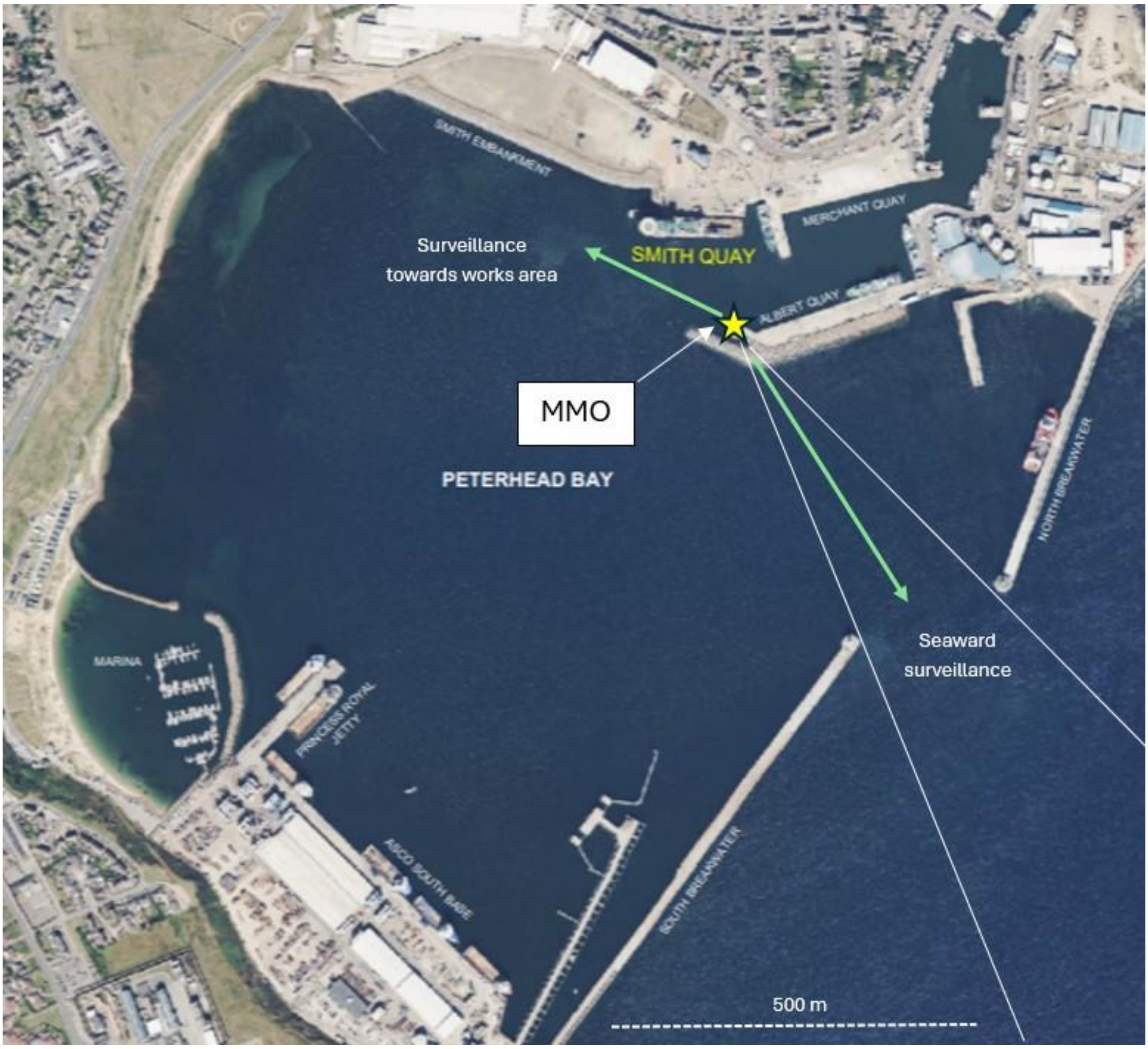

Figure 5.1 Proposed location for Marine Mammal Observer.

5.3.7 For hammer piling, such as used during offshore wind farm construction and in relation to which the mitigation protocols were developed, a soft start, i.e. a gradual increase in piling power, over a minimum of 20 minutes is required before piling can commence after a 30-minute pre-piling search where no marine mammals are detected within the MZ. For the current project, a short period of piling (minutes) will follow a period of drilling (approximately 4 hours). Drilling will effectively serve as a soft start to piling.

5.3.8 For dredging and mechanical rock breaking, positioning of the vessel, and starting up of equipment, will be considered to represent soft start. High intensity activities will be avoided during the initial phase of these works, for a period of at least 20 minutes from initial activity (e.g. vessel positioning).

5.3.9 For Cardox use, the following additional practices will be adopted:

- Minimal charge size and number of charges to be used in all cases[2].
- 'Soft start' to be applied[3].

5.3.10 The use of acoustic deterrents is discounted as disproportionate for all activities, given the low likelihood of EPS being present within injury range. Acoustic deterrents would add unnecessarily to overall disturbance risk.

5.3.11 Should there be a pause in any mitigated activity, of less than 10 minutes, provided that the MMO has continued to monitor, the activity may recommence. For pauses between drilling and piling, or breaks in piling, of more than 10 minutes, a 30 minute pre-search would be undertaken before the activity starts/re-starts. Surveillance around such pauses may be undertaken by the nominated MMO-liaison at the works site as maintaining full time MMO presence at the dedicated MMO location is considered disproportionate, given the low risk present.

Scottish Marine Wildlife Watching Code & Awareness Raising

5.3.12 All personnel and contractors involved in marine operations will be briefed on environmental risks identified in the project Environmental Appraisal and this EPS risk assessment, including required mitigation measures. This will be implemented via a project Construction Environmental Management Plan.

5.3.13 All site personnel and contractors involved in marine operations will be required to adhere to the Scottish Marine Wildlife Watching Code (SMWWC) (NatureScot, 2017). This includes guidance on responsible behaviour around marine wildlife, vessel operation protocols, and avoidance of deliberate or accidental disturbance.

5.3.14 The SMWWC will be applied consistently to all marine megafauna, including incidental sightings of species not specifically listed in the EPS licence.

5.3.15 Vessel movements, construction activities, and any other operations with potential to disturb marine wildlife will be planned and conducted in a manner that:

- Avoids sudden changes in speed or direction near wildlife.
- Maintains appropriate distances from animals at all times.
- Reduces noise and visual disturbance where possible.

6 EPS Licence Assessment

[2] NatureScot advised that JNCC (2025) guidance on marine mammal protection and the use of explosives be applied. This measure (use of minimal charge size) is taken from that guidance; however, since explosives will not be used, and that the limited range for injury risk can be mitigated by applying the adapted piling mitigation guidance, it is not proposed to use the explosives guidance further.

[3] Cardox rock-breaking usually involves multiple small charges in boreholes, fired milliseconds apart, so there is inherent sequential firing, but the interval (25 ms) is too short for animals to respond between shots. Therefore, 'soft start' will be represented by use of the lowest effective charge sizes and avoidance of simultaneous detonation of many charges in favour of sequential firing.

6.1 Introduction

6.1.1 Any EPS licence application (under regulation 44(2)) must undergo a detailed assessment of whether a licence may be granted. This assessment is comprised of three tests, which have been designed to ascertain:

1) Whether the purpose of the licence relates to those specified in the Habitat Regulations;
2) Whether there are any/no satisfactory alternatives to the proposed activity (that would not result in an offence); and
3) That the undertaking of the proposed activity will not negatively impact the maintenance of the population of the EPS concerned, at a favourable conservation status.

6.1.2 An EPS licence application must pass all three of these tests before it may be granted.

6.2 Test 1: Purpose

6.2.1 The licence application must relate to one of the purposes referred to in Regulation 44(2).

6.2.2 Regulation 44 (2) of the Conservation (Natural Habitats, &c.) Regulations 1994 lists the purposes where an EPS licence is appropriate. Regulation 44 states:

1) *Regulations 39, 41 and 43 do not apply to anything done for any of the following purposes under and in accordance with the terms of a licence granted by the appropriate authority.*
2) *The purposes referred to in paragraph (1) are*
   a) *scientific, research or educational purposes;*
   b) *ringing or marking, or examining any ring or mark on, wild animals;*
   c) *conserving wild animals, including wild birds, or wild plants or introducing them to particular areas;*
      i. *conserving natural habitats;*
   d) *protecting any zoological or botanical collection;*
   e) *preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment;*
   f) *preventing the spread of disease; or*
   g) *preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, or any other form of property or to fisheries.*

6.2.3 The extension to Smith Quay, and therefore the proposed construction works meet the requirements of Test 1 as they are in line with Scotland's National Marine Plan (SNMP, 2015) and therefore fall into option e) above as an imperative reason of overriding public interest including those of an economic nature.

6.2.4 Smith Quay is used by many industries, such as the pelagic fishing sector, renewable energy, oil and gas decommissioning, subsea construction and maintenance industry, and ship repair facilities. The proposed extension will provide vital additional berthing capacity and deck space with adjacent laydown area for this busy port, enhancing the area economically and further supporting the decommissioning of oil and gas, as well as supporting increased renewable energy routes.

6.3 Test 2: Satisfactory Alternative

6.3.1 There must be no satisfactory alternative (Regulation 44(3)(a)).

6.3.2 An EPS licence may only be granted where Marine Scotland is satisfied that there is no satisfactory alternative to the proposed activity.

Option 1: No Action

6.3.3 Option 1 is for no construction activity to occur and for Smith Quay to remain as it is. As discussed in Test 1, the need for the extension meets the requirements of Scotland's National Marine Plan (SNMP, 2015), increasing capabilities in renewable energy, oil and gas decommissioning, and other industries and thus improving the economic value and growth of the port. Therefore, no action is not a viable option for this project.

Option 2: Different Construction Programme

6.3.4 The construction programme for the Smith Quay extension has had several reiterations since conception. The current programme is significantly shorter than the original plan; originally the programme was due to be carried out over 117 weeks, whereas now the programme is to be carried out over 67 weeks, due to changes in methodologies and construction sequencing. This change reduces the potential impacts discussed in Section 5.

Option 3: Alternative New Quay

6.3.5 As with all project of this nature, alternative locations were explored by PPA, which included a new quay being constructed. These options were discounted due to their significant cost both monetarily and operationally. They would significantly impact operational activity within the port. In addition, a new quay would cause significantly more environmental impact than extension of an existing quay, both in the marine environment and on land. As such, this option was not seen as a viable alternative.

Option 4: Current Scenario

6.3.6 The best viable option has been assessed as the current scenario, in conjunction with the risk assessment contained within this document, and best practice measures outlined in Section 5.3.

6.4 Test 3: Favourable Conservation Status

6.4.1 The action authorised must not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range (Regulation 44(3)(b)).

6.4.2 An EPS licence will not be granted if the proposed activity is detrimental to the maintenance of the population of the EPS affected at a favourable conservation status (FCS) in their natural range. When assessing FCS for cetaceans, the application should refer to the relevant cetacean Management Units (MU). Article 1(i) of the Habitats Directive defines FCS of a species as follows:

Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within its natural range.

The conservation status will be taken as 'favourable' when:

- *Population dynamics data on the species concerned indicates that it is maintaining itself on a long-term basis as a viable component of its natural habitats;*
- *The natural range of the species is neither being reduced nor is likely to be reduced for the fore-seeable future; and*
- *There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*

6.4.3 Negligible numbers of EPS will be affected compared to the Management Unit populations (Table 6.1).

Table 6.1 Percentage management unit populations predicted to be disturbed.

Species	Number disturbed	Management Unit Population	Percentage
Minke whale (LF)	2.3	10,288 (CGNS)	0.02%
Fin whale (LF)	0.02	No MU	n/a
Bottlenose dolphin (HF)	4.5	224 (CES) 1,855 (GNS)	2% (CES) 0.24% (GNS)
White beaked-dolphin (HF)	1.8	34,025 (CGNS)	0.01%
Common dolphin (HF)	0.2	57,417 (CGNS)	0.0003%
Risso's dolphin (HF)	0.9	8,687 (CGNS)	0.01%
Harbour porpoise (VHF)	437.6	159,632 (NS)	0.27%

6.4.4 Following the definitions outlined for FCS for cetaceans, the proposed surveys are assessed as having no significant detrimental impact on any of the populations of the species concerned.

7 Conclusion

7.1.1 The proposed construction activities satisfy all three EPS licence assessment tests. The activities have a licensable purpose, have considered all alternatives, and will maintain a favourable conservation status for all potentially impacted EPS.

7.1.2 However, as there is the potential for low to negligible risk of disturbance to some species due to underwater sound produced by construction equipment, an inshore EPS licence (for disturbance) will be required for the Project, to undertake the proposed construction works.

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