Inch Cape
OFFSHORE LIMITED

Inch Cape Cofferdam - Marine Licence Application Report

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Acronyms & Abbreviations

Acronym	Term
ALARP	As Low As Reasonable Practicable
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELC	East Lothian Council
ES	Environmental Statement
HRA	Habitats Regulation Appraisal
ICOL	Inch Cape Offshore Limited
LF	Low Frequency
LSE	Likely Significant Effects
MD-LOT	Marine Directorate – Licensing Operations Team
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NIS	Non-Indigenous Species
OfTI	Offshore Transmission Infrastructure
OfTW	Offshore Transmission Works
OSP	Offshore Substation Platform
PAC	Pre-Application Consultation
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SSC	Suspended Sediment Concentrations

SSSI	Site of Special Scientific Interest
TTS	Temporary Threshold Shift
UTM30N	Universal Transverse Mercator Zone 30 Northern Hemisphere
VOR	Valued Ornithological Receptor
WSI	Written Scheme of Investigation

Glossary

Defined Term	Meaning
Additional Landfall Works	Comprising the construction of a temporary access road, diversion of the East Lothian Council (ELC) outfall, movement of part of the rock revetment and temporary removal and reinstatement of sections of the seawall (covered by Marine Licence MS-00010672).
The 2010 Act	Marine (Scotland) Act 2010.
The 2013 Application	The Environmental Statement, HRA Report and supporting documents submitted by the Inch Cape Offshore Limited (ICOL) on 1st July 2013 to construct and operate an offshore generating station and transmission works.
The 2018 Application	The EIA Report, HRA Report and supporting documents submitted by ICOL on 15 August 2018 to construct and operate an offshore generating station and transmission works.
Cofferdam	A structure used in construction projects to create a dry working environment. The main components of a Cofferdam include steel sheet-piles, waling beams, props, and tie-rods. Each element serves a specific function in maintaining the structural form and integrity of the Cofferdam.
Development	The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Works (OfTW) being developed by ICOL.

Defined Term	Meaning
Development Area	The area for the Wind Farm, within which all Wind Turbine Generators, inter-array cables, interconnector cables, offshore substation platform(s) and the initial part of the Offshore Export Cable and any other associated works must be sited. As stipulated in the Crown Estate agreement for lease.
Inch Cape Offshore Transmission Infrastructure (OfTI)	Components of the Development comprising the offshore export cable and OSP which are permitted by the OfTI Marine Licence (MS-00010593).
Inch Cape Offshore Wind Farm/ The Wind Farm	A component of the Development, comprising wind turbines and their foundations and substructures, and inter-array cables.
Offshore Export Cables	The subsea, buried or protected electricity cables running from the offshore wind farm substation to the landfall and transmitting the electricity generated to the onshore cables for transmission onwards to the onshore substation and the electrical grid connection.
Offshore Export Cable Corridor/ Export Cable Corridor	The area within which the Offshore Export Cables will be laid from the Offshore Substation Platform (OSP) and up to Mean High Water Springs.
Offshore Transmission Works (OfTW)	Offshore Transmission Works (i.e., construction methods) associated with Inch Cape Offshore Wind Farm.
Props	Diagonal or horizontal compressive elements that support the Cofferdam walling beams and transfer the loads to the ground. They act as temporary support, resisting the weight of the water and soil acting on the Cofferdam.
Tie Rods	Tension members that run through the Cofferdam horizontally, connecting the sheet-piles on opposite sides. Like props, they help hold the sheet-piles in position and prevent them from spreading apart due to the lateral pressure exerted by the water and soil.

Defined Term	Meaning
Steel Sheet-Piles	Long, interlocking, vertical steel elements driven into the ground to form the perimeter of the Cofferdam. They act as a barrier, preventing water and soil from flowing into the enclosed area. The sheet-piles are usually installed deep into the ground or toed into rock to provide stability and resist lateral forces from the surrounding water and soil.
Waling Beams	Horizontal beams that connect and support the sheet-piles. They run along the length of the Cofferdam and provide additional lateral support. Waling beams help distribute the loads from the sheet-piles and transfer them to the props and tie-rods, enhancing the overall stability of the structure.

Executive Summary

Inch Cape Offshore Limited (ICOL) is applying for a marine licence under Part 4 of the Marine (Scotland) Act 2010 ('the 2010 Act'). The marine licence is required for the installation, operation and subsequent removal of a Cofferdam to facilitate the Additional Landfall Works (comprising the construction of a temporary access road, diversion of the East Lothian Council (ELC) outfall, movement of part of the rock revetment, and temporary removal and reinstatement of sections of the seawall) as part of the wider Offshore Export Cables installation for the Inch Cape Offshore Wind Farm.

A Screening Request under the 2017 Marine Works Environmental Impact Assessment (EIA) Regulations was made to the Scottish Ministers on the 18 August 2023 in respect of the proposed Cofferdam. A Screening Opinion was provided by Scottish Ministers on 20 September 2023. The Screening Opinion concluded that the Scottish Ministers were of the view that the work proposed was not an EIA project under the 2017 Marine Works EIA Regulations, therefore, an EIA is not required to be carried out in respect of the Cofferdam.

The Cofferdam is relatively small scale, temporary, and will be constructed within the existing consented Inch Cape Offshore Export Cable Corridor. Based on the consideration of effects on all potential environmental receptors, it can be concluded that the Cofferdam will not result in any potential significant impacts, and that no adverse effects on site integrity will arise on any European site.

The Cofferdam requires Pre-Application Consultation (PAC) under The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013 ("the Regulations"). ICOL has consulted with all required parties in line with the Regulations at a PAC event, and a PAC Schedule and supporting PAC Report accompanies this marine licence application (Appendix C).

This document has been prepared by competent experts, (The Natural Power Consultants), to provide the supporting information to inform the marine licence application.

1 Introduction

1.1 Background

1 The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Infrastructure (OfTI), hereafter referred to as the Development, is being developed by Inch Cape Offshore Limited (ICOL) (see Figure 1.1).

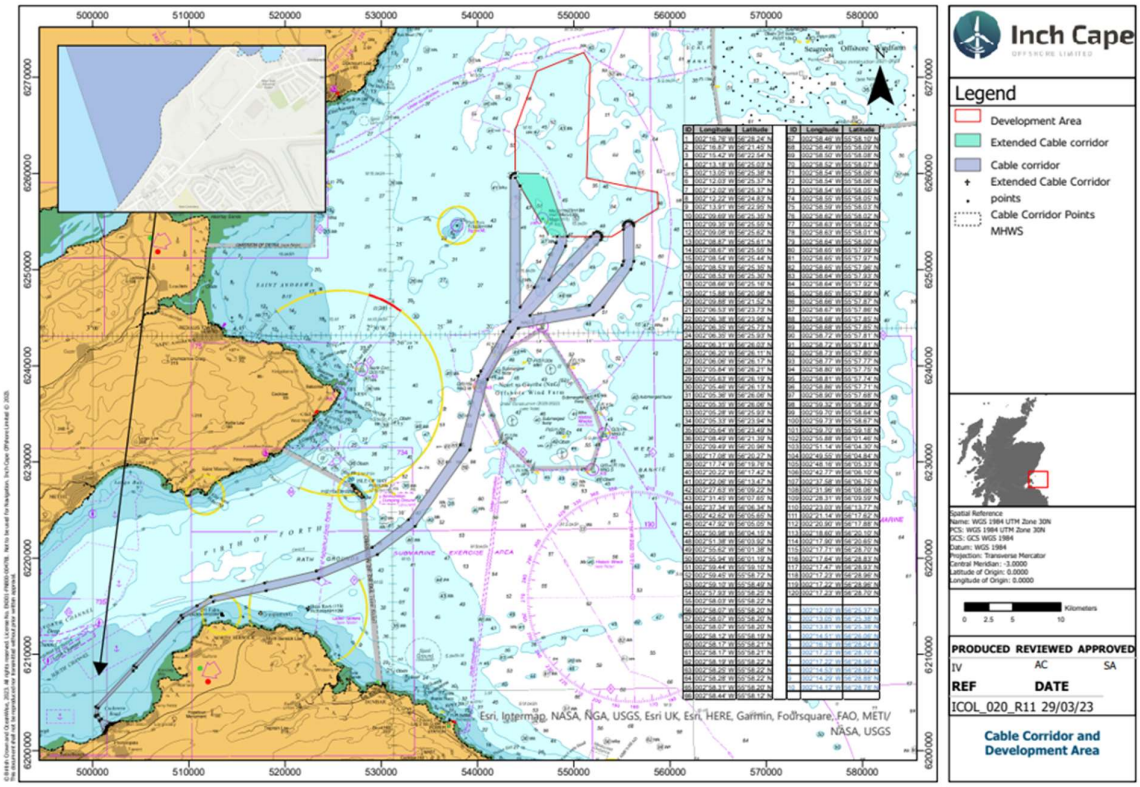

Figure 1.1: Inch Cape Offshore Development Area and Offshore Export Cable Corridor

2 In 2014, the Scottish Ministers granted ICOL Section 36 and Marine Licence Consents, pursuant to the 2013 Application, for the construction and operation of an offshore wind farm and a Marine Licence for the construction and operation of offshore transmission works. The licences granted to ICOL in 2014 (along with those for other Forth and Tay projects, Seagreen Alpha and Bravo and Neart na Gaoithe) were subject to a petition for judicial review in early 2015. A decision was made by the UK Supreme Court in November 2017 to uphold the Scottish Ministers' decisions to grant the offshore consents.

3 ICOL subsequently submitted the 2018 Application with a revised design that would allow the development of a project that could utilise progressions in technology since the 2014 consent. Section 36 and Marine Licence Consents for the revised design, were granted by Scottish Ministers in 2019.

4 Since the consent for the revised design was received, ICOL has successfully sought two variations to the Inch Cape Offshore Wind Farm Section 36 Consent and Marine Licence 06781/19/0. A separate variation application for these consents, to optimise wind farm efficiency and enable utilisation of the best available technological solution, was submitted to Marine Scotland Licensing and Operations Team (MD-LOT) and was granted consent in June 2023.

5 In 2019 a revised Marine Licence (06782/19/0) (dated 17th June 2019) was granted for the OfTI connecting the landfall location, near Cockenzie, East Lothian, and the Inch Cape Offshore Wind Farm which is located approximately 15 - 22 km off the Angus coastline, to the east of the Firth of Tay. A varied Marine Licence (MS-00010593), to capture changes to temporary and permanent deposit quantities and revision of the Offshore Export Cable Corridor Coordinates to include the intended Offshore Substation Platform (OSP) location, was granted 10 November 2023.

1.2 Intention to Apply for a New Marine Licence

6 ICOL is applying for a marine licence for installation, operation, and subsequent removal of a Cofferdam to undertake the Additional Landfall Works relating to the landfall cable installation. A Cofferdam is anticipated to be required, based on the current design and construction methodology, for the installation of the Offshore Export Cables. The Cofferdam will be installed within the area identified in Figure 1.2 and Table 1.1 and will form a separate marine licence application to the 'Additional Landfall Works' Marine Licence (dated 15/01/2024 - MS-00010672).

7 A Screening Report was submitted to MD-LOT under the 2017 Marine Works EIA Regulations for the Cofferdam works, and a Screening Opinion was provided by Scottish Ministers on October 25, 2023. This concluded that the Scottish Ministers were of the view that the works proposed were not an EIA project under the 2017 Marine Works EIA Regulations, therefore, an EIA was not required to be carried out in respect of this application.

Table 1.1: Cofferdam Coordinates

Latitude (Degrees, minutes, decimal minutes)	Longitude (Degrees, minutes, decimal minutes)	Northings	Eastings
55° 58.077'N	2° 58.512'W	675423	339226
55° 58.090'N	2° 58.538'W	675448	339200
55° 58.107'N	2° 58.510'W	675479	339229
55° 58.115'N	2° 58.490'W	675495	339252
55° 58.094'N	2° 58.476'W	675455	339264
55° 58.087'N	2° 58.487'W	675442	339253
55° 58.083'N	2° 58.501'W	675434	339238

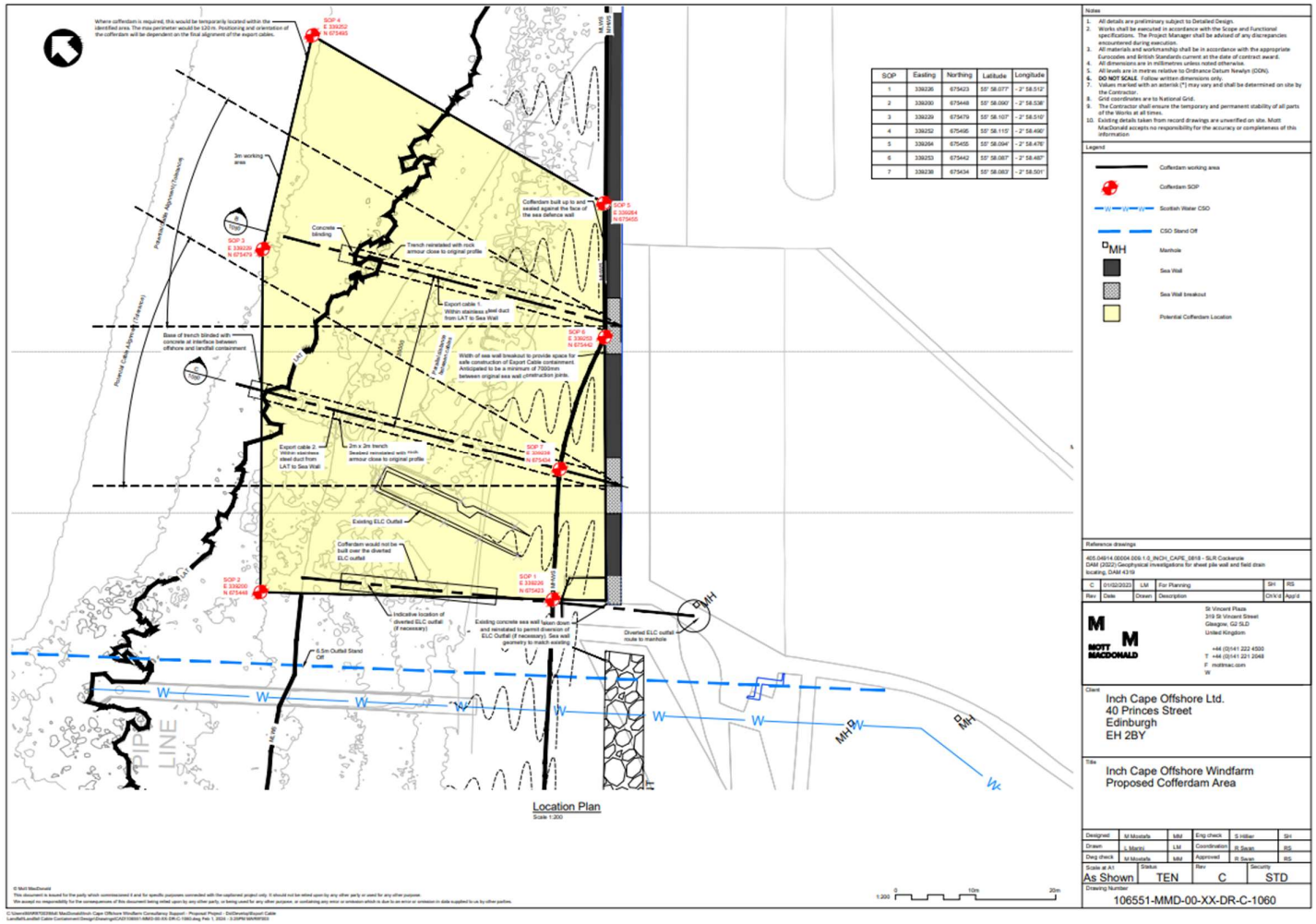

Figure 1.2: Inch Cape Offshore Wind Farm Proposed Cofferdam Area

8 Under the Marine (Scotland) Act 2010, a marine licence is required if a person or organisation intends to carry out marine construction works in the Scottish marine area, seaward of Mean High Water Springs (MHWS). ICOL intends to apply for a new marine licence under Part 4 of the Marine (Scotland) Act 2010 ("the 2010 Act") for the Cofferdam.

9 The Cofferdam requires Pre-Application Consultation (PAC) under The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013. ICOL has consulted with all required parties in line with the Regulations and a PAC Report accompanies this Marine Licence application (see PAC Schedule and supplementary PAC Report (Appendix C)).

10 As the Cofferdam is located in the intertidal area, planning permission is also needed from the local planning authority for the works. The required permission for the works above Mean Low Water Springs (MLWS) is being sought from East Lothian Council (ELC), separately.

1.3 Scope of this Document

11 This document has been produced to provide the supporting information to inform the marine licence application, and contains the following:

- Description of the Cofferdam Works (Section 2);
- Consultation (Section 3);
- Review of Environmental Effects (Section 4);
- Further Technical Considerations (Section 5); and
- Summary and Conclusions (Section 6).

2 Description of the Cofferdam Works

12 To facilitate the enabling works included within the Additional Landfall Works Marine Licence (Marine Licence MS-00010672), plus installation of the export cables, a temporary Cofferdam in the intertidal zone, under the proposed methodology, will be required. The Cofferdam is necessary to enable the intertidal elements of the work to be completed safely, to as low as reasonably practicable (ALARP) standards, to provide protection for the works, and to ensure a safe working area without being inundated by the tide.

2.1 Outline Programme

13 The indicative sequencing of the work in relation to other associated activities is set out in Table 2.1 below. The Cofferdam is likely to be in place until both Export Cables are installed and all backfilling works complete, currently anticipated to be up to 18 months. The estimated start date is Summer 2025; however, the programme is indicative, and both the programme and sequencing are subject to change.

Table 2.1: Sequencing of Operations

Sequence	Activity	Relevant Consent
1	Installation of temporary access	Additional Landfall Works Marine Licence
2	Diversion of ELC outfall[1]	Additional Landfall Works Marine Licence
3	Temporary removal of rock revetment	Additional Landfall Works Marine Licence
4	**Install temporary crushed rock piling platform**	**This marine licence application**
5	**Excavate narrow trench to facilitate piling operations**	**This marine licence application**
6	**Steel piles installed using vibro-piling**	**This marine licence application**
7	**Grout/concrete to seal toes of sheet piles and sides of Cofferdam to seawall**	**This marine licence application**
8	Temporary flood defence wall installed behind the sea defence wall on the landward side, if considered necessary by the contractor.	Onshore planning consent
9	Seawall openings created	Additional Landfall Works Marine Licence
10	Pre-works for cable pull-in and installation	OfTI Marine Licence Variation MS-00010593

[1] The Cofferdam is not required for this activity.

Sequence	Activity	Relevant Consent
11	Seawall reinstated and complete cable containment	Additional Landfall Works Marine Licence and OfTI Marine Licence Variation MS-00010672
12	**Cofferdam removed**	**This marine licence application**
13	**Crushed rock piling platform removed**	**This marine licence application**
14	Temporary access removed	Additional Landfall Works Marine Licence
15	Reinstate original beach profiles using stored rock armour	Additional Landfall Works Marine Licence

2.2 Outline Method Statement

14 The Cofferdam is envisaged as a traditional box structure (not necessarily square) with a maximum perimeter of up to 120 m (assuming any shape and size Cofferdam could be constructed within this parameter), formed from a perimeter of steel sheet-piles toed into the seabed and supported by horizontal waling beams, props, and tie-rods for stability (Figure 2.1). Installation of the Cofferdam is estimated to take 10 to 12 weeks, undertaken during low tide events, following clearance of the foreshore and anticipated upon completion of the ELC outfall diversion, prior to breaking through the seawall. Key parameters are outlined in Table 2.2 and described in more detail in the remainder of this Section.

Figure 2.1: Example Image Showing Waling Beam, Props and Tie Rods within a Cofferdam

Table 2.2: Key Parameters

Cofferdam Construction		
Cofferdam	• Cofferdam footprint with a maximum perimeter of up to 120 m. • A crushed rock level platform of up to 120 m in length and 3m width is required for piling operations. • Conventional Cofferdam constructed from steel sheet-piles to protect the foreshore working area. • Steel sheet-piles may be complemented by vertical steel H-Piles to stiffen the structure (subject to detailed design). • Internally, the sheet piles will be connected and stiffened using horizontal steel beams (waling beams) at multiple levels. • It is likely that the waling beams will be diagonally braced for support (subject to detailed design). • The steel-piles will likely be set into drilled "slots" on the seabed to achieve toe-fixity and be vibrated rather than percussively piled. • The toe and landward connection points may need to be grouted to create a seal.	• Top of the Cofferdam is at least the same level as the sea defence wall (subject to detailed design) (+7 m OD is estimated).
Anticipated method for	• Steel piles in pairs (assumed to be 1.4 m wide x 86 no. x 12 m high) would be installed	• It is likely, given the ground conditions and nature of the

installation and removal	using a vibro hammer into the seabed to achieve the required penetration[2]. • Piling duration: conservative estimate of up to 60 working days has been assumed. • Excavate a narrow trench around the footprint of the Cofferdam to prepare for piling work. • Where rock or difficult driving conditions are encountered it is anticipated that the ground will be prepared by pre-drilling to allow the piles to be advanced. • The Cofferdam would be constructed tight to the existing sea defence wall such that a seal could be formed to limit sea water entering the space: this will likely require an amount of grout/concrete to seal the toes of the sheet-piles and voids against/within the sea defence along with de-watering pumps. • It is feasible that the Cofferdam could be removed in full on completion of the works, however, depending on how the toes have been formed, it may be necessary to cut the sheet piles off just below bed level.	existing sea defence wall, that water will enter the Cofferdam and pumping will be needed. • Any water that requires to be pumped out of the Cofferdam will be pumped onshore to be filtered and returned or disposed of, safely off site.
Indicative programme	• The estimated start date is Summer 2025; however, the programme is indicative and subject to change.	• Cofferdam to be in place for up to 18 months.
Expected plant and equipment	• 45 te Long-reach excavator to clear the line of the piles (rock grab attachment). • 45 te Excavator with drill to break the rocky seabed and prepare for pile installation. • 150 te+ Crawler crane to pitch and install the piles. • Vibro-hammer to install the piles into the rock. • 10 te dumper. • Concrete pump to place grout. • De-watering pumps. • Mobile generators and lighting sets. • Option: a spud-leg barge with deck crane may be needed to install the outer line of Cofferdam piles if these are beyond the reach of the land-based crane.	
Expected working area	• Refer to Figure 1.2	
Types & Quantities of	• Anticipate the rock platform could be around 3 m wide and 0.5 m thick extending around	

[2] Please note that MHWS is +2.71 m ODN, therefore, the upper 3.8 m (around 1/3) of the steel sheet-pile is above MHWS. However, all the Cofferdam materials are treated as deposits below MHWS.

deposited material below MHWS (incl. temporary deposits)	•	the maximum perimeter (up to a maximum perimeter of 120 m). The volume of rock would be (120 m x 3 m x 0.5 m) 180 m³, Steel piles in pairs, assumed to be 1.4 m wide x 87 no x 12 m high = 1,500m^2 allowing for tolerances.

15 If a temporary flood defence wall is required, this will be above MHWS and therefore covered under the onshore consent.

16 A narrow trench will be excavated around the footprint of the Cofferdam to prepare for piling work. This narrow trench (potentially 600 mm wide) will extend through soft deposits to help start piling works. The material excavated including native rocks, cobbles, gravels and sands, will be temporarily stored onshore in advance of the piling works and will be reinstated once the Cofferdam has been removed. Depth will vary depending on ground conditions at the time of commencement. Steel piles would be installed into the seabed using vibro-piling to achieve the required penetration and is expected to take up to 60 working days.

17 The Cofferdam would be constructed tight to the existing sea defence wall such that a seal could be formed to limit sea water ingress: this will likely require grout/concrete to seal the toes of the sheet-piles and voids against/within the sea defence. The seawall cut through may require sheet piling above MHWS for trench sheeting and to ensure the cut through is secure.

18 Where rock or difficult driving conditions are encountered, it is anticipated that the ground will be prepared by pre-drilling to allow the piles to be advanced. Assuming a worst case, where the entire maximum outer perimeter requires drilling to a depth of 1000 mm, the volume of arisings would be no more than 80 m^3. It is anticipated that any arisings would be recovered to the onshore storage areas. Materials would be stored and processed for reuse when reinstating the beach. The materials will derive from native rocks and likely be processed through drilling and onshore crushing to cobble, gravel, and sand sized materials in accordance with the requirements of the relevant Pollution Prevention Control Part B permit or Waste Management Licences.

19 The top of the piles would match the height of the existing sea defence wall. It is possible temporary props and other supports may be required to ensure stability. There is the potential that gaps may be required in the Cofferdam to enable moveable ‘gates’ or ‘stoplogs’ to be installed to enable the Export Cables to cross. The gates/stoplogs section, if required, is also likely to include a bellmouth to receive the cable protection system and export cables. Once these are installed, the Cofferdam will be watertight. It is possible that de-watering pumps may be required, with water from the Cofferdam being pumped onshore. Once onshore, water will be treated and returned to the sea or tankered away and disposed of safely off site.

20 Whilst the sheet piles are not specifically designed as flood defences, they do afford a level of flood protection determined largely by the height of the Cofferdam.

21 Access to the foreshore would be via the temporary access road. The foreshore area will be required to be cleared of loose material, debris, and other obstructions to the work. The clearance and access

roads are not covered within the application for the Cofferdam and instead forms part of the Additional Landfall Works Marine Licence (MS-00010672).

22 Cofferdam construction would use conventional land-based plant to access the foreshore and install piles during low-tides. Piles would be pitched and installed by vibro-hammer working from the landward edge. A crushed rock piling platform around the perimeter is also anticipated to allow safe piling operations. It is anticipated this would be approximately 3 m wide and 0.5 m thick extending around the perimeter.

23 Subject to design development, following seabed clearance and immediately prior to Cofferdam installation, crushed rock would be placed to form the piling platform. Rock would be lifted from the onshore working area to the intertidal working area and be placed using excavators and bulldozers to form the platform. It is anticipated that a polypropylene geotextile geogrid (NAUE SecuGrid, or equivalent) could be used for the piling platform. It is assumed that the geotextile would be 3 m wide and installed around the full perimeter of the Cofferdam.

24 Both the rock access road and piling platform are temporary works to help construction of the Cofferdam and would be removed fully when the Cofferdam is no longer required.

25 The aim is to completely remove the Cofferdam (including any required gates/stoplogs) upon completion; however, it is anticipated that the grouted steel piles may be difficult to remove and, in this event, could be cut about 1 m below the seabed level, remaining *in-situ*. On the restored shoreline, the cut ends would be covered in rock armour. The scour potential at these locations is the same as the present seabed and therefore considered to be very low. The rock armour would be reused from the original beach deposits excavated and stored prior to construction, and therefore would be the same as original material as far as practicable. Allowance has however been made in the permanent deposits table (Table 2.3, below) for the import of additional rock armour should it be required. No additional grouting of the cut piles beyond that required to seal the toe of the functioning Cofferdam, is anticipated.

2.3 Deposits

26 Tables 2.3 and 2.4 below outline the estimated permanent and temporary deposits for the Cofferdam, respectively. For simplicity, and due to the difficulty in separating the Cofferdam materials, estimates include the height of the Cofferdam above MHWS to the top of the Cofferdam. The intention is that there are minimal permanent deposits (permanent deposits only remaining where they cannot be removed through standard means., e.g., steel piles not able to be fully removed but cut below surface and sealed/protected). Any potential permanent deposits are accounted for in Table 2.3.

Table 2.3: Permanent Substance(s) or Object(s) to be Deposited Below MHWS

Type of Deposit	Description/number	Quantity & Dimensions (metric)
Steel/Iron	On removal of the temporary Cofferdam, the grouted steel piles could be difficult to remove and would then be cut 1 m below the seabed level. This is an estimate of residual steel that could be left in the seabed. Noting that the steel would be covered by the restored beach deposits.	No.
		Dimensions: Maximum 120 m long perimeter. AZ24-700 steel sheet-piles 120 m x 200 kg/m run x 1.5m height
		Weight (Kg/tonnes): Approximately 40 tonnes
Boulders **(≥ 256.0 mm)**	Preferably the seabed would be restored using the stockpiled native materials, however, if imported, non-native, materials were required, then the following quantities would be required.	Volume (m^3): 900 m^3
		Weight (kg/tonnes): 1440 tonnes
Timber	Non anticipated.	No.
		Dimensions
		Weight (Kg/tonnes)
Concrete	Non anticipated.	No.
		Dimensions
		Weight (Kg/tonnes)
Plastic/Synthetic	Non anticipated.	
Clay (< 0.004 mm)	Non anticipated.	Volume (m^3)
		Weight (kg/tonnes)

Type of Deposit	Description/number	Quantity & Dimensions (metric)
Silt (0.004 ≤ Silt < 0.063 mm)	Non anticipated.	Volume (m^3)
		Weight (kg/tonnes)
Sand (0.063 ≤ Sand < 2.0 mm)	Non anticipated.	Volume (m^3)
		Weight (kg/tonnes)
Gravel (2.00 ≤ Gravel < 64.0 mm)	Non anticipated.	Volume
		Weight
Cobbles (64.0 ≤ Cobbles < 256.0 mm)	Non anticipated.	Volume (m^3)
		Weight (kg/tonnes)
Boulders (≥ 256.0 mm)	Non anticipated.	Volume (m^3)
		Weight (kg/tonnes)
Pipe	Non anticipated.	Length
		External Diameter
Cable	Non anticipated.	Length (m)
		External Diameter (cm/m)
Other (please describe below)		
Grout	On removal of the temporary Cofferdam, the grouted steel piles could be difficult to remove and would then be cut 1 m below the seabed level. This is an estimate of residual grout that could be left in the seabed. Noting that the grout would be covered by the restored beach deposits.	Volume (m^3): 35 m^3
Concrete (disposal)	Non anticipated.	No.
		Dimensions
		Weight (Kg/tonnes)

Table 2.4: Temporary Substance(s) or Object(s) to be Deposited Below MHWS

Type of Deposit	Description/number	Quantity & Dimensions (metric)
Steel/Iron	Maximum perimeter of up to 120 m length of steel sheet-pile creating a temporary construction Cofferdam built against the seaward face of the concrete sea wall. AZ24-700 steel sheet-piles 120 m x 200 kg/m run x 12 m height. Two rows of waling beams and props (plus additional 25% as allowance). Note potential for some permanent deposit – see Table 2.3.	No. Dimensions: 120 m long perimeter. Extends from ~1 m into seabed to the sea defence crest level. Weight (Kg/tonnes): 300 tonnes
Timber	Non anticipated.	No. Dimensions Weight (Kg/tonnes)
Concrete	Non anticipated.	No. Dimensions Weight (Kg/tonnes)
Plastic/Synthetic	Geotextile 3 m wide x 120 m = 360 m^2. 400 m^2 included for working permit tolerances. This is temporary and will be removed upon completion.	Dimensions: 400 m^2
Clay **(< 0.004 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)
Silt **(0.004 ≤ Silt < 0.063 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)

Type of Deposit	Description/number	Quantity & Dimensions (metric)
Sand **(0.063 ≤ Sand < 2.0 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)
Gravel **(2.00 ≤ Gravel < 64.0 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)
Cobbles **(64.0 ≤ Cobbles < 256.0 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)
Boulders **(≥ 256.0 mm)**	Non anticipated.	Volume (m^3) Weight (kg/tonnes)
Pipe	Non anticipated.	Length (m) External Diameter (cm/m)
Cable	Non anticipated.	Length (m) External Diameter (cm/m)
Other (please describe below)		
Crushed rock for the piling platform	Anticipated to be around 3 m wide x 0.5 m thick extending around the perimeter. The volume would be (120 m x 3 m x 0.5 m) 180 m^3, allowing for tolerances, up to 200 m^3 assumed. This is temporary and will be removed upon completion.	Volume (m^3): 200 m^3
Grout	Pile toe grout: assume 0.5 m x 0.5 m x 120 m plus tolerance. 2 x grout seals between the Cofferdam and seawall: assume 2 x 0.5 m x 0.5 m x 12 m plus tolerance.	Volume (m^3): 50 m^3

Type of Deposit	Description/number	Quantity & Dimensions (metric)
	This is temporary and will be removed upon completion.	

2.3.1 Excavated Materials

27 Beach deposits, gravels, and rock armour will be screened and stored onsite for reuse to reinstate the foreshore area upon completion of the works.

2.4 Access

28 A temporary road will be required to access the foreshore working areas and permit the safe movement of plant, material, and labour. The temporary access road is anticipated to comprise crushed rock and geotextiles placed on a prepared surface to suitable gradients. This temporary deposit of materials to construct the road forms part of the Additional Landfall Works Marine Licence (MS-00010672) and is not covered by this Cofferdam application.

2.5 Licensible Marine Activities

29 The following activities associated with the Cofferdam are considered to be licensable under the Marine (Scotland) Act 2010:

- Creation of working areas in the intertidal zone including the instalment of a Cofferdam; and
- Temporary removal and reinstatement of material in the intertidal zone from the narrow trench excavated in preparation for piling work.

3 Consultation

3.1 Screening Opinion Consultation

30 The Scottish Ministers in their Screening Opinion (20 September 2023) were of the view that the Cofferdam did not constitute an EIA project under the 2017 Marine Works Regulations and, therefore, an EIA is not required to be carried out in respect of this application.

31 Table 3.1 provides a summary of the consultation responses received for the Screening Request and, where relevant, how these have been addressed in this report.

Table 3.1: Summary of Screening Consultation

Consultee	Consultee Response Summary	ICOL Response
Angus Council	Angus Council has no requirements or comments to make.	Noted, no further information requested.
Aberdeenshire Council	Having reviewed the Screening Report (Inch Cape Offshore Transmission Works – 'Cofferdam Screening Request & Supporting Information'; Inch Cape Offshore Limited, Rev 0) I can confirm that Aberdeenshire Council would have no comment to make on the requirement for an Environmental Impact Assessment. The proposal would be unlikely to have any direct or indirect impact upon the Aberdeenshire Council area due to the distance of the development from our boundary.	Noted, no further information requested.
Dundee City Council	Dundee City Council has no comment on the Screening Opinion.	Noted, no further information requested.
East Lothian Council (ELC)	***Material assets – roads*** Having reviewed the information relating to this proposed Cofferdam element of the project, the council can conclude that it would not result in permanent or temporary impacts on the transport network that would have sufficient significance to require an EIA on transportation grounds. Notwithstanding this, there would still be some temporary impacts on the local road network as a result of the construction and dismantling phases	***Material assets – roads*** Noted, no further information requested at this stage. This detail will be provided in the Construction Traffic Management Plan (CTMP), once produced.

Consultee	Consultee Response Summary	ICOL Response
	that we would expect to be mitigated through a Construction Management Plan or at least amendment of the over-arching CMP to include reference to this additional element. ***Flood risk*** We would have no objection on the grounds of flood risk but would expect that the applicant completes a construction phase mitigation plan, which includes combatting flood risk during construction (e.g., the Cofferdam impact). In terms of screening for requirement of an EIA, the flood risk does not constitute the level required to need an EIA – the construction mitigation can be dealt with through a plan as above. ***Cultural heritage*** The additional landfall works will fall on an area of previously reclaimed land so have no further or limited/ no heritage implications. ***Biodiversity*** The proposal is in the intertidal area and below the low water mark, with some construction activity on the landward side. Table 3.1 identifies receptors which have potential to lead to significant effects and whether or not they require to be further considered. The potential receptors were benthic ecology, natural fish and shellfish, marine mammals and ornithology. Others with more expertise on these aspects of biodiversity including the qualifying features of European Sites and commercial effect of any impact on fish and shellfish will comment on this. The Council would support any views of NatureScot on impacts on marine mammals and the bird life of the Special Protection Areas. The council notes that National Planning Framework 4 Policy 3 requires provision for enhancement of biodiversity. This does not appear to have been included as part of the	***Flood Risk*** Noted, Construction plans to provide detail on any required flood risk mitigations. ***Cultural heritage*** Noted, no further information requested at this stage. ***Biodiversity*** Noted, no further information requested at this stage. See NatureScot comments and response for additional information on impacts to biodiversity receptors. The work proposed is highly localised and temporary in nature and all affected areas will be reinstated following removal of the Cofferdam. As such, there is no prediction of any long-term loss of biodiversity in the area of the proposed Cofferdam. Biodiversity enhancements will be provided within the intertidal habitat. These will focus on creating additional habitat on the existing seawall and enhancing habitat within the bare substrates (boulders) along the base of

Consultee	Consultee Response Summary	ICOL Response
	proposal to be screened.	the seawall. Such enhancements are expected to include: • Artificial rock pools which temporarily hold seawater following high tide. These structures can be attached directly to the existing seawall or any reinstated sections of seawall and provide additional habitat. • Drill coring into existing bare substrate (boulders) at the base of the seawall. Drilling small holes into existing substrates creates additional habitat by mimicking small rock pools. • Installation of rock pools at the base of the seawall. Larger tide pools or artificial rock pools may be installed amongst the existing bare substrates at the base of the seawall, which would provide additional habitat. The exact nature of the intertidal enhancements is currently unknown, however, the Environmental Clerk of Works will work with the Principal Contractor to develop intertidal biodiversity enhancements.
	Climate The Screening Report Table 3.1 discusses climate impacts. It recognised that some greenhouse gas emissions will be emitted as part of the proposed works, and that additional construction materials will be required. The table notes that where possible all materials removed on the completion of the work will be recycled or re-used, with disposal only where this cannot be done. I refer to the Institute of Environmental Management & Assessment (IEMA) Guide (2022): "Assessing Greenhouse Gas Emissions and Evaluating their Significance." Almost all	***Climate*** Please see Section 5.6 which considers the potential implications of the work in relation to Climate.

Consultee	Consultee Response Summary	ICOL Response
	projects will contribute to climate change, the consequences of which could lead to significant effects across all receptors. Emissions are approaching the limits under the Paris Agreement. This proposal is part of a project (renewable energy generation from offshore wind) which will replace activity in the baseline that has a higher greenhouse gas impact through helping to decarbonise its electricity supply. Decarbonising the electricity supply is an important strand of meeting climate change targets. We agree that the climate impacts of the proposal are not likely to be significant on their own. The IEMA guidance further notes: "For proposed projects where the need for an EIA has been screened out, it is still important that its GHG emissions are minimised wherever possible, as emissions of any scale contribute cumulatively to global climate change. Undertaking a proportionate assessment of GHG emissions on non-EIA projects is therefore good practice to support decisions that reduce GHG emissions". We would recommend that this is done. Regardless of the overall balance of greenhouse gas emissions of the project as a whole, the goal should be to reduce its residual emissions at all stages. If that is possible through the use of different methods or materials this should be considered. ***Conclusion*** The council does not consider the impact of the proposal is likely to be significant on receptors in or affecting East Lothian. The planning authority's opinion on the likelihood of significant environmental effects is reached only for the purpose of your consultation above. Our views are given without prejudice to any subsequent consideration by the planning authority through	***Conclusion*** Noted, no further action required.

Consultee	Consultee Response Summary	ICOL Response
	any other formal process of the impacts of the proposed development, and the authority's assessment of the acceptability or otherwise of the proposed development.	
Fife Council	Fife Council is not providing a formal EIA opinion in this instance on the basis that this request relates to an area outwith our geographical jurisdiction.	N/a
Historic Environment Scotland	We understand that the screening is in support of a separate marine licence for a Cofferdam to facilitate additional landfall works. These works comprise a temporary access road, outfall diversion, rock revetment alterations and export cable installation. We note that the assessment states that with the proposed mitigation there will be no further significant impacts on our interests from the proposals (Section 4.5.4) and we are content to agree with this assessment regarding our interests. We therefore have no further comments to make for the proposals	Noted, no further information requested.
NatureScot	***NatureScot advice - EIA*** Table 3.1 of the EIA Screening Report summarises potential significant effects arising from the Cofferdam works, and Section 4 considers these potential effects in detail. Topics that are considered in detail, and which are within our remit are: benthic ecology, fish & shellfish, marine mammals, ornithology. We accept the conclusions set out in Section 4 which can be summarised as: the additional works are small-scale and temporary, and the scale and magnitude of their impacts fall within the existing consented parameters, which have previously all been assessed as not significant (in EIA terms).	Noted. It is considered that sufficient information is included within this report, and the HRA information provided for the existing project consents, to provide the Appropriate Authority with the required information to reach a conclusion of No Adverse Effects on Site Integrity.

Consultee	Consultee Response Summary	ICOL Response
	We therefore support the applicant's position that these further engineering works can be screened out of EIA. ***NatureScot advice – HRA*** European sites overlap or lie in close proximity to the further engineering works. We therefore support the applicant's position that any forthcoming Marine Licence application must be supported by an HRA. At this early stage we advise that there is likely to be connectivity from the further engineering works to several European sites, and that we anticipate likely significant effects upon those sites. However, as the scale and magnitude of these impacts are likely to fall within existing consented parameters, we advise that the previous HRAs and appropriate assessments can be used to inform the forthcoming supporting HRA. We anticipate the previous conclusions of no adverse effects on site integrity on any European site are likely to apply to the current proposal.	
Scottish Borders Council	No comments to make on the Cofferdam screening.	Noted, no further information requested.
SEPA	We have no comments to make on this EIA screening request as works which are purely within the marine environment, including at any stage of EIA, falls below our consultation thresholds. Please refer to Section 2.2 of our SEPA standing advice for the Department for Business, Energy and Industrial Strategy and Marine Scotland on marine consultations. Please consider our standing advice in Section 3 and Table 1 as SEPA's views and consultation response, where relevant. If there is a significant site-specific issue, not addressed by our guidance or other information	Noted, no further information requested.

Consultee	Consultee Response Summary	ICOL Response
	provided on our website, with which you would want our advice, then please reconsult us highlighting the issue in question and we will try our best to assist. Please note that we have provided comments to East Lothian Council in relation to the substation at Cockenzie, which we have attached to this response for your information, given the relation to the onshore aspects of the Inch Cape project.	

3.2 Pre-Application Consultation (PAC)

32 Applicants for marine licences for certain activities are required to carry out PAC under the Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013 (PAC Regulations). One of these activities is construction works (other than for a renewable energy structure), in or over the sea or on or under the seabed where the area of the works exceeds 1000 m^2. The Cofferdam exceeds this threshold and therefore ICOL has undertaken PAC as detailed in the PAC Report and Schedule in Appendix C.

33 In accordance with the PAC Regulations, the Applicant prepared a Public Notice providing details of the formal PAC event proposed in respect of the Cofferdam. A copy of this notice is provided in Appendix C. The notice was advertised in the East Lothian Courier on 11 May 2023 giving details of the consultation and feedback mechanisms.

34 The Notice highlighted several methods to engage with the Applicant and provide feedback on the proposed Cofferdam. This included:

- A public drop-in event 13.00 – 19.00 Tuesday 27 June 2023 at Port Seton Community Centre;
- A public drop-in event 13.00 – 19.00 Wednesday 28 June 2023 at Prestonpans Town Hall;
- Online Consultation was available on the website www.inchcapewind.com from the 27 June to 1 October 2023, which included a link to an online feedback form; and
- Comments were also encouraged via email to info@inchcapewind.co.uk.

35 The public drop-in event was attended by nine people during the consultation time. Two feedback forms were completed, and one direct email was received.

4 Review of Environmental Effects

36 This review has been undertaken with particular regard to the environmental sensitivities of the geographical area that may be affected through a review of relevant designated sites, specifically those closest to the Cofferdam (shortest straight-line distances provided) (see Figure 4.1):

- Outer Firth of Forth and St Andrews Bay Complex SPA, SSSI and Ramsar (adjacent to working area);
- Firth of Forth SPA (adjacent to working area);
- Forth Islands SPA (13.0 km);
- Forth Islands SSSI (16.1 km);
- Isle of May SAC (34.7 km);
- Firth of Tay and Eden Estuary Ramsar (41.8 km);
- Firth of Tay and Eden Estuary SPA (42.8 km);
- Firth of Tay and Eden Estuary SAC (43.5 km); and
- Berwickshire and North Northumberland Coast SAC (46.8 km).

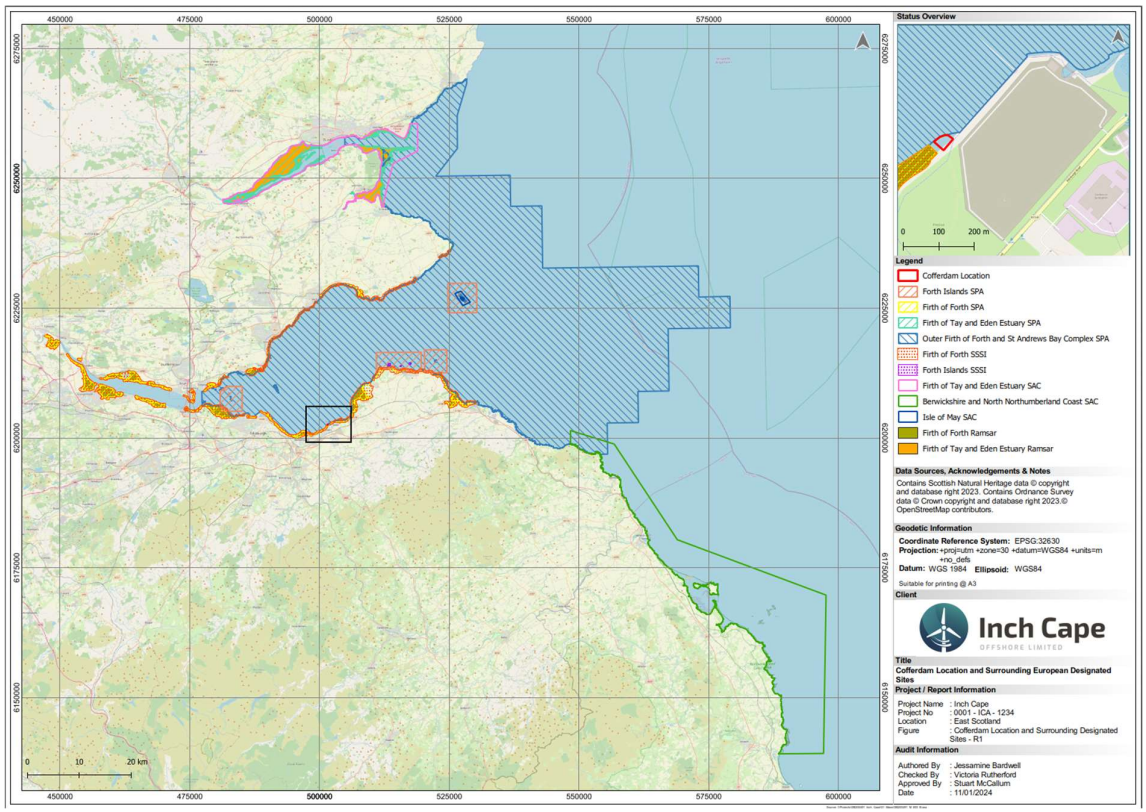

Figure 4.1: Cofferdam Location and Surrounding Designated Sites

37 A Habitat Regulations Assessment (HRA) is provided in Section 5.8 for European Sites for which Likely Significant Effects (LSE) cannot be ruled out.

38 A summary of potential significant environmental effects on receptors is identified in Table 4.1 below, with additional information provided in Section 5 (Further Technical Considerations), where necessary. Topics considered not to have the potential to lead to significant effects are also highlighted.

Table 4.1: Summary of Potential Significant Effect Relating to the Cofferdam Works

Receptor	Requires Further Consideration?	Reasoning
Metocean and Coastal Processes	No	The temporary presence of the Cofferdam in the intertidal zone has some potential to affect sediment transport processes by interrupting longshore sediment transport. However, any effects will be localised, temporary, and therefore reversible, and would not be enough to disrupt or alter the regional wave and tidal processes or the associated sediment transport in this area. The temporary placement of the structure and the dynamic nature of the Firth of Forth, would give to rise to only minor temporary and localised effects which are not considered to be significant and therefore no further assessment is required. No potential for significant effects to arise.
Benthic Ecology	Yes	Some minor temporary disturbance on the intertidal area by construction plant may occur, and temporary habitat loss whilst the Cofferdam is in-situ. Further consideration is presented in Section 5.1.
Natural Fish and Shellfish	Yes	The construction of the Cofferdam will require vibro-piling and therefore some minor temporary disturbance may occur. Further consideration is presented in Section 5.2.
Marine Mammals	Yes	The construction of the Cofferdam will require vibro-piling and therefore some minor temporary disturbance may occur. Further consideration is presented in Section 5.3.

Receptor	Requires Further Consideration?	Reasoning
Ornithology	Yes	Some minor disturbance on the intertidal area by construction plant may occur. Further consideration is presented in Section 5.4.
Seascape, Landscape and Visual Impact Assessment (SLVIA)	No	A temporary visual change would be expected. The Cofferdam is expected to be at least the same height as the existing seawall with landward views largely unchanged. No further assessment required. No potential for significant effects to arise.
Cultural Heritage and Marine Archaeology	Yes	Some minor disturbance on the intertidal area by construction plant may occur. Further consideration is presented in Section 5.5.
Commercial Fish	No	All work will be undertaken intertidally or from the landward side of the Cofferdam, with construction plant accessing from an onshore direction. As such no effects on commercial fisheries will arise. No further assessment required. No potential for significant effects to arise.
Shipping and Navigation	No	All work will be undertaken intertidally or from the landward side of the Cofferdam, with construction plant accessing from an onshore direction. No potential for significant effects to arise.
Socio-Economics and Tourism	No	No effects on socio-economic receptors. No potential for significant effects to arise.
Military and Civil Aviation	No	No effects on military and civil aviation. No potential for significant effects to arise.

Receptor	Requires Further Consideration?	Reasoning
Other Human Considerations	No	There may be very short periods of time during the works when partial closure of beach areas is required to maintain the safety of all beach users and construction workers. Such short term and partial closures are not predicted to result in any significant effects on other users as large areas of amenity beach areas will remain accessible. The Cofferdam will be used as the temporary flood defence which will be in place prior to removal of sections of the seawall. This will afford the same protection in terms of flood risk, maintaining the crest level and overall sea defence. No potential for significant effects to arise.
Climate Change and Greenhouse Gases	No	It is recognised that some greenhouse gas emissions, arising from vehicular sources will be emitted as part of this proposed work, and that additional construction materials will be required for the works. Where possible, all materials removed on the completion of the work will be recycled or re-used, with disposal used only where materials cannot be otherwise re-used or recycled. Due to the temporary and localised nature of the works, greenhouse gas emissions and waste materials are not considered to represent any potential for significant effects. It is considered that the works, as applied for, represent the lowest overall environmental effect compared to other options considered. No potential for significant effects to arise.

5 Further Technical Considerations

39 Where identified as required in Table 4.1, further information and consideration of environmental effects arising from the Cofferdam works are provided in this section through a review of existing OfTW environmental assessment conclusions (from the 2013 and 2018 Environmental Statements (ES)).

40 The Cofferdam works are analogous to other construction phase work that may be undertaken for the installation of the Wind Farm (i.e., short duration and temporary, and utilised for facilitating the OfTI construction). It is therefore considered that the construction phase impacts from the existing EIA's are relevant to the consideration of whether significant effects may arise from the proposed work.

5.1 Intertidal and Benthic Ecology

5.1.1 Existing Assessment

41 The effects of the OfTW on the intertidal benthic ecology of the area is set out in Chapter 12 of the 2013 Inch Cape Offshore ES. No further assessment was undertaken for the revised design (2018) EIA and benthic ecology was scoped out as the design changes proposed in the new application, coupled with no material changes to the baseline, were considered not to change the impact assessment conclusions. Effects were determined to be between minor and minor/moderate (not significant) (see Table 5.1).

Table 5.1: Assessment Conclusions Relevant to Intertidal Ecology During Construction from the Inch Cape Offshore Export Cable ES (2013) at the Cofferdam Location (northern half of Cockenzie landfall)

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Direct Temporary Disturbance of seabed habitats caused by Construction Activities. **Potential release of pollutants from construction plant.**	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.Fspi.FS LS.Lsa.MuSa.Lan	Minor	N/A	Minor
Indirect impacts of temporary increases in Suspended Sediment Concentration (SSC) from construction-based activities. **Deposition of resuspended sediments leading to smothering.** **Release of contaminants bound in sediments.** **Secondary impacts of decreased**	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.Fspi.FS LS.Lsa.MuSa.Lan	Negligible/ Minor	N/A	Negligible/ Minor

Effect	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
primary production due to increased SSC of the water column.				
Introduction of Non-Indigenous Species (NIS).	LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, IR.MIR.KR.Ldig.Ldig, LR.LLR.F.Fspi.FS LS.Lsa.MuSa.Lan	Minor/ Moderate	N/A	Minor/ Moderate

5.1.2 Baseline

42 During baseline surveys undertaken for the OfTW, nine biotopes were observed along the intertidal area surveyed at Cockenzie (Table 5.2).

Table 5.2: Biotopes Recorded at the Cockenzie Landfall

Biotope Code	Name
LS.LSa.St.Tal	Talitrids on the upper shore and strandline
LR.MLR.BF.PelB	*Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock
LR.HLR.MusB.Cht.Cht	*Chthamalus spp*. On exposed upper eulittoral rock
LR.MLR.BF.FspiB	*Fucus spiralis* on exposed to moderately exposed upper eulittoral rock
LS.LCS.Sh.BarS	Barren littoral shingle
LR.FLR.Eph.BlitX	Barnacles and *Littorina* spp. On unstable eulittoral mixed substrata
LR.FLR.F.Fspi.X	*Fucus spiralis* on full salinity upper eulittoral mixed substrata
LS.Lsa.MuSa.Lan	*Lanice conchilega* in littoral sand
IR.MIR.KR.Ldig.Ldig	*Laminaria digitata* on moderately exposed sublittoral fringe bedrock

43 The surveyed area, which includes the Cofferdam area, could be divided into distinct southern and northern areas. The southern half of the site was composed of mixed sediments, backed by soil composite. Below the strandline biotope (LS.Lsa.St.Tal), the mixed sediment was composed of sand and gravel, providing a habitat for limited fauna (LS.LCS.Sh.BarS). The gravel substrate below this supported a green algal community due to the numerous freshwater runoffs (LR.FLR.Eph.BlitX). The lower shore was covered by a fucoid community (LR.FLR.F.Fspi.X). On the extreme low shore, the kelp biotope of IR.MIR.KR.Ldig.Ldig was recorded with an area of sandy sediment characterised by the sand mason worm (LS.Lsa.MuSa.Lan).

44 The northern half of the intertidal area, where the Cofferdam will be located, was characterised by hard substrata, ranging from cobbles to boulders and bedrock. A seawall was also present, extending over 200 m into the surveyed area and beyond the northern limit of the survey area. Below the seawall, a narrow area of large boulders supported a fucoid community (LR.MLR.BF.PelB) mixed with a sparse barnacle community (LR.HLR.MusB.Cht.Cht). The barnacle community extended down the shore but gave way to the fucoid, *Fucus spiralis* biotope (LR.MLR.BF.FspiB). On the extreme low shore and extending into the infralittoral, the kelp biotope (IR.MIR.KR.Ldig.Ldig) was recorded on boulders and bedrock.

45 The biotopes LR.MLR.BF.PelB, LR.HLR.MusB.Cht.Cht, LR.MLR.BF.FspiB, and IR.MIR.KR.Ldig.Ldig are listed under the EC Habitats Directive under the Annex I reef habitat type (JNCC, 2010). Additionally, LR.FLR.F.Fspi.X is a biotope classified as typical of the Annex I large shallow inlet and bay physiographic type. LS.Lsa.MuSa.Lan is listed under the Annex I mudflats and sandflats not covered by seawater at low tide habitat type.

5.1.3 Effect of the Cofferdam works

46 Potential effects from the Cofferdam works include:

- Temporary disturbance / loss of habitat;
- Temporary increases in SSC leading to decreased primary productivity and smothering;
- Potential accidental release of pollutants from construction plant; and
- Introduction of NIS.

47 The installation of the Cofferdam (along with any preparatory works including the rock piling platform perimeter and excavated trench), may result in the temporary loss and disturbance to intertidal habitats for up to 18 months, particularly those at the top of the shore within the area contained by the Cofferdam. This area contains a mosaic of bare rock, fucoids and sparse barnacles which are likely to recover quickly after any disturbance as the species present are ubiquitous, typically found in high energy areas where disturbance and recolonisation occur regularly, and are present in the surrounding area which will facilitate rapid recolonisation and recovery upon completion of the works. There are discreet areas where rock protection may be required after the removal of the Cofferdam if all the sheet piles cannot be removed in full, and are instead cut off below the surface level. In this instance, it is envisaged that original beach material can be re-used for protection, however there is the possibility that additional material will need to be brought in for this purpose. In this eventuality, it is expected that the material will function in the same manner as that already present on the shore, providing a substrate for colonisation of the species local to the area, and any such additional material will not lead to any long-term changes in the habitats, species, or zonation

in the intertidal area.

48 There may be a temporary increase in SSC and associated smothering of habitats during and just after installation and removal of the Cofferdam, as areas of disturbed sediment are mobilised by tidal and wave activity. It is considered that such areas of disturbed sediment will be quickly restored to their pre-impacted state due to the nature of the shore, which is considered moderately exposed. In addition, due to the location within the Firth of Forth, the habitats present are already considered to be reasonably tolerant to relatively high levels of SSC and as such only negligible effects are predicted in relation to reductions in primary productivity and smothering.

49 Biosecurity and standard pollution prevention measures will be in place to reduce any potential for pollution events or introduction of NIS as far as is reasonably practicable.

5.1.4 Conclusion

50 No significant effects will arise on the intertidal ecology of the area as a result of the Cofferdam works. The impacts which may occur are also considered to be lesser in scale and magnitude than those already consented (and assessed as not significant) for installation of the Inch Cape Offshore Export Cables.

5.2 Natural Fish and Shellfish

5.2.1 Existing OfTW Assessment

51 The effects of the construction of the consented Inch Cape Offshore Export Cable works on natural fish and shellfish ecology were assessed in Chapter 12 of the original application submitted in 2013 and determined to be between minor / moderate, and negligible (i.e., not significant). No further assessment was undertaken for the revised design (2018) EIA on fish and shellfish ecology from the OfTW as the design changes proposed in the new application, coupled with no material changes to the baseline, were considered not to change the impact assessment conclusions.

52 The assessment of OfTW impacts is presented in Table 5.3 below.

Table 5.3: Assessment Conclusions Relevant to Fish and Shellfish Ecology from the Inch Cape Offshore Export Cable ES (2013) at the Cofferdam location

Impact	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Direct temporary habitat disturbance via Export Cable installation	Mobile fish	Negligible / Minor	N/A	Negligible / Minor
	Hearing specialists	Minor		Minor
	Prey species	Minor		Minor
	Electro-sensitive elasmobranchs	Negligible / Minor		Negligible / Minor
	SAC qualifying species	Minor / Moderate		Minor / Moderate
	Shellfish	Negligible / Minor		Negligible / Minor
Indirect disturbance as a result of	Mobile fish	Negligible / Minor	N/A	Negligible / Minor
	Hearing specialists	Minor		Minor
	Prey species	Minor		Minor

Impact	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
sediment deposition and temporary increases in SSC	Electro-sensitive elasmobranchs	Negligible / Minor		Negligible / Minor
	SAC qualifying species	Minor / Moderate		Minor / Moderate
	Shellfish	Negligible / Minor		Negligible / Minor
Disturbance or physical injury associated with construction noise	Mobile fish	Negligible / Minor	Piling operations will incorporate a soft start procedure	Negligible / Minor
	Hearing specialists	Minor		Minor
	Prey species	Minor		Minor
	Electro-sensitive elasmobranchs	Negligible / Minor		Negligible / Minor
	SAC qualifying species	Minor / Moderate		Minor / Moderate
	Shellfish	Negligible / Minor		Negligible / Minor

5.2.2 Baseline

53 During baseline surveys undertaken for the OfTW, an analysis of potential sandeel habitat in and around the Offshore Export Cable Corridor (and the Development Area) was undertaken due to the importance placed on sandeel as a prey resource. Sampling of 45 subtidal locations along the Offshore Export Cable Corridor revealed the dominant sediment classification was slightly gravelly muddy sand ((g)mS) and slightly gravelly sand ((g)S) accounting for approximately 70% of the samples. It was concluded that the Offshore Export Cable Corridor had only one small area which indicated suitability for sandeel, with the remainder being comprised of 'unsuitable' habitat (Appendix 13B (2013 ES), Sandeel Habitat Mapping).

54 The area of the Cofferdam is not within a herring or sandeel spawning ground (Ellis *et al*., 20123; Coull et al., 1998[4]).

5.2.3 Effect of the Cofferdam Works

55 Potential effects from the Cofferdam construction include:

- Disturbance or physical injury associated with construction noise;
- Direct temporary habitat disturbance; and

[3] Ellis, J.R., Milligan, S.P., Readdy, L., Taylor, N. And Brown, M.J. (2012). *Spawning and nursery grounds of selected fish species in UK waters*. Sci. Ser. Tech. Rep., Cefas Lowestoft, 147:56pp.

[4] Coull, K.A., Johnstone, R., and Rogers, S.I. (1998). *Fisheries Sensitivity Maps in British Waters*. Published and distributed by UKOOA Ltd.

- Indirect disturbance as a result of sediment deposition and temporary increases in SSC.

56 The impacts will be temporary in nature (with the worst-case piling duration estimated to be up to 60 working days (not including weather or down time)) and will be highly localised. Recent modelling undertaken by Subacoustech (Appendix A) revealed the maximum range for fish (where the swim bladder is involved in hearing) to display a temporary threshold shift (TTS) is 40 m, and the maximum range for which recoverable injury is predicted is 20 m from the noise source. As the piling activities will all be in the upper shore area, it is considered that risk of significant effects arising on fish receptors is negligible.

57 Direct temporary habitat disturbance within the intertidal zone will occur during low tide and the presence of species likely to be affected is low, given that the majority of fish and shellfish species covered within this topic are subtidal i.e., not found within the intertidal zone. As such, it is considered that risk of significant effects arising on fish receptors is negligible.

58 There may be a temporary increase in SCC as areas of disturbed sediment are mobilised by tidal and wave activity. It is considered that such areas of disturbed sediment will be quickly restored to their pre-impacted state due to the nature of the shore which is considered moderately exposed. In addition, due to the location within the Firth of Forth, any species present in the area are considered to be tolerant to relatively high levels of SSC as they would be within the area of wave affected natural sediment disturbance and as such only negligible effects are predicted.

5.2.4 Conclusion

59 No significant effects will arise on the natural fish and shellfish ecology of the area as a result of the Cofferdam works. These are considered to be lesser in scale and magnitude than those already consented (and assessed as not significant) for installation of the Inch Cape Offshore Export Cables.

5.3 Marine Mammals

5.3.1 Existing OfTW Assessment

60 The effects of construction of the consented Inch Cape Offshore Export Cable works on marine mammals were assessed as part of the revised application in 2018 (EIAR, Chapter 10) and determined to be minor (i.e., non-significant). The assessment of OfTW impacts is presented in Table 5.4 below.

Table 5.4: Assessment Conclusions Relevant to Marine Mammal Ecology from the Inch Cape Offshore Export Cable ES (2013) at the Cofferdam Location

Impact	Receptor	Pre-Mitigation Effect	Mitigation	Post-Mitigation Effect
Increase in underwater noise	Marine mammals (Harbour porpoise (*Phocoena phocoena*) used as a worst-case proxy)	Minor	N/A	Minor
Increased vessel movement	Marine mammals	Minor	N/A	Minor
Use of ducted propellors	Harbour seal (*Phoca vitulina*) Grey seal (*Halichoerus grypus*)	Minor Minor	N/A	Minor Minor
Change in the availability of prey species	Foraging marine mammals	Minor	N/A	Minor

5.3.2 Baseline

61 The most common species recorded in the Firths of Forth and Tay are as follows:

- Minke whale (*Balaenoptera acutorostrata*);
- Bottlenose dolphin (*Tursiops truncatus*);
- White-beaked dolphin (*Lagenorhynchus albirostris*));
- Harbour porpoise (*Phocoena phocoena*);
- Grey seal (*Halichoerus grypus*); and
- Harbour seal (*Phoca vitulina*).

62 Of the marine mammal species listed, grey seal, harbour seal, and bottlenose dolphins are of particular relevance with regard to the work on the Offshore Export Cable Corridor. Though other cetaceans such as minke whales and white-beaked dolphins do occur on a seasonal basis within the Firths of Forth and Tay, they are considered less likely to be present in the area, particularly closer to shore where the Cofferdam works are proposed.

63 The conservation status of all cetaceans and pinnipeds likely to be found in the area is listed as “favourable”. However, while the overall status of harbour seal is favourable, the local population in

the Firth of Tay and Eden Estuary SAC is predicted to be in an overall decline.

64 The Offshore Export Cable Corridor passes relatively close to the south-west of the Isle of May (approximately 5.5 km at the nearest point), an area designated as an SAC for grey seal. Around 2,000 pups are born each year on the island, with lower numbers recorded on smaller islands in the southern half of the Firth of Forth. A fast-growing colony can also be found at Fast Castle, on the southern outer reaches of the Forth.

65 Bottlenose dolphins (*Tursiops truncatus*) are primarily coastal, generally in waters less than 25 m deep, and whilst there appears to be no reports of bottlenose dolphins near to Cockenzie, they have been recorded along the Northumberland coast, suggesting they occur across the Offshore Export Cable Corridor.

5.3.3 Effect of the Cofferdam Works

66 Potential effects from the Cofferdam works include:

- Increase in underwater noise; and
- Change in the availability of prey species.

67 The impacts will be temporary in nature (with the worst-case piling duration estimated to be up to 60 working days (not including weather time)) and will be highly localised. Modelling (see Appendix A) revealed that the maximum predicted impact ranges for vibro-piling noise are predicted for the Low frequency (LF) hearing cetacean group (i.e., all mysticetes including minke whale) (Southall *et al*., 2019), with cumulative sound exposure level (SELcum) ranges for up to 50 m for TTS, based on a stationary receptor during a six-hour piling window. No SACs overlap this range, the closest, Isle of May is >30 km from the works, and the predicted range is based on highly precautionary parameters, particularly around stationary species, given their high mobility in the marine environment. As such, effects on marine mammals from underwater noise are considered to be negligible.

68 A change in available prey species as an indirect impact via disturbance to the seabed is not anticipated given the works will be undertaken in the upper area of the intertidal zone and that effects on marine mammals are considered negligible and not significant.

5.3.4 Conclusion

69 No significant effects will arise on the marine mammal features in the area as a result of the Cofferdam works. These are considered to be lesser in scale and magnitude than those already consented (and assessed as not significant) for installation of the OfTW.

5.4 Ornithology

5.4.1 Existing OfTW Assessment

70 The effects of construction of the consented Inch Cape Offshore Export Cable works nearshore to MHWS (including in the intertidal) on ornithology have been assessed as part of Chapter 15 of the 2013 ES (ICOL, 2013) and determined to be negligible (not significant) for all Valued Ornithological Receptors (VORs) (Table 4.5). This was not reassessed for the revised design as the design changes were deemed to fall within the existing worst case assessed.

Table 5.5: Assessment Conclusions Relevant to Ornithology from the Inch Cape Offshore Export Cable ES (2013) at the Cofferdam Location

Impact	Receptor	Season	Residual Effects
Direct habitat loss during construction	All ornithological receptors	All	Negligible
Direct disturbance during all phases			
Indirect impacts on birds via prey			

5.4.2 Baseline

71 The Offshore Export Cable Corridor passes through the intertidal area of the Firth of Forth, passing near to the Firth of Forth SPA, Ramsar site and SSSI, and through the Outer Firth of Forth and St Andrews Bay Complex. This shoreline contains a variety of coastal and estuarine habitats which attract large numbers, and a wide variety, of over-winter and passage wetland birds (waders and waterfowl) to the area. During intertidal ornithology surveys undertaken for the 2013 ES, the Cockenzie Power Station location supported a reasonably high number of species, recorded in significant proportions of their respective Firth of Forth SPA population estimates, compared to other areas.

5.4.3 Effect of the Cofferdam Works

72 Potential effects from the Cofferdam works include:

- Direct Disturbance (visual and noise stimulus);
- Habitat loss; and
- Indirect effects on bird communities via effects on prey species.

73 The impacts on ornithological receptors from the Cofferdam works will be temporary in nature and/or highly localised. Given the available foraging areas in the wider Firth of Forth, the spatial extent of any impact represents a very slight change from baseline conditions. Disturbance is therefore predicted to represent effects which will lie within the limits of natural variation and as such will not lead to any significant effects.

74 Noise levels from vibro-piling have been recorded as 80-90 dBA @ 10m[5]. The Waterbird Disturbance Mitigation Toolkit (Cutts *et al.*, 2013), notes that noise levels of this magnitude are likely to fall to non-disturbing levels within approximately 85 m of the source. It is noted that visual disturbance effects on waterbirds will, in most cases, trigger a disturbance effect before any associated noise will and flight responses in intertidal species may be triggered within approximately. 100-150 m of visual stimuli.

[5] https://wsdot.wa.gov/sites/default/files/2021-10/Env-Noise-MonRpt-AirborneVibratory.pdf

75 The area over which the effects of disturbance and associated displacement (and resulting temporary loss of habitat) are likely to occur are considered to be negligible in the context of the wider availability of similar (or preferential) intertidal habitat within the Firth of Forth.

76 During the Cofferdam works, indirect effects on bird communities through impacts on prey availability may occur. The impacts on prey species may result from temporary habitat disturbance and an increase in SSC and deposition. The Cofferdam works are very localised, and any effects on benthic and intertidal communities are likely to be negligible (see above). It is considered that seabird communities would not be affected as impacts would not significantly extend beyond the area of works or be of sufficient scale to impact prey abundance or distribution.

5.4.4 Conclusion

77 No significant effects will arise on ornithological receptors as a result of the Cofferdam works, which are considered to be lesser in scale and magnitude than those already consented (and assessed as not significant) for the installation of the Inch Cape Offshore Export Cables.

5.5 Cultural Heritage and Marine Archaeology

5.5.1 Existing Assessment

78 The effects of construction of the consented Inch Cape Offshore Export Cable works on cultural heritage assets have been assessed in Chapter 17 of the original ES (2013) and determined to be minor (not significant) after mitigation in the form of implementation of a Written Scheme of Investigation (WSI) (Table 5.6).

Table 5.6: Assessment Conclusions Relevant to Cultural Heritage Receptors in the Inch Cape Offshore Export Cable ES (2013) at the Cofferdam Location

Impact	Receptor	Pre-Mitigation Effects	Mitigation	Post-Mitigation Effects
Damage to or removal of heritage features resulting from direct physical impacts.	Known maritime features (A1), unconfirmed locations of shipwrecks (A3) and known intertidal heritage assets.	Major Adverse Significance	Implementation of Written Scheme of Investigation	Minor
Damage to or removal of features.	Unknown maritime, aviation and intertidal heritage features.	Major Adverse Significance	Reporting Protocols, programme of mitigation works.	Minor

5.5.2 Baseline

79 Baseline data on known cultural heritage receptors and assessment of the potential for unknown receptors has been made here only for assets falling partially or completely between the MHWS and MLWS.

80 The ES (2013) identified a total of ten known cultural heritage assets within the intertidal section (up to MHWS) of the Offshore Export Cable Corridor study area, defined as the Offshore Export Cable Corridor plus a one-kilometre buffer (which includes the location of the Cofferdam). These include a small number of prehistoric finds including a worked flint and various pieces of Iron Age metalwork thought to relate to a hoard buried on the beach. There are three harbours within the intertidal zone, two of which are still in use. Although most of the physical remains of these harbours lie above the MHWS mark, they are included here as they extend into the intertidal zone. All three were first constructed in the 16th/17th centuries. The two harbours still in use are the focus of the Cockenzie and Port Seton Conservation Areas, and Morrison's Haven is the site of a medieval harbour, built in the 16th century by the monks of Newbattle. It fell out of use during WWII and has since been largely covered by an area of mining spoil known locally as 'the cast', although a significant part of the structure appears to be intact within the spoil heap.

81 There are also several industrial archaeological features in the intertidal element of the Offshore Export Cable Corridor study area. These include rock-cut salt pans with associated remains of walls and a disused circular domed cement structure (which formerly served as a cap for an air shaft from Preston Grange Colliery).

82 None of these features are within the location of the Cofferdam construction area. The closest is an intertidal feature of cultural heritage interest (a Worked Flint WA – 1003), approximately 1 km to the west of the installation.

5.5.3 Effect of the Cofferdam Works

83 Potential effects from the Cofferdam works in the intertidal zone include:

- Direct damage to archaeological deposits and material; and
- Disturbance or destruction of relationships between deposits and material and their wider surroundings.

84 There are no known archaeological features within the intertidal area of the Cofferdam but there is a potential for currently unknown archaeological features being identified. This stretch of East Lothian coastline has a high archaeological potential and has been extensively settled throughout human history. The intertidal archaeological sites in the wider area attest to a variety of activities, including salt panning, pottery manufacture, coal mining and related maritime activities such as fishing.

85 As such, it is considered that all mitigations in place for the installation of the Offshore Export Cables be implemented for any intertidal works required under this application. This will include:

- Implementation of a WSI; and

- Implementation of reporting protocols and development of an agreed programme of mitigation in the event of any removal requirements.

5.5.4 Conclusion

86 With mitigation, no significant effects will arise on cultural heritage receptors as a result of the Cofferdam works, which are considered to be lesser in scale and magnitude than those already consented (and assessed as not significant) for the installation of the Inch Cape Offshore Export Cables.

5.6 Climate

87 It is recognised that the Cofferdam works described within this Application have the potential to contribute to greenhouse gas emissions. However, the objective of the Cofferdam works is to support the development of the Inch Cape Offshore Wind Farm which will generate a renewable source of electricity and contribute to a reduction in Scotland's greenhouse gas emissions. As per the Inch Cape 2021 Carbon Balance Assessment[6], the Inch Cape Project's annual greenhouse gas emissions saving from displacing gas-fired generation is predicted to be 1.43 Metric tonnes of CO_2 per year. This is equivalent to a reduction of 3.1% of the annual total greenhouse gas emissions in Scotland (based on 2019 records).

88 It can be clearly seen that the Inch Cape project will be of net benefit to Scottish Government's Net Zero target and support the work undertaken in declaration of the Climate Emergency. It is considered that any greenhouse gas emissions that may arise in response to the works under this Application will be negligible in comparison to the overall project benefits and that no significant impact from greenhouse gas emissions will result from the Cofferdam (overall there remains a significant beneficial CO_2 impact as a result of the Inch Cape project).

5.7 Cumulative Considerations

89 As the Cofferdam works are very localised in extent and will not result in any significant adverse effects on any receptor, it is considered that there is no potential for significant cumulative effects to arise.

90 The only other plans or projects that could be considered to act cumulatively are the Additional Landfall Works (application screened – no EIA), and the installation of the Inch Cape Offshore Export Cables in the intertidal area (no significant effects predicted), as this work will be undertaken during the same timeframe and at the same spatial location.

91 All effects of the installation of the Inch Cape Offshore Export Cable were considered to be not-significant, as are any effects that may result from the Cofferdam works and the Additional Landfall Works. As such, it is therefore considered that all effects at a cumulative level will not be significant, due to the short duration of works, and limited spatial scale over which all will act.

[6] 4-ICOL-OnTW-EIA-Volume-3-Technical-Appendices.pdf (inchcapewind.com)

5.8 Habitats Regulation Appraisal (HRA)

92 The European Sites in proximity to the Cofferdam works (see Figure 4.1) are:

- Outer Firth of Forth and St Andrews Bay Complex SPA (overlaps with intertidal working area);
- Firth of Forth SPA (adjacent to the Cofferdam);
- Forth Islands SPA (13.0 km); and
- Firth of Tay and Eden Estuary SPA (42.8 km).

93 NatureScot confirmed that the potential for LSE cannot be ruled out on the designated sites listed above. As such, a consideration of the potential for the work to result in adverse effects on site integrity is required. The features and conservation objectives relevant to each European Site are described in Appendix B.

94 It is considered that LSE can be ruled out on all other European sites, including the Isle of May SAC, and Berwickshire to Northumberland coast SAC, based upon the lack of connectivity, or due to the negligible potential for environmental effects to arise on receptors from all other European designated sites.

95 Detail on the potential effects on ornithological receptors are set out in Section 5.4.

96 Considering the small spatial scale and short duration of the works, the only other plans or projects that are considered to act in-combination are the installation of the Inch Cape Offshore Export Cables, the Additional Landfall Works, and potential construction and removal of the Cofferdam in the intertidal area, as this work will be undertaken during the same timeframe and spatial location as the work under this proposed application.

97 Based upon the scale and duration of the potential effects arising from the Cofferdam on the features of the above listed designated sites, it is concluded (and NatureScot has indicated their likely agreement of this position), that, in light of the conservation objectives for the Sites, there is no potential for adverse effects on site integrity, either alone or in combination with other plans or projects.

6 Summary and Conclusion

98 The Cofferdam is small scale, temporary and will take place within the existing consented Inch Cape Offshore Export Cable Corridor. Based on the above consideration of effects on all potential environmental receptors, it can be concluded that the Cofferdam works (as described in Section 2) will not result in any potential significant effects and that no adverse effects on site integrity will arise on any European site.

Appendix A: Subacoustech Noise Modelling Report

Modelling of underwater noise from vibro-piling for cofferdam installation: inshore works for Inch Cape Offshore Wind Farm

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This report is a controlled document. The report documentation page lists the version number, record of changes, referencing information, abstract and other documentation details.

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Glossary

Term	Definition
Decibel (dB)	A customary scale commonly used (in various ways) for reporting levels of sound. A difference of 10 dB corresponds to a factor of 10 in sound power. The actual sound measurement is compared to a fixed reference level and the "decibel" value is defined to be $10\log_{10}(actual/reference)$ where $(actual/reference)$ is a power ratio. Because sound power is usually proportional to sound pressure squared, the decibel value for sound pressure is $20\log_{10}(actual\ pressure/reference\ pressure)$. The standard reference for underwater sound is 1 micropascal (µPa). The dB symbol is followed by a second symbol identifying the specific reference value (e.g., re 1 µPa).
Peak pressure	The highest pressure above or below ambient that is associated with a sound wave.
Permanent Threshold Shift (PTS)	A permanent total or partial loss of hearing caused by acoustic trauma. PTS results in irreversible damage to the sensory hair cells of the ear, and thus a permanent reduction of hearing acuity
Sound Exposure Level (SEL)	The constant sound level acting for one second, which has the same amount of acoustic energy, as indicated by the square of the sound pressure, as the original sound. It is the time-integrated, sound-pressure-squared level. SEL is typically used to compare transient sound events having different time durations, pressure levels, and temporal characteristics.
Sound Pressure Level (SPL)	The sound pressure level is an expression of sound pressure using the decibel (dB) scale; the standard frequency pressures of which are 1 µPa for water and 20 µPa for air.
Temporary Threshold Shift (TTS)	Temporary reduction of hearing acuity because of exposure to sound over time. Exposure to high levels of sound over relatively short time periods could cause the same level of TTS as exposure to lower levels of sound over longer time periods. The mechanisms underlying TTS are not well understood, but there may be some temporary damage to the sensory cells. The duration of TTS varies depending on the nature of the stimulus.
Unweighted sound level	Sound levels which are "raw" or have not been adjusted in any way, for example to account for the hearing ability of a species.
Weighted sound level	A sound level which has been adjusted with respect to a "weighting envelope" in the frequency domain, typically to make an unweighted level relevant to a particular species. Examples of this are the dB(A), where the overall sound level has been adjusted to account for the hearing ability of humans in air, or the filters used by Southall *et al*. (2019) for marine mammals.

1 Introduction

Subacoustech Environmental have been requested by Inch Cape Offshore Limited to carry out underwater noise modelling for vibro-piling activity to install a cofferdam as part of the inshore works for the Inch Cape Offshore Wind Farm.

1.1 Site description

The cofferdam site for the inshore works is located on the southern bank of the Firth of Forth, near Cockenzie, Lothian, Scotland as shown in Figure 1-1. Modelling has been undertaken at a single location along the northern edge of the site (6202544N, 501546E, UTM 30N) in the deepest waters, which tend to lead to the highest noise levels. This gives a worst-case scenario.

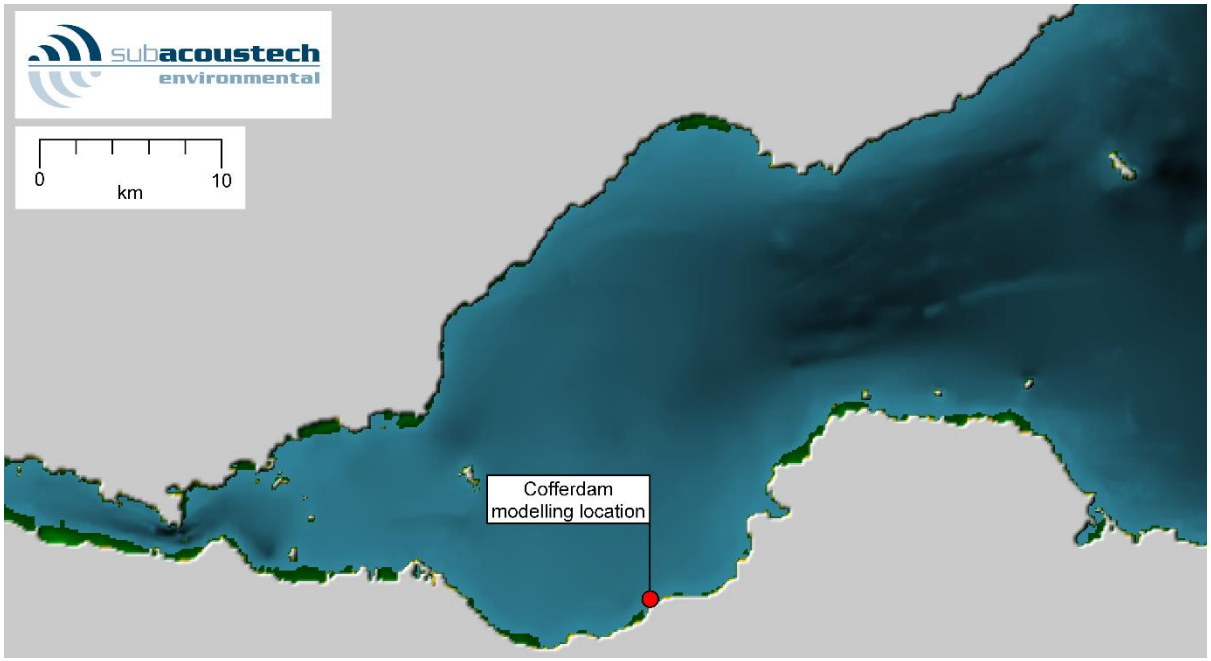

Figure 1-1 Location of the cofferdam modelling location and the surrounding bathymetry in the Firth of Forth

1.2 Vibro-piling noise

The cofferdam installation involves driving AZ24-700 type sheet piles, which measure 1.4 m wide, secured in the seabed using a vibratory hammer. The anticipated model of hammer for these works is a Movax SG75.

A vibratory hammer works by using spinning counterweights to create vibration combined with vertical pressure to drive the pile into the soil.

At the site there is a six-hour tidal working window per day, so, for cumulative noise impact criteria, it has been assumed that the vibro-piling noise will be present for the entire six-hour window as a worst-case.

2 Background to underwater noise metrics

Sound travels much faster in water (approximately 1,500 ms^{-1}) than in air (340 ms^{-1}). Since water is a relatively incompressible, dense medium, the pressures associated with underwater sound tend to be much higher than in air. As an example, background levels of sea noise of approximately 130 dB re 1 µPa for UK coastal waters are not uncommon (Nedwell *et al*, 2003 and 2007).

It should be noted that stated underwater noise levels should not be confused with noise levels in air, which use a different scale.

2.1 Units of measurement

Sound measurements underwater are usually expressed using the decibel (dB) scale, which is a logarithmic measure of sound. A logarithmic scale is used because, rather than equal increments of sound having an equal increase in effect, typically each doubling of sound level will cause a roughly equal increase of "loudness."

Any quantity expressed in this scale is termed a "level." If the unit is sound pressure, expressed on the dB scale, it will be termed a "sound pressure level."

The fundamental definition of the dB scale is given by:

$$Level = 10 \times \log_{10}\left(\frac{Q}{Q_{ref}}\right)$$

where Q is the quantity being expressed on the scale, and Q_{ref} is the reference quantity.

The dB scale represents a ratio. It is therefore used with a reference unit, which expresses the base from which the ratio is expressed. The reference quantity is conventionally smaller than the smallest value to be expressed on the scale so that any level quoted is positive. For example, a reference quantity of 20 µPa is used for sound in air since that is the lower threshold of human hearing.

When used with sound pressure, the pressure value is squared. So that variations in the units agree, the sound pressure must be specified as units of Root Mean Square (RMS) pressure squared. This is equivalent to expressing the sound as:

$$Sound\ pressure\ level = 20 \times \log_{10}\left(\frac{P_{RMS}}{P_{ref}}\right)$$

For underwater sound, a unit of 1 µPa is typically used as the reference unit (P_{ref}); a Pascal is equal to the pressure exerted by one Newton over one square metre, one micropascal equals one millionth of this.

2.2 Quantities of measurement

Sound may be expressed in different ways depending upon the particular type of noise, and the parameters of the noise that allow it to be evaluated in terms of a biological effect. These are described in more detail below.

2.2.1 Sound pressure level (SPL)

The Sound Pressure Level (SPL) is normally used to characterise noise and vibration of a continuous nature, such as drilling, boring, continuous wave sonar, or background sea and river noise levels. To calculate the SPL, the variation in sound pressure is measured over a specific period to determine the RMS level of the time-varying sound. The SPL can therefore be considered a measure of the average unweighted level of sound over the measurement period.

Where SPL is used to characterise transient pressure waves, such as that from impact piling, seismic airgun or underwater blasting, it is critical that the period over which the RMS level is calculated is quoted. For instance, in the case of a pile strike lasting a tenth of a second, the mean taken over a tenth of a second will be ten times higher than the mean averaged over one second. Often, transient sounds such as these are quantified using "peak" SPLs or Sound Exposure Levels (SELs).

Unless otherwise defined, all SPL noise levels in this report are referenced to 1 µPa.

2.2.2 Peak Sound Pressure Level (SPL_{peak})

Peak SPLs are often used to characterise transient sound from impulsive sources, such as percussive impact piling. SPL_{peak} is calculated using the maximum variation of the pressure from positive to zero within the wave. This represents the maximum change in positive pressure (differential pressure from positive to zero) as the transient pressure wave propagates.

A further variation of this is the peak-to-peak SPL ($SPL_{peak\text{-}to\text{-}peak}$) where the maximum variation of the pressure from positive to negative is considered. Where the wave is symmetrically distributed in positive and negative pressure, the peak-to-peak pressure will be twice the peak level, or 6 dB higher.

2.2.3 Sound Exposure Level (SEL)

When considering the noise from transient sources, the issue of the duration of the pressure wave is often addressed by measuring the total acoustic energy (energy flux density) of the wave. This form of analysis was used by Bebb and Wright (1953, 1954a, 1954b, 1955), and later by Rawlins (1987), to explain the apparent discrepancies in the biological effect of short and long-range blast waves on human divers. More recently, this form of analysis has been used to develop criteria for assessing injury ranges for fish and marine mammals from various noise sources (Popper *et al*., 2014; Southall *et al*., 2019).

The SEL sums the acoustic energy over a measurement period, and effectively takes account of both the SPL of the sound and the duration it is present in the acoustic environment. Sound Exposure (SE) is defined by the equation:

$$SE = \int_0^T p^2(t)dt$$

where p is the acoustic pressure in Pascals, T is the total duration of sound in seconds, and t is time in seconds. The SE is a measurement of acoustic energy and has units of Pascal squared seconds (Pa^2s).

To express the SE on a logarithmic scale by means of a dB, it must be compared with a reference acoustic energy (${p^2}_{ref}$) and a reference time (T_{ref}). The SEL is then defined by:

$$SEL = 10 \times \log_{10}\left(\frac{\int_0^T p^2(t)dt}{{p^2}_{ref}T_{ref}}\right)$$

By using a common reference pressure (p_{ref}) of 1 µPa for assessments of underwater noise, the SEL and SPL can be compared using the expression:

$$SEL = SPL + 10 \times \log_{10} T$$

where the SPL is a measure of the average level of broadband noise and the SEL sums the cumulative broadband noise energy.

This means that, for continuous sounds of less than (i.e., fractions of) one second, the SEL will be lower than the SPL. For periods greater than one second, the SEL will be numerically greater than the SPL

(i.e., for a continuous sound of 10 seconds duration, the SEL will be 10 dB higher than the SPL; for a sound of 100 seconds duration the SEL will be 20 dB higher than the SPL, and so on).

Where a single impulse noise such as the soundwave from a pile strike is considered in isolation, this can be represented by a "single strike" SEL or SEL_{ss}. A cumulative SEL, or SEL_{cum}, accounts for the exposure from multiple impulses or pile strikes over time, where the number of impulses replaces the T in the equation above, leading to:

$$SEL_{cum} = SEL + 10 \times \log_{10} X$$

Where SEL is the sound exposure level of one impulse and X is the total number of impulses or strikes. Unless otherwise defined, all SEL noise levels in this report are referenced to 1 μPa^2s.

3 Assessment approach

This section presents a summary of the modelling approach used to assess the expected underwater noise levels from vibro-piling activity related to cofferdam installation, as well as the criteria used to assess the noise impact on the relevant marine species.

The modelling approach presented herein conforms to the recommendations found in the National Physical Laboratory (NPL) Good Practice Guide 133 for Underwater Noise (Robinson *et al*., 2014).

3.1 Modelling methodology

To estimate the likely underwater noise levels from vibro-piling activity, noise propagation modelling has been carried out using an approach that is widely used and accepted by the acoustics community, in combination with publicly available environmental data, information provided by Inch Cape, and data from Subacoustech Environmental's measurement library.

Modelling of underwater noise is complex and can be approached in several different ways. In this case, Subacoustech Environmental have chosen to use a numerical modelling approach that is based on both a parabolic equation (PE) method for low frequencies (12.5 Hz to 400 Hz) and a ray tracing method for high frequencies (500 Hz to 100 kHz). The PE method is widely used but has computational limitations at high frequencies. Ray tracing is more computationally efficient but is not suited to low frequency noise (Etter, 1991). This study implements these numerical solutions using the dBSea software (v2.3)

This model uses a wide array of input parameters including bathymetry, sediment data, sound speed and source frequency to ensure the results are as detailed and accurate as possible. These parameters are described in detail in Sections 3.1.1 and 3.1.2.

By its nature, mathematical modelling will produce results which indicate a precise range at which a criterion (Section 3.2) will be reached, but this does not reflect the inherent uncertainties in the process. The results give a specific numeric value to a problem with a vast number of variables and parameters, including many that change constantly in real world conditions. Most modelling parameters, such as the source noise level, the duration of operation and its location, are selected to be precautionary, to avoid the risk of underestimating the impact. The results given in Section 4 present specific ranges at which each impact threshold is met, to determine where environmental effects may occur in receptors during the survey activity. Due to the natural fluctuations noted above, the ranges should be taken as indicative, albeit worst case.

3.1.1 Modelling inputs

The bathymetry data used in the modelling was obtained from the European Marine Observation and Data Network (EMODnet), which has a grid resolution of 1/16 arc minutes (approximately 115 m). This data has been adjusted to high tide using tidal data from Cockenzie: 5.3 m above LAT.

The speed of sound has been calculated for the average annual temperature and salinity data for the survey areas obtained from Marine Scotland's National Marine Plan Interactive (NMPi) tool[1]. The calculations were based on equations from Mackenzie (1981) and the resulting profile is shown in Figure 3-1.

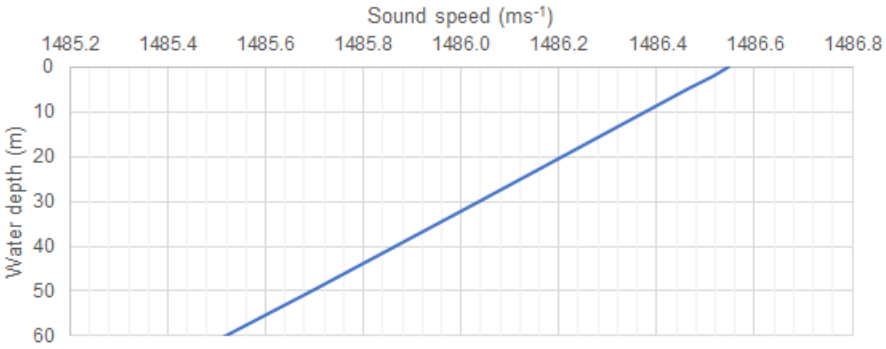

Figure 3-1 Sound speed profile used for modelling in the Firth of Forth

Based on information from the British Geological Survey (BGS) the characteristics of the seabed around the modelling locations assume sediment of sandy mud above a limestone bedrock. Geo-acoustic properties have been based on available data for this sediment type from Jensen *et al*. (2011), and the properties for the bedrock were derived from Jensen *et al*. (1994) and Alden (2020). The specific details for the ground types used for modelling are given in Table 3-1.

Table 3-1 Details of the seabed parameters used for modelling

Material type	Speed of sound	Density	Attenuation
Sandy mud	1,675 ms^{-1}	1,700 kg/m^3	0.9 dB/wavelength
Limestone	3,000 ms^{-1}	2,500 kg/m^3	0.1 dB/wavelength

3.1.2 Source noise levels and frequency content

The vibratory hammer anticipated to be used for the cofferdam installation is a Movax SG75. This is a hydraulically powered hammer with an eccentric moment of 7.6 kgm and a maximum centrifugal force of 750 kN.

For this study, measurements undertaken by Subacoustech Environmental of the larger ICE 1412C hydraulic vibratory hammer have been used and modified based on the specifications of the Movax SG75. The ICE 1412C hammer has a larger eccentric moment of 110 kgm and maximum centrifugal force of 2,300 kN. A scaling factor based on the centrifugal force of the hammers has been used, as the Movax hammer outputs approximately one third as much as the ICE hammer, and the pressure level has been reduced by the same factor. This means an unweighted SPL_{RMS} source level of 202.9 dB re 1 µPa @ 1 m has been used for modelling.

The 1/3rd octave band source spectrum used for the modelling is shown in Figure 3-2.

[1] Marine Scotland (2021). *National Marine Plan Interactive (NMPi)*. Accessed May 2023. https://marinescotland.atkinsgeospatial.com/nmpi/

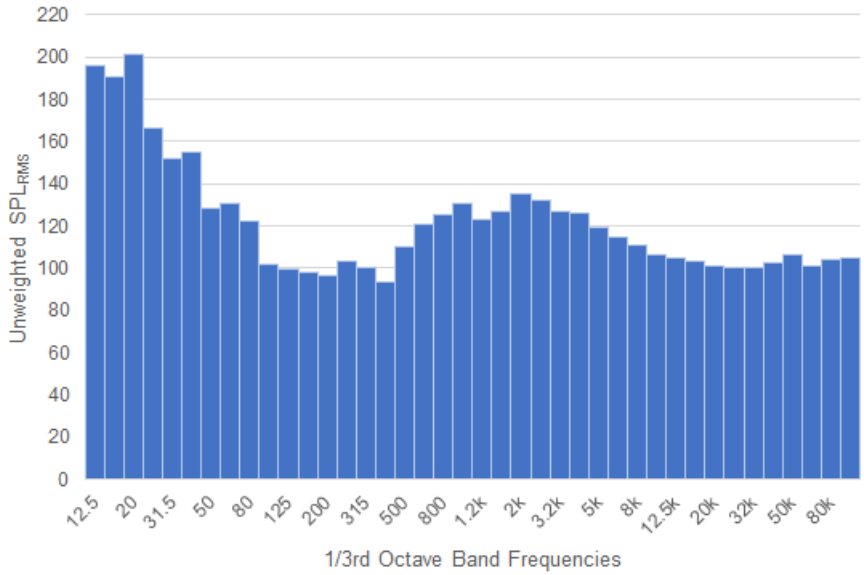

Figure 3-2 1/3rd octave band source level frequency spectral used in this modelling for vibro-piling

3.2 Assessment of underwater noise

3.2.1 Criteria to be used

Over the last 20 years it has become increasingly evident that noise from human activities in and around underwater environments can have an impact on the marine species in the area. The extent to which intense underwater sound might cause adverse impacts in species is dependent upon the incident sound level, source frequency, duration of exposure, and/or repetition rate of an impulsive sound (see, for example, Hastings and Popper, 2005). As a result, scientific interest in the hearing abilities of aquatic species has increased. Studies are primarily based on evidence from high level sources of underwater noise such as blasting, impact piling and seismic airguns, as these sources are likely to have the greatest immediate environmental impact and therefore the clearest observable effects, although interest in chronic noise exposure is increasing.

The impacts of underwater sound on marine species can be broadly summarised as follows:

- Physical traumatic injury and fatality;
- Auditory injury (either permanent or temporary); and
- Disturbance.

The following sections discuss the underwater noise criteria used in this study with respect to species of marine mammals and fish that may be present around the study area in the Firth of Forth.

The main metrics and criteria that have been used in this study to aid assessment of environmental effects come from two key papers covering underwater noise and its effects:

- Southall *et al*. (2019) marine mammal exposure criteria; and
- Popper *et al*. (2014) sound exposure guidelines for fishes and sea turtles.

At the time of writing these include the most up-to-date and authoritative criteria for assessing environmental effects for use in impact assessments.

3.2.2 Marine mammals

The Southall *et al*. (2019) paper is effectively an update of the previous Southall *et al*. (2007) paper and provides identical thresholds to those from the National Marine Fisheries Service (NMFS) (2018) guidance for marine mammals (although describing marine mammal categories slightly differently).

The Southall *et al*. (2019) guidance categorises marine mammals into groups of similar species and applies filters to the unweighted noise to approximate the hearing sensitivities of the receptor in question. The hearing groups given by Southall *et al*. (2019) are summarised in Table 3-2 and Figure 3-3. Further groups for sirenians and other marine carnivores in water are given, but these have not been included in this study as those species are not commonly found in and around the Firth of Forth.

Table 3-2 Marine mammal hearing groups (from Southall et al., 2019)

Hearing group	Generalised hearing range	Example species
Low-frequency cetaceans (LF)	7 Hz to 35 kHz	Baleen whales
High-frequency cetaceans (HF)	150 Hz to 160 kHz	Dolphins, toothed whales, beaked whales, bottlenose whales (including bottlenose dolphin)
Very high-frequency cetaceans (VHF)	275 Hz to 160 kHz	True porpoises (including harbour porpoise)
Phocid carnivores in water (PCW)	50 Hz to 86 kHz	True seals (including harbour seals)

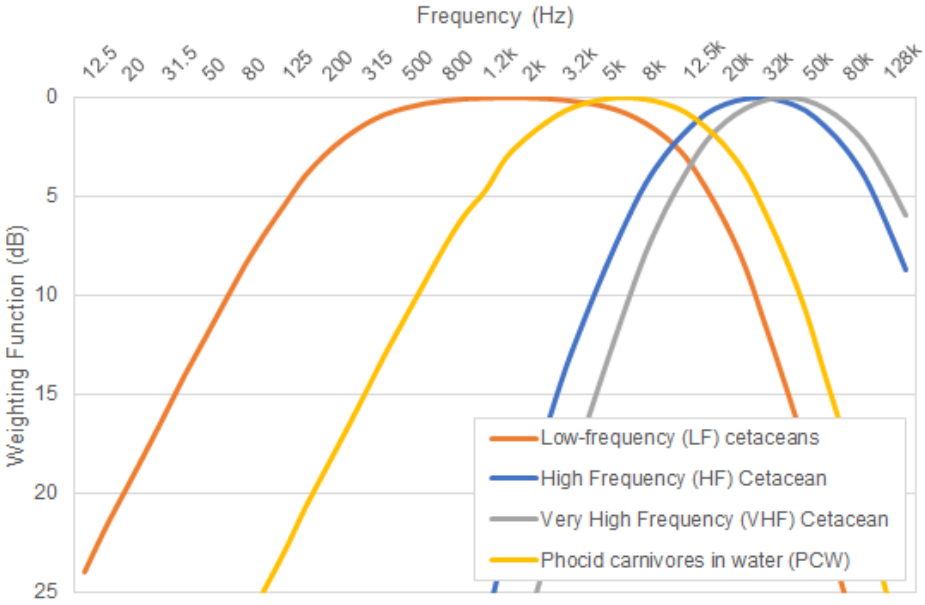

Figure 3-3 Auditory weighting functions for low-frequency cetaceans (LF), high-frequency cetaceans (HF), very high-frequency cetaceans (VHF), and phocid carnivores in water (PCW) (from Southall et al., 2019)

Southall *et al*. (2019) also gives individual criteria based on whether the noise source is considered impulsive or non-impulsive. Southall *et al*. (2019) categorises impulsive noises as having high peak sound pressure, short duration, fast rise-time and broad frequency content at source, and non-impulsive sources as steady-state noise. Explosives, impact piling and seismic airguns are considered impulsive noise sources and sonars, vibro-piling, drilling and other such low-level continuous noises are generally considered non-impulsive. A non-impulsive noise does not necessarily have to have a long duration. Under these criteria vibro-piling is considered a non-impulsive noise.

Southall *et al*. (2019) presents cumulative weighted sound exposure criteria for both permanent threshold shift (PTS), where unrecoverable (but incremental) hearing damage may occur, and temporary threshold shift (TTS), where a temporary reduction in hearing sensitivity may occur in individual receptors.

Table 3-3 presents the weighted SEL_{cum} criteria for marine mammals from Southall *et al*. (2019) for non-impulsive noise.

Table 3-3 Non-impulsive SEL_{cum} criteria for PTS and TTS in marine mammals (Southall et al., 2019)

Southall *et al*. (2019)	**Weighted SEL_{cum} (dB re 1 µPa^2s)**	
	Non-impulsive	
	PTS	**TTS**
Low-frequency cetaceans (LF)	199	179
High-frequency cetaceans (HF)	198	178
Very high-frequency cetaceans (VHF)	173	153
Phocid carnivores in water (PCW)	201	181

For these SEL_{cum} thresholds a worst-case stationary animal model has been used, assuming that a receptor does not flee from the noise source.

3.2.3 Fish

The large number of, and variation in, fish species leads to a greater challenge in production of a generic noise criterion, or range of criteria, for the assessment of noise impacts. The publication of Popper *et al*. (2014) provides an authoritative summary of the latest research and guidelines for fish exposure to sound and uses categories for fish that are representative of the species present in UK waters.

The Popper *et al*. (2014) study groups species of fish by whether they possess a swim bladder, and whether it is involved in its hearing; groups for sea turtles and fish eggs and larvae are also included. The guidance also gives specific criteria for a variety of noise sources. (It is recognised that these are related to sound pressure, whereas more recent documents (e.g., Popper and Hawkins, 2019) state that many fish species are most sensitive to particle motion. This is discussed in section 3.2.3.1.)

Vibro-piling noise falls under the continuous sounds category in the Popper *et al*. (2014) criteria; these are summarised in Table 3-4.

Table 3-4 Criteria for recoverable injury, and TTS in species of fish from shipping and continuous sounds (Popper et al., 2014)

Type of animal	**Impairment**	
	Recoverable injury	**TTS**
Fish: swim bladder involved in hearing	170 dB RMS for 48 hours	158 dB RMS for 12 hours

Where insufficient data are available, Popper *et al*. (2014) also gives qualitative criteria that summarise the effect of the noise as having either a high, moderate, or low effect on an individual in either the near-field (tens of metres), intermediate-field (hundreds of metres), or far-field (thousands of metres). These qualitative effects for continuous sounds are reproduced in Table 3-5. These include masking, where an introduced noise source is loud enough such that the audibility of natural, useful noises is impaired, and general, but substantial, behavioural effects, such as changes to feeding sites and distribution.

Table 3-5 Summary of the qualitative effects on species of fish from shipping and continuous sounds (Popper et al., 2014) (N = Near-field; I = Intermediate-field; F = Far-field)

Type of animal	Mortal and potential mortal injury	Impairment			Behaviour
		Recoverable injury	TTS	Masking	
Fish: no swim bladder	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder is not involved in hearing	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Fish: swim bladder involved in hearing	(N) Low (I) Low (F) Low	See Table 3-4	See Table 3-4	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low
Sea turtles	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) High (I) Moderate (F) Low
Eggs and larvae	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) High (I) Moderate (F) Low	(N) Moderate (I) Moderate (F) Low

3.2.3.1 Particle motion

The criteria defined in the above section define the noise impacts on fishes in terms of sound pressure or sound pressure-associated functions (i.e., SEL). It has been identified by researchers (e.g., Popper and Hawkins, 2019; Nedelec *et al*., 2016; Radford *et al.,* 2012) that many species of fish, as well as invertebrates, actually detect particle motion rather than acoustic pressure. Particle motion describes the back-and-forth movement of water, substrate or other media as a sound wave passes, rather than the pressure caused by the action of the force created by this movement. Particle motion is usually defined in reference to the velocity of the particle (often a peak particle velocity, PPV), but sometimes the related acceleration or displacement of the particle is used. Note that species in the "Fish: swim bladder involved in hearing" category, the species most sensitive to noise, are sensitive to sound pressure.

Popper and Hawkins (2018) state that in derivation of the sound pressure-based criteria in Popper *et al.* (2014) it may be the unmeasured particle motion detected by the fish, to which the fish were responding: there is a relationship between particle motion and sound pressure in a medium. This relationship is very difficult to define where the sound field is complex, such as close to the noise source or where there are multiple reflections of the sound wave in shallow water. Even these terms "shallow" and "close" do not have simple definitions.

The primary reason for the continuing use of sound pressure as the criteria, despite particle motion appearing to be the physical measure to which so many fish react or sense, is a lack of data (Popper and Hawkins, 2018) both in respect of predictions of the particle motion level as a consequence of a noise source, and a lack of knowledge of the sensitivity of a fish, or a wider category of fish, to a particle motion value. There continue to be calls for additional research on the levels of and effects with respect to levels of particle motion. Until sufficient data are available to enable revised thresholds based on the particle motion metric, Popper and Hawkins, 2019 states that "since there is an immediate need for updated criteria and guidelines on potential effects of anthropogenic sound on fishes, we recommend, as do our colleagues in Sweden (Andersson *et al*., 2017), that the criteria proposed by Popper *et al*. (2014) should be used."

4 Modelling results

This section presents the noise modelling carried out in the Firth of Forth for vibro-piling noise as discussed in section 3.

For the results presented in the following sections, calculated impact ranges which fall below 10 m have not been shown, as the modelling processes used are unable to specify that level of accuracy with confidence due to complex acoustic effects at close range.

4.1 Unweighted noise levels

The modelled underwater noise levels, as SPL_{RMS} from vibro-piling noise are presented in Figure 4-1, to show the distribution of noise into the surrounding area. These results are analysed in terms of the assessment criteria discussed earlier for marine mammals and fish in sections 4.2 and 4.3.

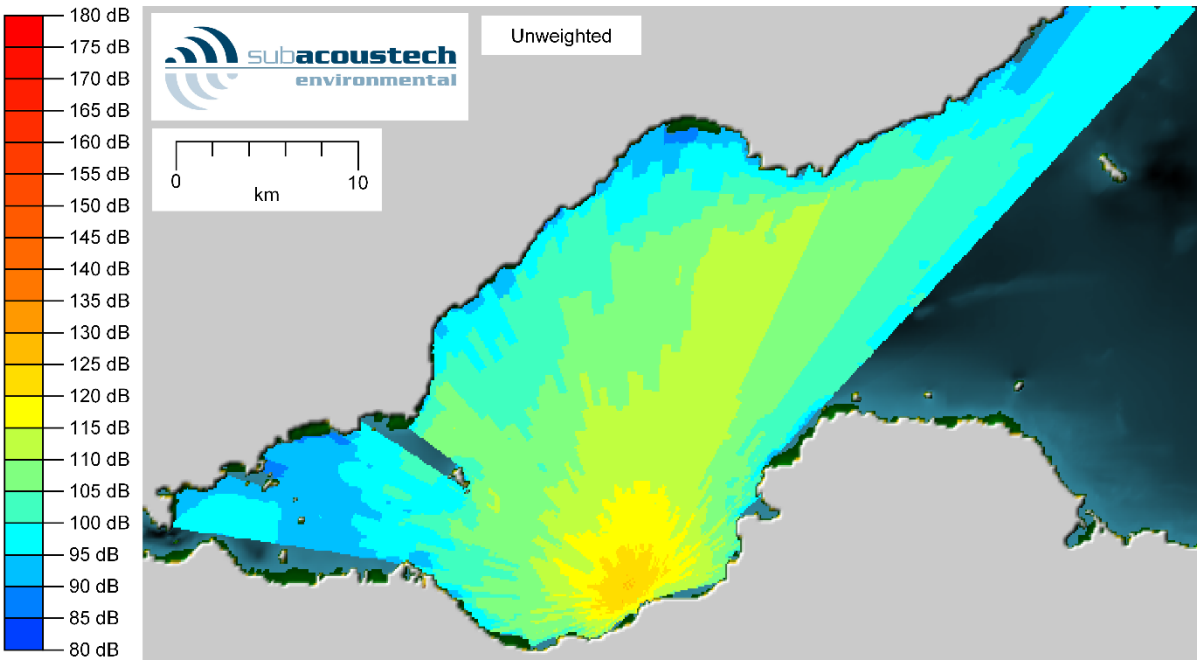

Figure 4-1 Predicted vibro-piling noise, unweighted SPL_{RMS}

4.2 Marine mammal criteria

Predicted PTS and TTS impact ranges for marine mammals are given in Table 4-1 using the relevant weighted non-impulsive SEL_{cum} criteria from Southall *et al*. (2019) assuming a stationary animal during a six-hour piling operational window. In addition, the weighted noise levels for the four marine mammal groups are presented in Figure 4-2 to Figure 4-5. Some of the figures demonstrate images ranges which may be too small to be visible.

The LF cetacean weighting results in the largest impact ranges as the other species groups with greater sensitivity to higher frequencies are more insensitive to vibro-piling noise, which is predominantly low frequency at range. This effectively means the vibro-piling noise is much less audible for these groups.

The results show maximum TTS ranges of up to 50 m predicted for LF cetaceans, with impact ranges for all other criteria predicted to be less than 10 m.

Table 4-1 Summary of the weighted SEL_{cum} PTS and TTS ranges for vibro-piling using the non-impulsive Southall et al. (2019) criteria for marine mammals

Southall *et al*. (2019) Weighted SEL_{cum} criteria			**Maximum range**	**Mean range**	**Minimum range**
PTS	LF	199 dB	< 10 m	< 10 m	< 10 m
	HF	198 dB	< 10 m	< 10 m	< 10 m
	VHF	173 dB	< 10 m	< 10 m	< 10 m
	PCW	201 dB	< 10 m	< 10 m	< 10 m
TTS	LF	179 dB	50 m	50 m	50 m
	HF	178 dB	< 10 m	< 10 m	< 10 m
	VHF	153 dB	< 10 m	< 10 m	< 10 m
	PCW	181 dB	< 10 m	< 10 m	< 10 m

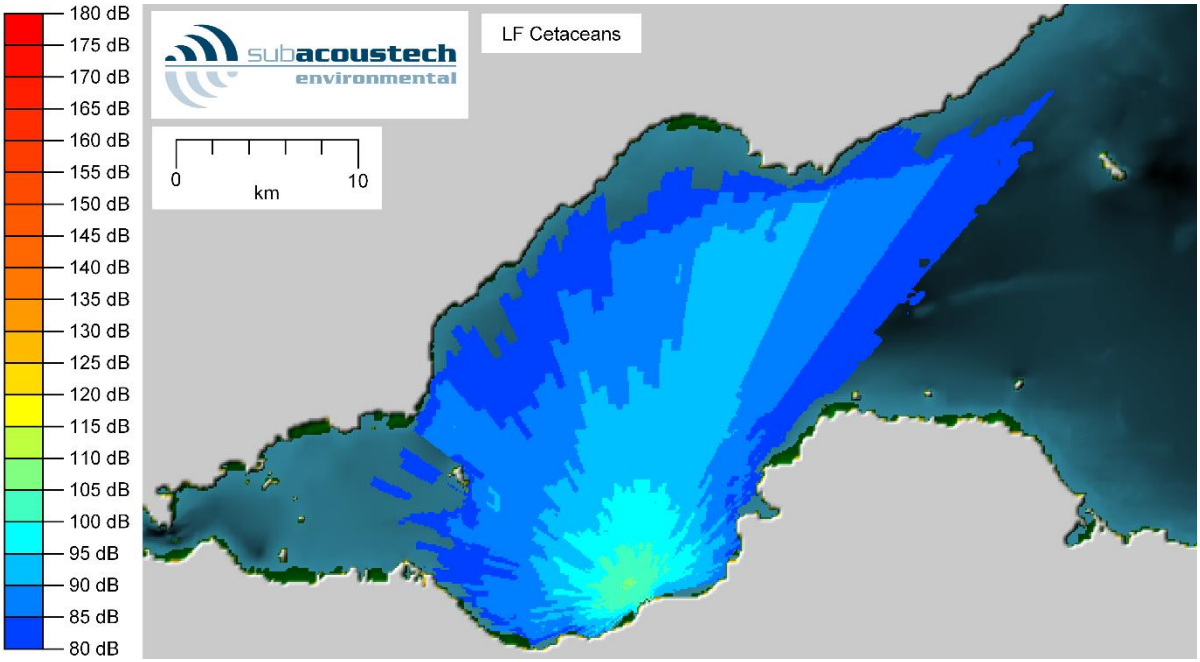

Figure 4-2 Predicted weighted SPL_{RMS} vibro-piling noise for LF cetaceans

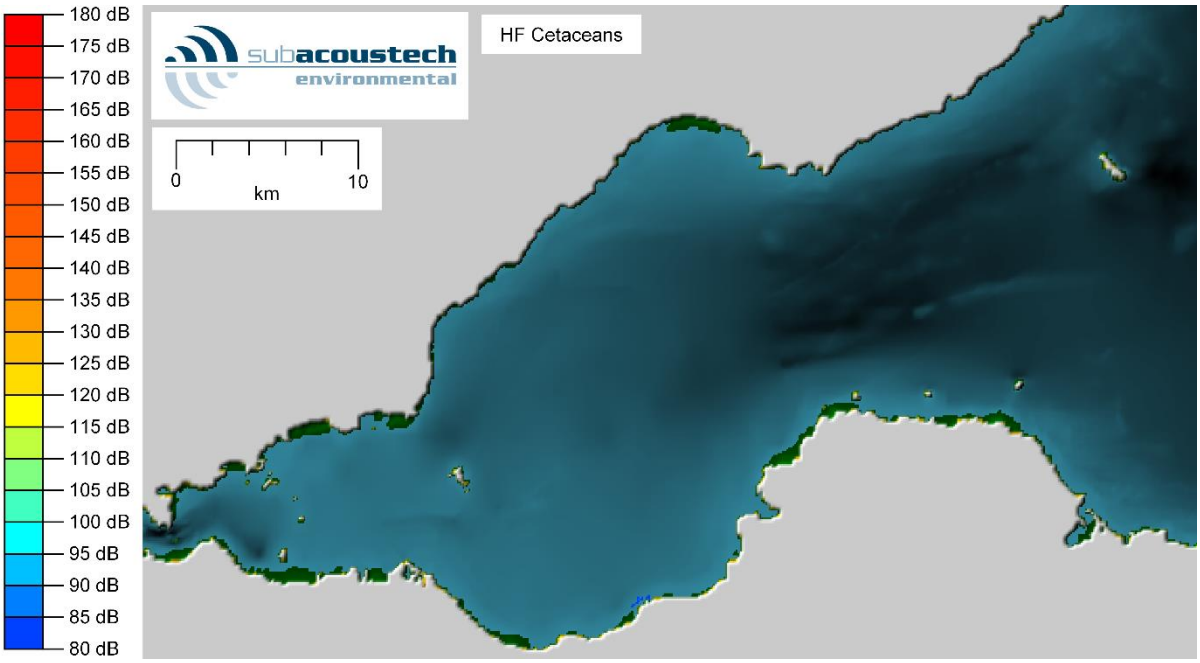

Figure 4-3 Predicted weighted SPL_{RMS} vibro-piling noise for HF cetaceans

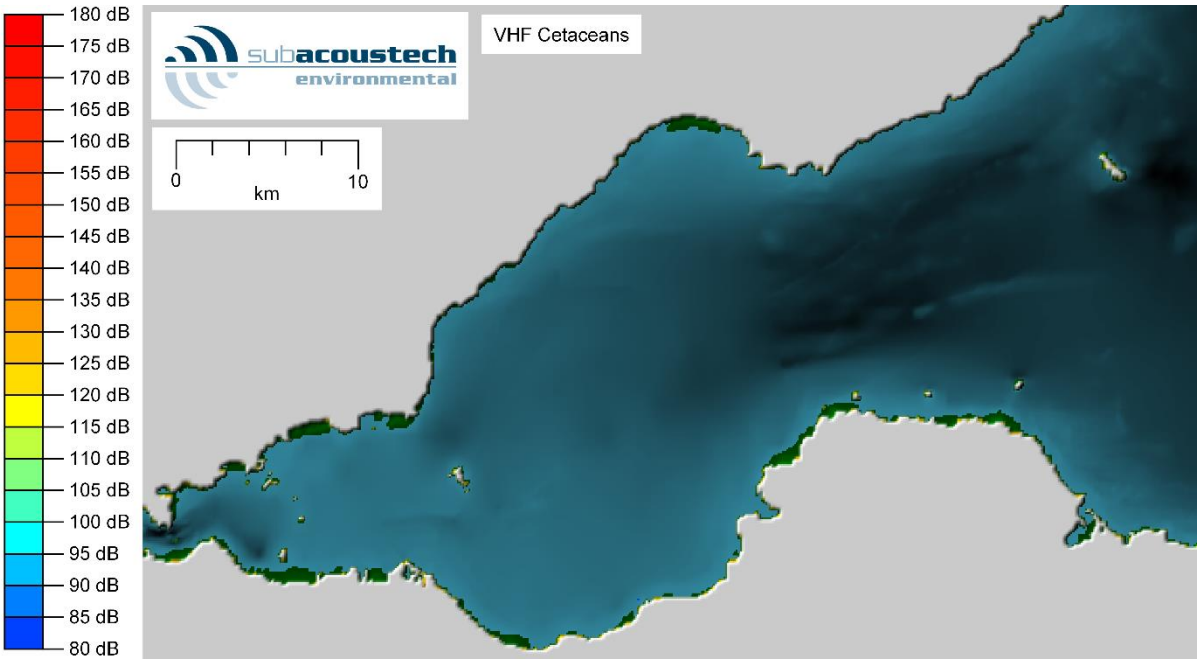

Figure 4-4 Predicted weighted SPL_{RMS} vibro-piling noise for VHF cetaceans

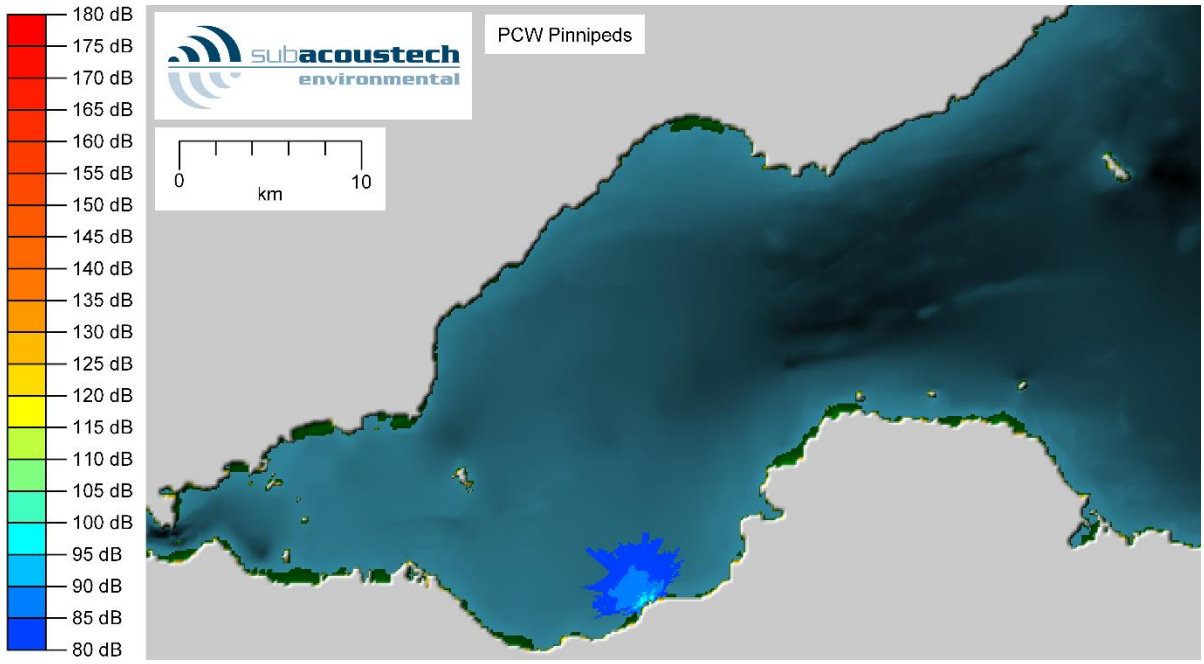

Figure 4-5 Predicted weighted SPL_{RMS} vibro-piling noise for PCW pinnipeds

4.3 Fish criteria

Table 4-2 gives the maximum, mean and minimum impact ranges for species of fish from vibro-piling noise using the Popper *et al*. (2014) guidance for continuous sounds.

The unweighted SPL_{RMS} criteria show that recoverable injury from vibro-piling noise could be expected at ranges up to 20 m, and that TTS could occur out to 40 m. The attenuation of this noise into the Firth of Forth is shown in Figure 4-1.

Table 4-2 Summary of the unweighted SPL_{RMS} recoverable injury and TTS ranges for vibro-piling using the continuous sounds Popper et al. (2014) criteria for fish

Popper *et al*. (2014) Unweighted SPL_{RMS} criteria			**Maximum range**	**Mean range**	**Minimum range**
Fish: swim bladder is involved in hearing	Recoverable injury	170 dB (48 hours)	20 m	20 m	20 m
	TTS	158 dB (12 hours)	40 m	40 m	40 m

5 Summary and conclusions

Subacoustech Environmental has undertaken an underwater noise modelling study on behalf of Inch Cape Offshore Limited to assess the effect of underwater noise from vibro-piling activity during the installation of a cofferdam as part of the inshore works for the Inch Cape Offshore Wind Farm.

The level of underwater noise has been estimated using a combined parabolic equation and ray tracing modelling methodology. The modelling considers a wide array of input parameters including source level, sound frequency content, seabed properties and the sound speed profile in the water column. Full account is also taken of the bathymetry in the areas surrounding the survey site.

The maximum predicted impact ranges for vibro-piling noise are predicted for the LF cetacean group from Southall *et al*. (2019) with SEL_{cum} ranges of up to 50 m for TTS, based on a stationary receptor during the six-hour piling window. For fish, ranges based on the Popper *et al*. (2014) guidance for continuous sounds gave recoverable injury ranges of up to 20 m and TTS ranges of up to 40 m from the vibro-piling.

Finally, it should be stressed that, by its nature, mathematical modelling will produce results that indicate a precise range at which a criterion will be reached, but this does not reflect the inherent uncertainty in the process. The results give a specific numerical value to a process with a vast number of variables and parameters, including many that change constantly under real world conditions. Most modelling parameters, such as the source noise level, the duration of operation and the location, are selected to be precautionary to avoid the risk of underestimating an impact. While the results present specific ranges at which each impact threshold is met based on the modelling results, the ranges should be taken as indicative, albeit worst case, in determining where environmental effects may occur in receptors during the proposed operations.

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Document No.	Draft	Date	Details of change
P271R0600	02	18/05/2023	Initial writing and internal review
P271R0601	-	22/05/2023	Issue to client
P271R0602	-	07/08/2023	Minor clarifications

Originator’s current report number	P271R0602
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Appendix B: European Sites: Features and Conservation Objectives

Table A.1 European Sites: Features and Conservation Objectives

Site	Feature		Conservation Objectives
	Breeding	Non-breeding	
Outer Firth of Forth and St Andrews Bay Complex SPA	Arctic tern Common tern Gannet Guillemot Herring gull Kittiwake Manx shearwater Puffin Seabird assemblage Shag	Black-headed gull Common gull Common scoter Eider Goldeneye Guillemot Herring gull Kittiwake Little gull Long-tailed duck Razorbill Red-breasted merganser Red-throated diver Seabird assemblage Shag Slavonian grebe Velvet scoter Waterfowl assemblage	To ensure that the qualifying features of the Outer Firth of Forth and St Andrews Bay Complex SPA are in favourable condition and make an appropriate contribution to achieving favourable conservation status (FCS). To ensure that the integrity of the Outer Firth of Forth and St Andrews Bay Complex SPA is restored in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature: • The populations of qualifying features are viable components of the site. • The distributions of the qualifying features throughout the site are maintained by avoiding significant disturbance of the species. • The supporting habitats and processes relevant to the qualifying features and their prey/food resources are maintained, or where appropriate restored, at the Outer Firth of Forth and St Andrews Bay Complex SPA.

Site	Feature		Conservation Objectives
	Breeding	Non-breeding	
Firth of Forth SPA	No breeding features	Bar-tailed godwit Common scoter Cormorant Curlew Dunlin Eider Golden plover Goldeneye Great-crested grebe Grey plover Knot Lapwing Long-tailed duck Mallard Oystercatcher Pink-footed goose Red-breasted merganser Red-throated diver Redshank Ringed plover Sandwich tern Scaup	To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained: To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site • Distribution of the species within the site. • Distribution and extent of habitats supporting the species. • Structure, function and supporting processes of habitats supporting the species. • No significant disturbance of the species.

Site	Feature		Conservation Objectives
	Breeding	Non-breeding	
		Shelduck	
		Slavonian grebe	
		Turnstone	
		Velvet scoter	
		Waterfowl	
		Wigeon	

Site	Feature		Conservation Objectives
	Breeding	Non-breeding	
Forth Islands SPA	Arctic tern Common tern Cormorant Gannet Guillemot Herring gull Kittiwake Lesser black-backed gull Puffin Razorbill Roseate tern Sandwich tern Seabird assemblage Shag	No non-breeding features	To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site. • Distribution of the species within site. • Distribution and extent of habitats supporting the species. • Structure, function and supporting processes of habitats supporting the species. • No significant disturbance of the species.

Site	Feature		Conservation Objectives
	Breeding	Non-breeding	
Firth of Tay and Eden Estuary SPA	Little tern Marsh harrier	Bar-tailed godwit Common scoter Cormorant Dunlin Eider Goldeneye Goosander Grey plover Greylag goose Icelandic Black-tailed godwit Long-tailed duck Oystercatcher Pink-footed goose Red-breasted merganser Redshank Sanderling Shelduck Velvet scoter Waterfowl assemblage	To avoid deterioration of the habitats of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and To ensure for the qualifying species that the following are maintained in the long term: • Population of the species as a viable component of the site. • Distribution of the species within site. • Distribution and extent of habitats supporting the species. • Structure, function and supporting processes of habitats supporting the species. • No significant disturbance of the species.

Appendix C: Pre-Application Consultation (PAC) Report and PAC Schedule

Inch Cape
OFFSHORE LIMITED

Inch Cape Cofferdam - Pre-Application Consultation Report

Table of Contents

Table of Figures

Acronyms & Abbreviations

Acronym	Term
ALARP	As low as reasonably practicable
CES	Crown Estate Scotland
EIA	Environmental Impact Assessment
ELC	East Lothian Council
HES	Historic Environment Scotland
ICOL	Inch Cape Offshore Limited
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate – Licensing Operations Team
NLB	Northern Lighthouse Board
OfTI	Offshore Transmission Infrastructure
OfTW	Offshore Transmission Works
OSP	Offshore Substation Platform
PAC	Pre-Application Consultation
RSPB	Royal Society for the Protection of Birds
SEPA	Scottish Environment Protection Agency
SFF	Scottish Fishermen's Federation

Glossary

Defined Term	Meaning
Additional Landfall Works	Comprising the construction of a temporary access road, diversion of the East Lothian Council (ELC) outfall, movement of part of the rock revetment and temporary removal and reinstatement of sections of the seawall (covered by Marine Licence MS-00010672).
Cofferdam	A structure used in construction projects to create a dry working environment. The main components of a cofferdam include steel sheet-piles, waling beams, props, and tie-rods. Each element serves a specific function in maintaining the structural form and integrity of the cofferdam.
Development	The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Works (OfTW) being developed by Inch Cape Offshore Limited (ICOL).
Development Area	The area for the Wind Farm, within which all Wind Turbine Generators, inter-array cables, interconnector cables, offshore substation platform(s) and the initial part of the Offshore Export Cable and any other associated works must be sited. As stipulated in the Crown Estate agreement for lease.
Inch Cape Offshore Transmission Infrastructure (OfTI)	Components of the Development comprising the offshore export cable and OSP which are permitted by the OfTI Marine Licence (MS-00010593).
Inch Cape Offshore Wind Farm/ Wind Farm	A component of the Development, comprising wind turbines and their foundations and substructures, and inter-array cables.
Offshore Export Cables	The subsea, buried or protected electricity cables running from the offshore wind farm substation to the landfall and transmitting the electricity generated to the onshore cables for transmission onwards to the onshore substation and the electrical grid connection.
Offshore Export Cable Corridor/ Export Cable Corridor	The area within which the Offshore Export Cables will be laid from the OSP and up to Mean High Water Springs.

Defined Term	Meaning
Offshore Transmission Works (OfTW)	Offshore Transmission Works (i.e., construction methods) associated with Inch Cape Offshore Wind Farm.
Props	Diagonal or horizontal compressive elements that support the cofferdam waling beams and transfer the loads to the ground. They act as temporary support, resisting the weight of the water and soil acting on the cofferdam.
The 2010 Act	Marine (Scotland) Act 2010.
The 2013 Application	The Environmental Statement, Habitat Regulations Assessment (HRA) Report and supporting documents submitted by the Company on 1st July 2013 to construct and operate an offshore generating station and transmission works.
The 2018 Application	The EIA Report, HRA Report and supporting documents submitted by the Company on 15 August 2018 to construct and operate an offshore generating station and transmission works.
The Wind Farm	The Inch Cape Offshore Wind Farm.
Tie Rods	Tension members that run through the cofferdam horizontally, connecting the sheet-piles on opposite sides. Like props, they help hold the sheet-piles in position and prevent them from spreading apart due to the lateral pressure exerted by the water and soil.
Steel Sheet-Piles	Long, interlocking, vertical steel elements driven into the ground to form the perimeter of the cofferdam. They act as a barrier, preventing water and soil from flowing into the enclosed area. The sheet-piles are usually installed deep into the ground or toed into rock to provide stability and resist. lateral forces from the surrounding water and soil.

Defined Term	Meaning
Waling Beams	Horizontal beams that connect and support the sheet-piles. They run along the length of the cofferdam and provide additional lateral support. Waling beams help distribute the loads from the sheet-piles and transfer them to the props and tie-rods, enhancing the overall stability of the structure.

1 Introduction

1 The Inch Cape Offshore Wind Farm (the Wind Farm) and Offshore Transmission Works (OfTW), hereafter referred to as the Development, is being developed by Inch Cape Offshore Limited (ICOL) (see Figure 1.1).

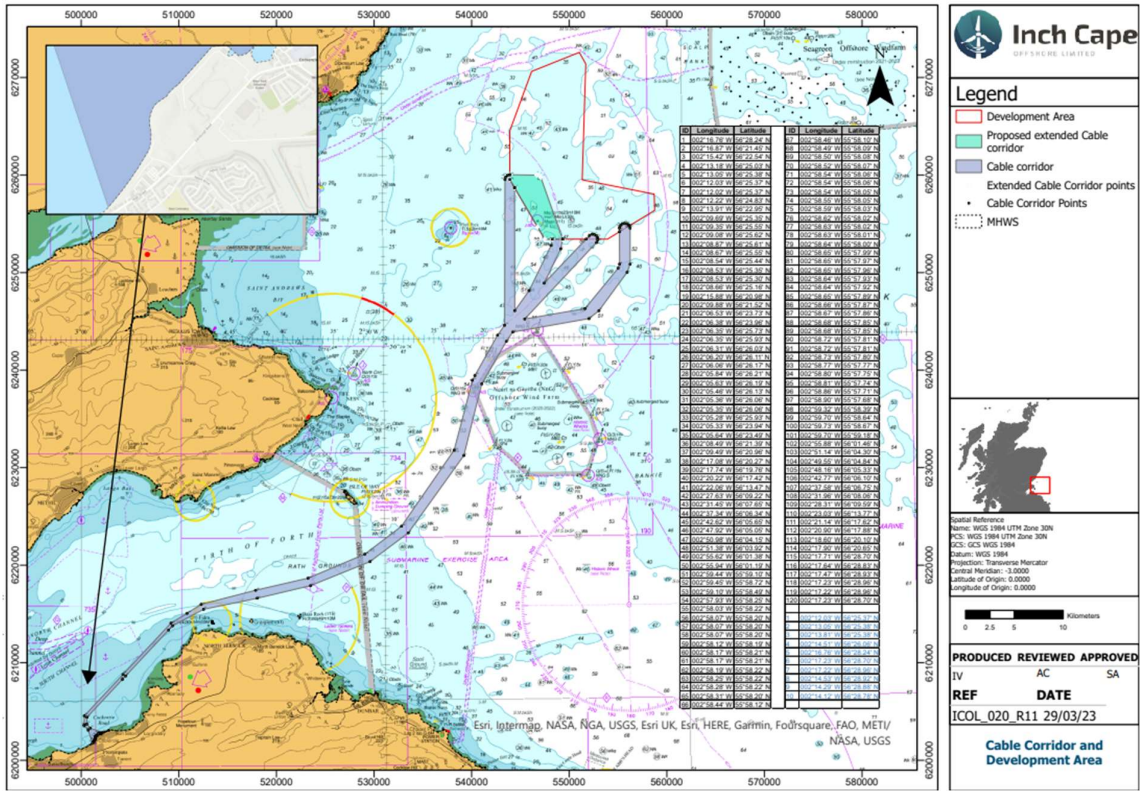


Figure 1.1: Inch Cape Offshore Development Area and Current Offshore Export Cable Corridor

2 In 2014, the Scottish Ministers granted ICOL Section 36 and Marine Licence Consents, pursuant to the 2013 Application, for the construction and operation of an offshore wind farm and a marine licence for the construction and operation of offshore transmission works. The licences granted to ICOL in 2014 (along with those for other Forth and Tay projects, Seagreen Alpha and Bravo and Neart na Gaoithe) were subject to a petition for judicial review in early 2015. A decision was made by the UK Supreme Court in November 2017 to uphold the Scottish Ministers' decisions to grant the offshore consents.

3 ICOL subsequently submitted the 2018 Application with a revised design that would allow the development of a project that could utilise progressions in technology since the 2014 consent. Section 36 and Marine Licence Consents for the revised design), were granted by Scottish Ministers in 2019.

4 Since the consent for the revised design was received, ICOL has successfully sought two variations to the Inch Cape Offshore Wind Farm Section 36 Consent and Marine Licence 06781/19/0. A

separate variation application for these consents, to optimise wind farm efficiency and enable utilisation of the best available technological solution, was submitted to Marine Directorate Licensing and Operations Team (MD-LOT) and was granted consent in June 2023.

5 In 2019 a revised Marine Licence (06782/19/0) (dated 17 June 2019) was granted for the Offshore Transmission Infrastructure (OfTI) connecting the landfall location, near Cockenzie, East Lothian, and the Inch Cape Offshore Wind Farm which is located approximately 15 - 22 km off the Angus coastline, to the east of the Firth of Tay. A varied Marine Licence (MS-00010593) (dated 10 November 2023) was granted to allow for changes to temporary and permanent deposit quantities and revision of the Offshore Export Cable Corridor coordinates to include the intended Offshore Substation Platform (OSP) location.

6 A Cofferdam is anticipated to be required, based on the current design and construction methodology, and Inch Cape Offshore Limited (ICOL) is applying for a subsequent marine licence (the marine licence application) under Part 4 of the Marine (Scotland) Act 2010, (the 2010 Act). The marine licence is required for a Cofferdam to facilitate the Additional Landfall Works (a separate application consented on 19 December 2023 (MS-00010546) and subsequently varied on 15 January 2024 (MS-00010672) relating to the construction of a temporary access road, diversion of the East Lothian Council (ELC) outfall, movement of part of the rock revetment, and temporary removal and reinstatement of sections of the seawall), for the Inch Cape Offshore Wind Farm. The Cofferdam will be installed within the area identified in Figure 1.2.

7 A Screening Report was submitted to MD-LOT under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) ("the EIA Regulations") for the Cofferdam and a Screening Opinion was made by Scottish Ministers on 25 October 2023. This concluded that the Scottish Ministers were of the view that the works proposed were not an EIA project under the 2017 Marine Works Regulations, therefore, an EIA was not required to be carried out in respect of this Proposed Variation.

8 A Pre-Application Consultation (PAC) Schedule has been prepared for the Cofferdam in accordance with Section 24 of the Marine (Scotland) Act 2010 and Regulation 8 of the Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013. This PAC Report accompanies the PAC Schedule and provides supplementary information. The application is submitted by ICOL (hereafter referred to as 'the Applicant').

9 As part of the marine licensing process, the Applicant has undertaken engagement with the public and all interested stakeholders. The PAC Schedule and this Report demonstrate how all views have been considered and influenced this application.

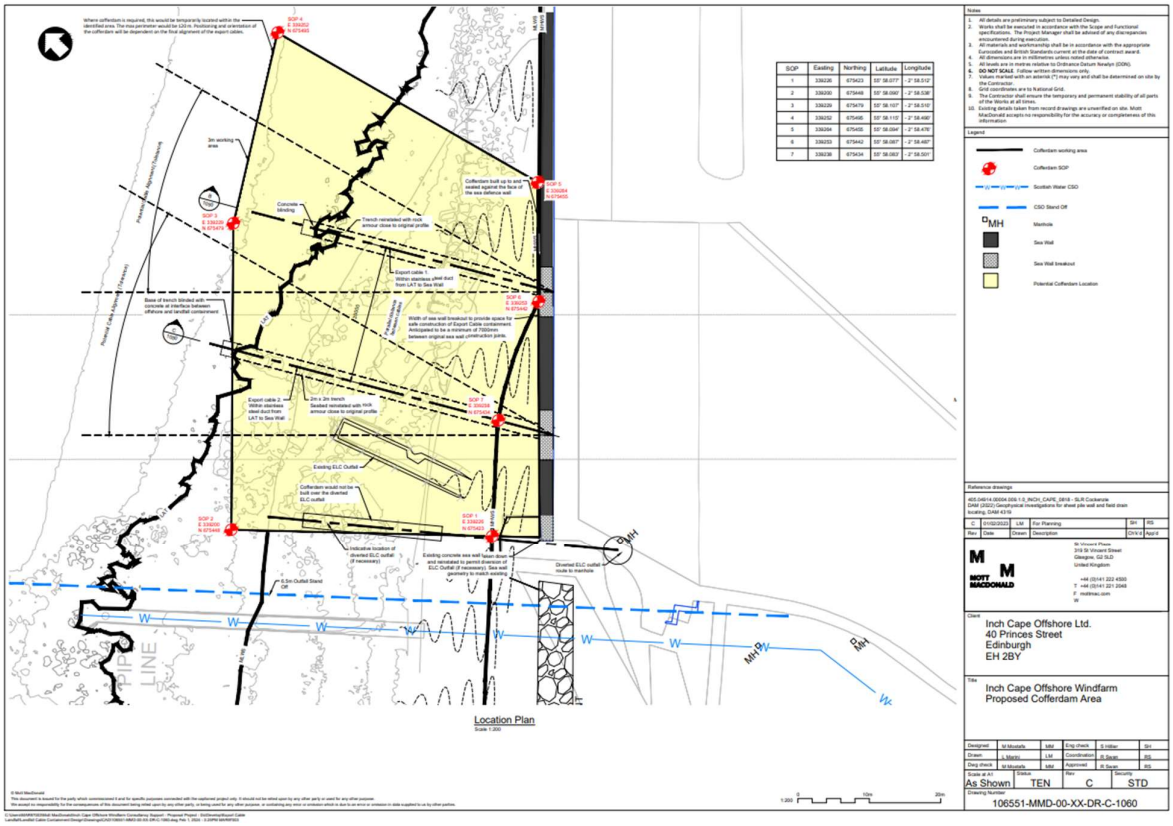


Figure 1.2: Cofferdam Location Area

10 This document should be read in conjunction with the following:

- Inch Cape Cofferdam - Pre-Application Consultation Schedule;
- Inch Cape Cofferdam - Marine Licence Application Form;
- Inch Cape Cofferdam - Marine Licence Application Report;
- Inch Cape Cofferdam - Screening Request; and
- Inch Cape Cofferdam - Marine Licence Screening Opinion from Marine Directorate dated 25 October 2023.

1.1 Structure of the Report

11 This Report includes the responses to the PAC Schedule questionnaire where there is insufficient space provided to complete them in the PAC Schedule, and also includes all other responses for completeness.

2 Legislation Requirements

12 Under Sections 2, 23 and 24 of the Marine (Scotland) Act 2010, certain classes or types of activity are subject to PAC. The Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013 prescribe the marine licensable activities that are subject to PAC and the pre-application process. The Cofferdam works falls under the PAC requirements as they cover an area of over 1000 m^2.

3 Pre-Application Consultation Report

3.1 Introduction

13 This section provides the information required within the PAC Schedule, with the relevant PAC Schedule question numbers being identified in brackets after each heading.

3.2 Proposed Licensable Marine Activity (Question 1)

14 ICOL is applying for a marine licence for a Cofferdam to facilitate the Additional Landfall Works plus installation of the Export Cables. The Cofferdam is necessary to enable the intertidal elements of the work to be completed to 'as low as reasonably practicable' (ALARP) standards, to provide protection for the works, and ensuring that there is a safe working area.

15 The Cofferdam will be located within the area identified in Figure 1.2, abutting at the existing sea wall at the location of the former power plant at Cockenzie, East Lothian.

3.2.1 Cofferdam design

16 The Cofferdam is envisaged as a traditional box structure with a maximum perimeter of up to 120 m (assuming any shape and size cofferdam within this parameter), formed from a perimeter of steel sheet-piles toed into the seabed and supported by horizontal waling beams, props, and tie-rods for stability (Figure 3.1). Installation of the Cofferdam is estimated to take 10 to 12 weeks, undertaken during low tide events, following clearance of the foreshore and upon completion of the ELC outfall diversion, prior to breaking through the seawall.

17 The Cofferdam would be constructed tight to the existing sea defence wall such that a seal could be formed to limit sea water ingress: this will likely require grout/concrete to seal the toes of the sheet-piles and voids against/within the sea defence.

18 The area within which the Cofferdam will be located is provided by the co-ordinates in Table 3.1 below. The exact location will be determined by the cables contractor once commissioned.

Figure 3.1: Example Image Showing Wailing Beam, props and tie rods within a Cofferdam

Table 3.1: Cofferdam Area Coordinates

Latitude (Degrees, minutes, decimal minutes)	Longitude (Degrees, minutes, decimal minutes)	Northings	Eastings
55° 58.077'N	2° 58.512'W	675423	339226
55° 58.090'N	2° 58.538'W	675448	339200
55° 58.107'N	2° 58.510'W	675479	339229
55° 58.115'N	2° 58.490'W	675495	339252
55° 58.094'N	2° 58.476'W	675455	339264
55° 58.087'N	2° 58.487'W	675442	339253
55° 58.083'N	2° 58.501'W	675434	339238

3.3 Applicant Details (Question 2)

Trading Title	Inch Cape Offshore Wind Limited
Address	5th Floor, 40 Princes Street Edinburgh EH2 2BY
Name of Contact	Keith Thomson
Position in the Company	Lead Consents Manager
Telephone:	0131 557 7101
Email	info@inchcapewind.co.uk
Company Registration No.	SC373173

19 The Applicant confirms that it is the proposed licensee and therefore Question 3 is not applicable.

3.4 Pre-Application Consultation Event (Question 4)

20 Initial notification of the proposed consultation event was submitted to Marine Scotland on 16 May 2023 (Appendix A) and Pre-Application Consultation Dates were set for 27 and 28 June 2023, six weeks after the date of formal advertisement in the local newspaper (11 May 2023).

21 In accordance with the Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013, the Applicant prepared a Public Notice providing details of the formal PAC event proposed in respect of the Cofferdam. A copy of this notice is provided in Appendix B. The notice was advertised in the East Lothian Courier on 11 May 2023 giving details of the consultation and feedback mechanisms.

22 The Notice highlighted several methods to engage with the Applicant and provide feedback on the proposed Cofferdam. This included:

- A public drop-in event 13.00 – 19.00 Tuesday 27 June 2023 at Port Seton Community Centre;
- A public drop-in event 13.00 – 19.00 Wednesday 28 June 2023 at Prestonpans Town Hall;
- Online Consultation available on the website www.inchcapewind.com from the 27 June 2023, which included a link to an online feedback form (see Appendix C); and
- Comments were also encouraged via email to info@inchcapewind.co.uk.

23 A separate advert was sent to both Port Seton and Prestonpans Community Councils to be used on their respective social media sites (see Appendix B).

24 In accordance with provisions of Section 23 of the Marine (Scotland) Act 2010, the Applicant provided formal notification to several statutory agencies on 16 May 2023, namely:

- Crown Estate Scotland (CES);
- NatureScot;

- Northern Lighthouse Board (NLB);
- Scottish Environment Protection Agency (SEPA);
- MD-LOT;
- Maritime and Coastguard Agency (MCA);
- Historic Environment Scotland (HES);
- Royal Society for the Protection of Birds (RSPB);
- Scottish Fishermen's Federation (SFF);
- East Lothian Council; and
- Forth Ports.

3.5 Information provided by Prospective Applicant at the Pre-applicatoin Consultation Event (Question 5)

3.5.1 In-Person Consultation Event

25 Two in-person consultation event were held on:

- Tuesday 27 June 2023 at Port Seton Community Centre between 13.00 and 19.00, South Seton Park, Port Seton, Prestonpans EH32 0BG; and
- Wednesday 28 June 2023 in Prestonpans Town Hall between 13.00 and 19.00, 157A High Street, Prestonpans, EH32 9AY.

26 The Project information including detail of the proposed works was presented on banners and computer-generated images for public viewing.

3.5.2 Online

27 Information was displayed on the dedicated Inch Cape Offshore Wind Farm Website www.inchcapewind.com (Appendix C).

The webpage provided:

- Introduction to the consultation;
- Information panels (Appendix D);
- Link to feedback form; and
- Details of dedicated email address.

3.6 Information received by the Prospective Applicant at the Pre-applicatoin Consultation Events (Question 6)

28 The in-person consultation events were attended by nine people. Two feedback forms were completed at the second event and one direct email was received.

29 Images from the in-person event are provided in Appendix E.

3.7 Amendments made, or to be made, to the Application for a Marine Licence by the Prospective Applicant following their Consideration of Comments and/or Objections received at the Pre-application Consultation Event (Question 7)

30 The consultation event generated very little interest and feedback on the Cofferdam was positive, recognising the need case. SSE Renewables (SSER), on behalf of Seagreen 1A responded by email directly with regard to the project boundaries. Discussion with SSER is held regularly and currently, no amendments to the application have been made. Feedback forms and correspondence can be found in Appendix F.

3.8 Explanation of Approach taken by the Prospective Applicant where, following Relevant Comments and/or Objections being received by the Prospective Applicant at the Pre-application Consultation Event, no Relevant Amendment has been made to the Application for a Marine Licence (Question 8)

31 The consultation event generated very little interest and the feedback received regarding the Cofferdam was positive – it was recognised as something necessary (in order to ensure health and safety at site). As such, no amendments to the application have been made. Additional feedback regarding construction traffic to site was also given and the Applicant is engaged in ongoing discussion with local residents and East Lothian Council regarding this matter. The Applicant is also in ongoing discussion with Marine Directorate and SSER regarding relevant issues including the boundary location.

4 Conclusions

32 The PAC Schedule and this supplementary PAC Report demonstrate that the Applicant has undertaken meaningful and effective PAC, both formal and informal, in relation to the proposed Cofferdam works, which not only adheres to the statutory requirements, but utilises and maximises the advice provided in the relevant guidelines and regulations.

33 The Applicant has provided all stakeholders with up-to-date and accurate information and has encouraged them to proactively engage and provide feedback to the applicant, prior to finalising the design proposals and submitting the Marine Licence application.

34 The Applicant is committed to on-going liaison and effective engagement with key stakeholders to address any emerging issues during the construction and operational phase of the proposed works.

Appendix A: Pre-Application Event Notice

Dear Sir/Madam,

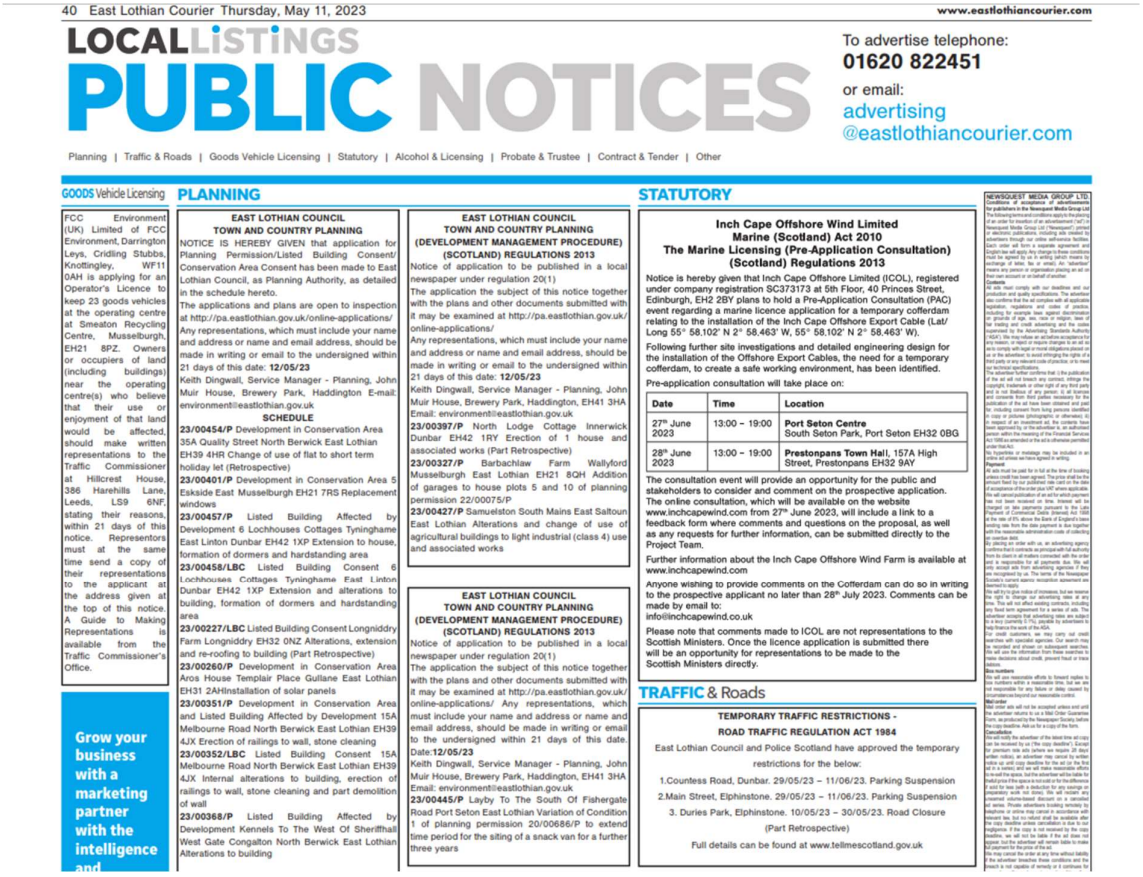
Inch Cape Offshore Limited (ICOL) intends to include a temporary cofferdam into the scope of the 'Additional Landfall Works'. As a result of this, ICOL will undertake further Pre-Application Consultation (PAC) under The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013 ("the Regulations") for the temporary cofferdam. ICOL will consult with all required parties in line with the Regulations including but not limited to a PAC event (details of which are provide below). A subsequent PAC report will then accompany the Marine Licence application.

Any comments should be made in writing to ICOL at the following email addresses: info@inchcapewind.co.uk or alternatively Sarah Arthur Sarah.Arthur@inchcapewind.co.uk. Please note that once the application has been submitted there will be an opportunity to make representations on that application to Marine Scotland.

Pre-application consultation will take place on:

Date	Time	Location
27th June 2023	13:00 – 19:00pm	**Port Seton Centre** South Seton Park, Port Seton EH32 0BG
28th June 2023	13:00 – 19:00pm	**Prestonpans Town Hall**, 157A High Street, Prestonpans EH32 9AY

Appendix B: Public Notice and Community Council Adverts



40 East Lothian Courier Thursday, May 11, 2023 www.eastlothiancourier.com

LOCAL LISTINGS

PUBLIC NOTICES

To advertise telephone: 01620 822451 or email: advertising @eastlothiancourier.com

Planning | Traffic & Roads | Goods Vehicle Licensing | Statutory | Alcohol & Licensing | Probate & Trustee | Contract & Tender | Other

GOODS Vehicle Licensing

FCC Environment (UK) Limited of FCC Environment, Darrington Leys, Cridling Stubbs, Knottingley, WF11 0AH is applying for an Operator's Licence to keep 23 goods vehicles at the operating centre at Smeaton Recycling Centre, Musselburgh, EH21 8PZ. Owners or occupiers of land (including buildings) near the operating centre(s) who believe that their use or enjoyment of that land would be affected, should make written representations to the Traffic Commissioner at Hillcrest House, 386 Harehills Lane, Leeds, LS9 6NF, stating their reasons, within 21 days of this notice. Representors must at the same time send a copy of their representations to the applicant at the address given at the top of this notice. A Guide to Making Representations is available from the Traffic Commissioner's Office.

PLANNING

EAST LOTHIAN COUNCIL
TOWN AND COUNTRY PLANNING

NOTICE IS HEREBY GIVEN that application for Planning Permission/Listed Building Consent/ Conservation Area Consent has been made to East Lothian Council, as Planning Authority, as detailed in the schedule hereto.

The applications and plans are open to inspection at http://pa.eastlothian.gov.uk/online-applications/

Any representations, which must include your name and address or name and email address, should be made in writing or email to the undersigned within 21 days of this date: **12/05/23**

Keith Dingwall, Service Manager - Planning, John Muir House, Brewery Park, Haddington E-mail: environment@eastlothian.gov.uk

SCHEDULE

23/00454/P Development in Conservation Area 35A Quality Street North Berwick East Lothian EH39 4HR Change of use of flat to short term holiday let (Retrospective)

23/00401/P Development in Conservation Area 5 Eskside East Musselburgh EH21 7RS Replacement windows

23/00457/P Listed Building Affected by Development 6 Lochhouses Cottages Tyninghame East Linton Dunbar EH42 1XP Extension to house, formation of dormers and hardstanding area

23/00458/LBC Listed Building Consent 6 Lochhouses Cottages Tyninghame East Linton Dunbar EH42 1XP Extension and alterations to building, formation of dormers and hardstanding area

23/00227/LBC Listed Building Consent Longniddry Farm Longniddry EH32 0NZ Alterations, extension and re-roofing to building (Part Retrospective)

23/00260/P Development in Conservation Area Aros House Templair Place Gullane East Lothian EH31 2AH Installation of solar panels

23/00351/P Development in Conservation Area and Listed Building Affected by Development 15A Melbourne Road North Berwick East Lothian EH39 4JX Erection of railings to wall, stone cleaning

23/00352/LBC Listed Building Consent 15A Melbourne Road North Berwick East Lothian EH39 4JX Internal alterations to building, erection of railings to wall, stone cleaning and part demolition of wall

23/00368/P Listed Building Affected by Development Kennels To The West Of Sheriffhall West Gate Congalton North Berwick East Lothian Alterations to building

EAST LOTHIAN COUNCIL
TOWN AND COUNTRY PLANNING
(DEVELOPMENT MANAGEMENT PROCEDURE)
(SCOTLAND) REGULATIONS 2013

Notice of application to be published in a local newspaper under regulation 20(1)

The application the subject of this notice together with the plans and other documents submitted with it may be examined at http://pa.eastlothian.gov.uk/online-applications/

Any representations, which must include your name and address or name and email address, should be made in writing or email to the undersigned within 21 days of this date: **12/05/23**

Keith Dingwall, Service Manager - Planning, John Muir House, Brewery Park, Haddington, EH41 3HA Email: environment@eastlothian.gov.uk

23/00397/P North Lodge Cottage Innerwick Dunbar EH42 1RY Erection of 1 house and associated works (Part Retrospective)

23/00327/P Barbachlaw Farm Wallyford Musselburgh East Lothian EH21 8QH Addition of garages to house plots 5 and 10 of planning permission 22/00075/P

23/00427/P Samuelston South Mains East Saltoun East Lothian Alterations and change of use of agricultural buildings to light industrial (class 4) use and associated works

EAST LOTHIAN COUNCIL
TOWN AND COUNTRY PLANNING
(DEVELOPMENT MANAGEMENT PROCEDURE)
(SCOTLAND) REGULATIONS 2013

Notice of application to be published in a local newspaper under regulation 20(1)

The application the subject of this notice together with the plans and other documents submitted with it may be examined at http://pa.eastlothian.gov.uk/online-applications/ Any representations, which must include your name and address or name and email address, should be made in writing or email to the undersigned within 21 days of this date. Date:**12/05/23**

Keith Dingwall, Service Manager - Planning, John Muir House, Brewery Park, Haddington, EH41 3HA Email: environment@eastlothian.gov.uk

23/00445/P Layby To The South Of Fishergate Road Port Seton East Lothian Variation of Condition 1 of planning permission 20/00686/P to extend time period for the siting of a snack van for a further three years

STATUTORY

Inch Cape Offshore Wind Limited
Marine (Scotland) Act 2010
The Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013

Notice is hereby given that Inch Cape Offshore Limited (ICOL), registered under company registration SC373173 at 5th Floor, 40 Princes Street, Edinburgh, EH2 2BY plans to hold a Pre-Application Consultation (PAC) event regarding a marine licence application for a temporary cofferdam relating to the installation of the Inch Cape Offshore Export Cable (Lat/ Long 55° 58.102' N 2° 58.463' W, 55° 58.102' N 2° 58.463' W).

Following further site investigations and detailed engineering design for the installation of the Offshore Export Cables, the need for a temporary cofferdam, to create a safe working environment, has been identified.

Pre-application consultation will take place on:

Date	Time	Location
27th June 2023	13:00 – 19:00	**Port Seton Centre** South Seton Park, Port Seton EH32 0BG
28th June 2023	13:00 – 19:00	**Prestonpans Town Hal**l, 157A High Street, Prestonpans EH32 9AY

The consultation event will provide an opportunity for the public and stakeholders to consider and comment on the prospective application. The online consultation, which will be available on the website www.inchcapewind.com from 27th June 2023, will include a link to a feedback form where comments and questions on the proposal, as well as any requests for further information, can be submitted directly to the Project Team.

Further information about the Inch Cape Offshore Wind Farm is available at www.inchcapewind.com

Anyone wishing to provide comments on the Cofferdam can do so in writing to the prospective applicant no later than 28th July 2023. Comments can be made by email to: info@inchcapewind.co.uk

Please note that comments made to ICOL are not representations to the Scottish Ministers. Once the licence application is submitted there will be an opportunity for representations to be made to the Scottish Ministers directly.

TRAFFIC & Roads

TEMPORARY TRAFFIC RESTRICTIONS -
ROAD TRAFFIC REGULATION ACT 1984

East Lothian Council and Police Scotland have approved the temporary restrictions for the below:

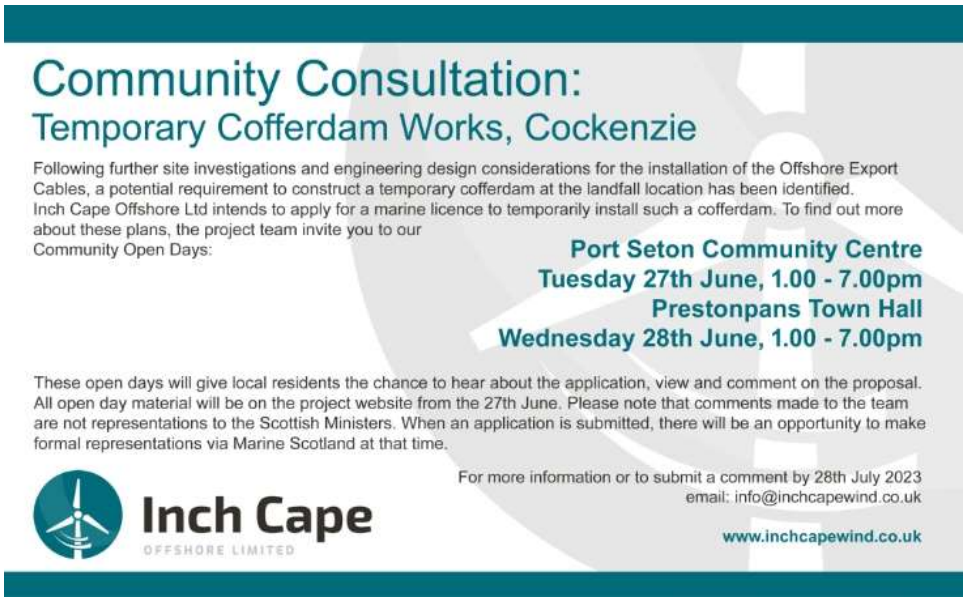
1.Countess Road, Dunbar. 29/05/23 – 11/06/23. Parking Suspension

2.Main Street, Elphinstone. 29/05/23 – 11/06/23. Parking Suspension

3. Duries Park, Elphinstone. 10/05/23 – 30/05/23. Road Closure

(Part Retrospective)

Full details can be found at www.tellmescotland.gov.uk



Community Consultation:

Temporary Cofferdam Works, Cockenzie

Following further site investigations and engineering design considerations for the installation of the Offshore Export Cables, a potential requirement to construct a temporary cofferdam at the landfall location has been identified. Inch Cape Offshore Ltd intends to apply for a marine licence to temporarily install such a cofferdam. To find out more about these plans, the project team invite you to our Community Open Days:

Port Seton Community Centre
Tuesday 27th June, 1.00 - 7.00pm
Prestonpans Town Hall
Wednesday 28th June, 1.00 - 7.00pm

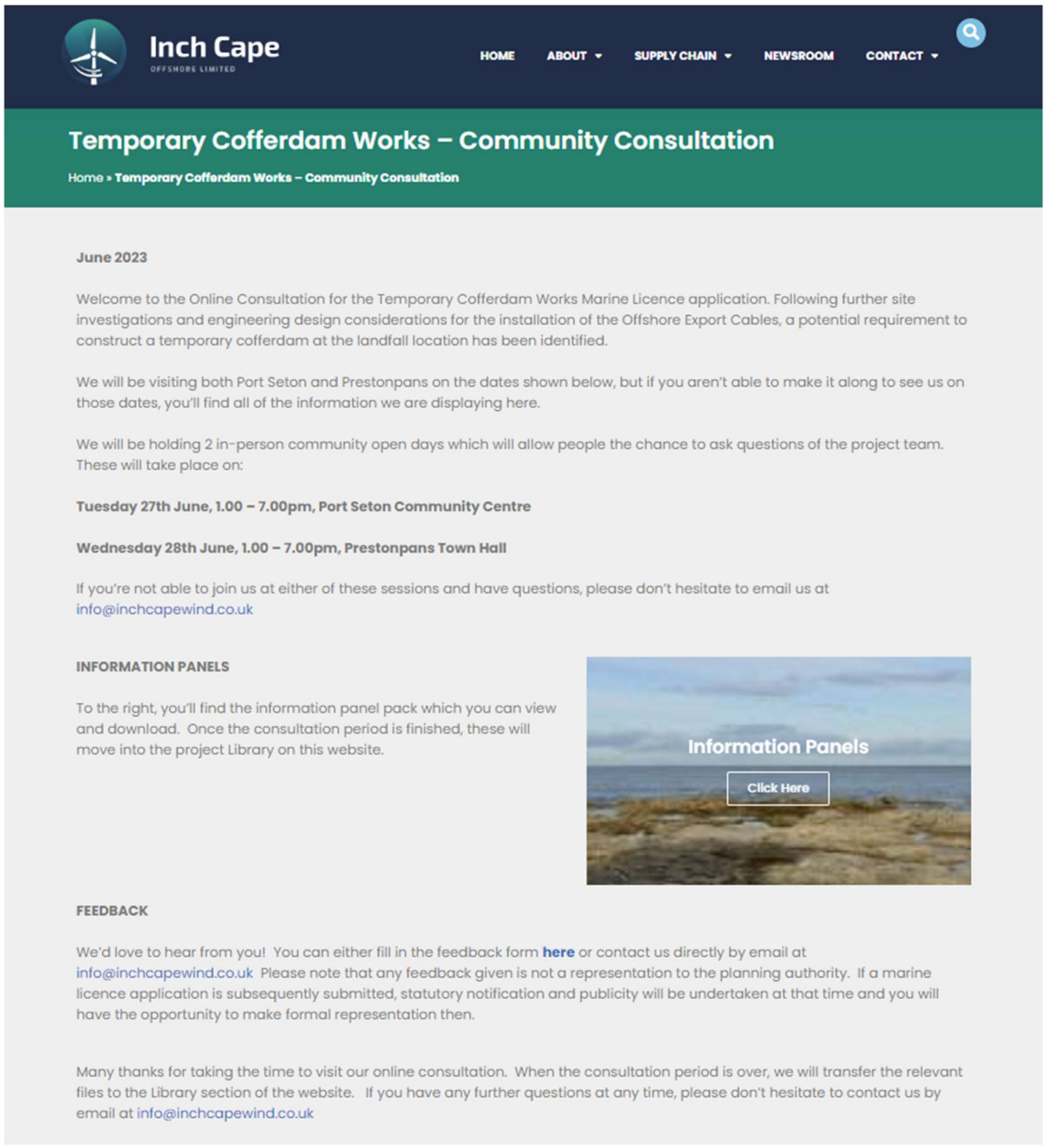
These open days will give local residents the chance to hear about the application, view and comment on the proposal. All open day material will be on the project website from the 27th June. Please note that comments made to the team are not representations to the Scottish Ministers. When an application is submitted, there will be an opportunity to make formal representations via Marine Scotland at that time.

For more information or to submit a comment by 28th July 2023 email: info@inchcapewind.co.uk

Inch Cape OFFSHORE LIMITED

www.inchcapewind.co.uk

Appendix C: Online Consultation



Inch Cape OFFSHORE LIMITED

HOME ABOUT SUPPLY CHAIN NEWSROOM CONTACT

Temporary Cofferdam Works – Community Consultation

Home » Temporary Cofferdam Works – Community Consultation

June 2023

Welcome to the Online Consultation for the Temporary Cofferdam Works Marine Licence application. Following further site investigations and engineering design considerations for the installation of the Offshore Export Cables, a potential requirement to construct a temporary cofferdam at the landfall location has been identified.

We will be visiting both Port Seton and Prestonpans on the dates shown below, but if you aren't able to make it along to see us on those dates, you'll find all of the information we are displaying here.

We will be holding 2 in-person community open days which will allow people the chance to ask questions of the project team. These will take place on:

Tuesday 27th June, 1.00 – 7.00pm, Port Seton Community Centre

Wednesday 28th June, 1.00 – 7.00pm, Prestonpans Town Hall

If you're not able to join us at either of these sessions and have questions, please don't hesitate to email us at info@inchcapewind.co.uk

INFORMATION PANELS

To the right, you'll find the information panel pack which you can view and download. Once the consultation period is finished, these will move into the project Library on this website.

FEEDBACK

We'd love to hear from you! You can either fill in the feedback form **here** or contact us directly by email at info@inchcapewind.co.uk Please note that any feedback given is not a representation to the planning authority. If a marine licence application is subsequently submitted, statutory notification and publicity will be undertaken at that time and you will have the opportunity to make formal representation then.

Many thanks for taking the time to visit our online consultation. When the consultation period is over, we will transfer the relevant files to the Library section of the website. If you have any further questions at any time, please don't hesitate to contact us by email at info@inchcapewind.co.uk

Appendix D: Information Panels

Banners 1, 2 and 3 shown below.

About the Inch Cape Project

The Inch Cape Offshore Wind Farm, currently in late-stage development, will see up to 72 turbines located 15 km off the Angus Coast and connect to the national transmission system at Cockenzie, East Lothian.

The project will make a significant contribution to meeting the UK's offshore wind target and will be Scotland's largest single source of renewable power when built, generating the equivalent of the annual power needs of more than 1.7 m homes.

Inch Cape was established as a concept in 2008 after the site was secured in the Crown Estate's third leasing round auction under previous ownership. The wind farm design has changed and improved over the years, taking advantage of new technologies and innovations within the wider offshore wind industry.

Inch Cape secured consent for an alternative wind farm design in Spring 2019 which would see the project benefit from improving turbine technology and allow a reduction in the number of turbines from 110 to up to 72. Fewer, higher capacity turbines will allow the project to reduce construction time and costs and minimise potential environmental impacts.

Electricity from Inch Cape will be transmitted via subsea export cables to an existing National Grid Electricity Transmission connection at the former Cockenzie Power Station site in East Lothian.

*Based on the project's projected average net energy yield and a typical annual household consumption of 3,800kWh, as per Ofgem's 2020 Typical Domestic Consumption Values. (these will next be updated in 2023)

Inch Cape OFFSHORE LIMITED

About us

Inch Cape OFFSHORE LIMITED

SDIC Red Rock Power Limited

ESB Energy for generations

Inch Cape Offshore Wind Farm is owned by Inch Cape Offshore Limited (ICOL), an equal joint venture between Edinburgh-based renewable and sustainable energy company, Red Rock Power Limited and Ireland's leading energy company, ESB.

The development of Inch Cape Offshore Wind Farm will make a vital contribution to achieving renewable energy targets, and correspondingly net zero ambitions, at the UK, Scottish and regional level. It will add to the existing Forth and Tay Offshore Energy Cluster along Scotland's east coast, contributing to developing the clusters international competitiveness as a source for investment in the Forth and Tay region and providing further opportunities for the local supply chain.

Over the course of its lifetime, Inch Cape is expected to support:

- 1,750 full time jobs and generate £143 million Gross Value Added (GVA) for the Forth and Tay Area;
- 6,650 full time jobs and generate £488 million GVA for Scotland; and
- 11,550 full time jobs and generate £885 million GVA for the UK.

15km from the Angus coastline

Up to 1 GW of clean electricity

Up to 72 turbines

150km² footprint

Inch Cape OFFSHORE LIMITED

Overview of the Temporary Cofferdam

The Inch Cape Offshore Export Cables will come ashore at the former Cockenzie Power Station site on the Firth of Forth coastline in East Lothian. The Export Cables will be installed using open cut trenching at the Landfall location at Cockenzie.

Following further site investigations and engineering design considerations for the installation of the Offshore Export Cables, a potential requirement to construct a temporary cofferdam at the Landfall location has been identified. A temporary cofferdam may be required to ensure a safe working area for intertidal elements of the work which cannot be completed within one period of low water.

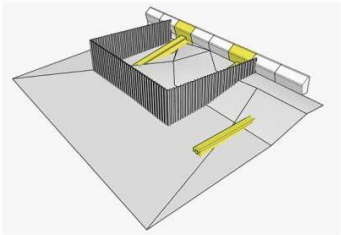
The existing consent for the installation of the Offshore Export Cables does not cover the construction of a temporary cofferdam. Therefore, ICOL is applying for a marine licence for works relating to the installation of the temporary cofferdam.

A Screening Request will shortly be submitted to Marine Scotland Licensing and Operations Team (MS-LOT) for the temporary cofferdam to determine if an Environmental Impact Assessment (EIA) is required in support of the marine licence application, however environmental impacts are expected to be minimal.

Inch Cape OFFSHORE LIMITED

Banners 4 and 5 shown below.

Indicative Cofferdam Sketch



The temporary cofferdam is envisaged as a traditional box structure approximately 40m x 40m formed from a perimeter of steel sheet piles (assumed 1.4m wide) fixed into the seabed and supported by beams and props for stability.

The above figure highlights in yellow the two contained export cables and the diverted local authority outfall (outwith the cofferdam).

Steel piles would be installed using vibro piling to achieve the required penetration and is expected to take approximately 30 days. Where rock or difficult driving conditions are encountered, it is anticipated that the ground will be prepared by pre-drilling to allow the piles to be advanced. The top of the piles would match the height of the existing sea defence wall.

The cofferdam would be constructed tight to the existing sea defence wall such that a seal could be formed to limit seawater entering the space: this will likely require an amount of grout/concrete to seal the toes of the sheet-piles and voids against/within the sea defence along with de-watering pumps.

Cofferdam construction would use conventional land-based plant to access the foreshore and install piles during low tides.

Access to the foreshore will be via temporary access road. The foreshore area will be required to be cleared of loose material, debris, and other obstructions to the work.

A crushed rock piling platform within the perimeter is also anticipated to allow safe piling operations. Both of these rock structures are temporary works to facilitate construction of the cofferdam and would be removed fully when the cofferdam is no longer required.

Construction of the temporary cofferdam will be undertaken during low tide and is estimated to take 8 – 10 weeks. It is anticipated that the cofferdam will be in place for up to 18 months and will be removed, by the appointed contractor, when no longer required.

On completion of the works the steel piles will be cut 1m below the seabed level and the cut ends covered in rock armour, on the restored shoreline.

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Outline of Activities and Indicative Timescale

Installation anticipated Q4 2024

- Installation of temporary access road
- Diversion of ELC Outfall
- Temporary removal of rock revetment
- Install temporary crushed rock levelling surface to facilitate piling operations
- Excavate narrow trench to facilitate piling operations
- Steel piles installed using vibro-piling
- Grout/concrete to seal toes of sheet piles (TBC)
- Grout/concrete to seal sides of cofferdam to sea wall
- Additional landfall works and export cable pull in
- Reinstate sea wall and complete cable containment
- Remove cofferdam on completion of export cable installation
- Remove temporary crushed rock levelling surface
- Reinstate original beach profiles using stored rock armour

Removal of Temporary Cofferdam Anticipated 2025

(removal sequence TBC on final programme and design).

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Appendix E: Photos of Event

Appendix F: Feedback Forms and Email Response (redacted)

Voice Your Opinion

Contact Details

Name .....

Address

.....

Postcode

[redacted]

on the proposals as you request.

Consultation Event: TEMPORARY COFFERDAM WORKS MARINE LICENCE Date: JUNE 2023

Your opinion is important to us. We would appreciate you taking a moment to complete the following questionnaire so we can find out more about your views on the proposal this exhibition is all about. The aim of this questionnaire is to allow individuals to contribute to the development process and interact with Inch Cape Offshore Ltd. This is not a substitute for the official planning process. No personal information will be passed on to third parties.

1. What is your view on the use of renewable energy to help meet our energy requirements?
(onshore and offshore wind power, solar power, biomass, wave and tidal power, amongst others)

☒ Very Supportive ☐ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

2. What is your view of the use of offshore wind energy in particular to help meet our energy requirements and the climate change emergency?

☒ Very Supportive ☐ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

3a. How do you feel about the Inch Cape Offshore Wind project?

☐ Very Supportive ☒ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

3b. Why do you hold this view? Please state:

Main concern is the way in which the construction work is being proposed to be moved to + from the site. The disruption noise danger etc to Eastriemer Pl - not acceptable when there is a perfectly appropriate alternative route.

4. How close do you live to the onshore substation site?

☐ Within 1 kilometre (0.6 miles) ☒ Between 1 and 5 kilometres (3.1 miles) ☐ Further away than 5 kilometres (3.1 miles)

5a. Having viewed all of the information, how do you feel about the application for temporary cofferdam works?

☒ Very Supportive ☐ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

5b. Why do you hold this view?

Presume the cofferdam essential so happy to bear the noise + disruption for the short term.

6. If you have any further interests, please state below:

7. How did you first learn about the project?

- [x] Word of mouth
- [ ] Social media
- [ ] Google or other search engine
- [ ] Newspaper advert
- [ ] Newspaper article
- [ ] (Invitation for) Public Exhibition
- [ ] Other (please state)

8. Please use the area below to ask a specific question or make comment relating to this Marine Licence Application process.

Would be good to know that the whole sea wall + surrounding area can be restored + repaired to safeguard the area from further sea / tidal damage.

9. If you would like us to respond to any of the comments you have made or questions you have asked in this questionnaire, please indicate here and, if required, we will get back to you shortly.

- [x] Response wanted
- [ ] No response wanted

Data Protection

We hold all personal data in accordance with the General Data Protection Regulation (GDPR) (EU) 2016/679 and your personal data will not be transferred outside of the European Economic Area

Please return this questionnaire to the registration desk at the entrance of the exhibition.
If preferred, you can send the questionnaire to

Inch Cape Offshore Ltd
40 Princes Street, Edinburgh EH2 2BY

Printed on recycled paper

Voice Your Opinion

Inch Cape OFFSHORE LIMITED

[redacted]

Consultation Event: TEMPORARY COFFERDAM WORKS MARINE LICENCE Date: JUNE 2023

Your opinion is important to us. We would appreciate you taking a moment to complete the following questionnaire so we can find out more about your views on the proposal this exhibition is all about. The aim of this questionnaire is to allow individuals to contribute to the development process and interact with Inch Cape Offshore Ltd. This is not a substitute for the official planning process. No personal information will be passed on to third parties.

1. What is your view on the use of renewable energy to help meet our energy requirements? (onshore and offshore wind power, solar power, biomass, wave and tidal power, amongst others)
☑ Very Supportive ☐ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

2. What is your view of the use of offshore wind energy in particular to help meet our energy requirements and the climate change emergency?
☑ Very Supportive ☐ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

3a. How do you feel about the Inch Cape Offshore Wind project?
☐ Very Supportive ☑ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

3b. Why do you hold this view? Please state:
VERY SUPPORTIVE OF THE PRINCIPLE, ~~BUT~~ CURRENTLY CONCERNED THAT INCH CAPE ARRANGE WITH E.L. COUNCIL TO RE-ROUTE TRAFFIC PLANS AWAY FROM EAST LORIMER PLACE (TO USE / DEVELOP THE PROPOSED 'LINK ROAD').

4. How close do you live to the onshore substation site?
☐ Within 1 kilometre (0.6 miles) ☑ Between 1 and 5 kilometres (APPROX 0.7 miles) ☐ Further away than 5 kilometres (3.1 miles)

5a. Having viewed all of the information, how do you feel about the application for temporary cofferdam works?
☑ Very Supportive ☑ Supportive ☐ Undecided ☐ Opposed ☐ Very opposed

5b. Why do you hold this view?
~~WOULD~~ LOOKS LIKE ESSENTIAL PART OF THE PROCESS. WOULD BE GREAT IF INCH CAPE WERE WILLING TO MAINTAIN SEAWALL ALL ALONG SITE

6. If you have any further interests, please state below:

7. How did you first learn about the project?

☐ Word of mouth ☐ Social media

☐ Google or other search engine ☐ Newspaper advert ☐ Newspaper article

☐ (Invitation for) Public Exhibition

☐ Other (please state) LEAFLET

8. Please use the area below to ask a specific question or make comment relating to this Marine Licence Application process.

CURRENTLY CONCERNED TO RE THE IMPACT OF THE CONSTRUCTION HGV TRAFFIC.

9. If you would like us to respond to any of the comments you have made or questions you have asked in this questionnaire, please indicate here and, if required, we will get back to you shortly.

☐ Response wanted (ALREADY IN CONTACT)

☐ No response wanted

Data Protection

We hold all personal data in accordance with the General Data Protection Regulation (GDPR) (EU) 2016/679 and your personal data will not be transferred outside of the European Economic Area

Please return this questionnaire to the registration desk at the entrance of the exhibition.
If preferred, you can send the questionnaire to

Inch Cape Offshore Ltd
40 Princes Street, Edinburgh EH2 2BY

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[redacted]

From: Noble, Ellie [redacted]
Sent: 28 July 2023 15:24
To: ICOL info
Cc: McKeown, Stephen; [redacted]
Subject: Pre-application consultation - Temporary Cofferdam Works - Cockenzie - Seagreen 1A response
Attachments: LF000012-CST-MA-LET-0002 Inch Cape Consultation response May 23.pdf; LF000012-CST-MA-LET-0003 Inch Cape Consultation response July 23.pdf

Hello,

I am writing to input into your current pre-application consultation regarding the Temporary Cofferdam Works at Cockenzie. The newspaper notice for the PAC states the deadline for comment is today, the 28 July.
We have provided consultation responses to your recent marine licence variation to amend the project boundaries associated with the offshore area. Our position is that Inch Cape's design is sufficiently mature as to no longer require the overlap with SG1A's project boundary at landfall as the coffer dam application process shows. I am attaching the 2 previous correspondence we have sent to yourselves and MD-LOT relating to this matter. Although these letters are addressed to MD-LOT as consultation communication, the Inch Cape team were copied in also and we would like for the details in these letters to be viewed as our input into the current PAC process for the coffer dam. Our position is that the points we raised during the marine licence variation are still valid, have not been addressed and are even more relevant to this pre-application consultation as it relates to the landfall area. We also intend to make similar representations when the presumed marine licence variation for the cofferdam is being determined.

I would be grateful if you could acknowledge receipt of this response and further information on how you intend to deal with the points raised.
If you wish for more information or would find a meeting useful, which we would also welcome, please do get in contact using my details below.
Best wishes
Ellie Noble

Ellie Noble | Consents Team Manager (Seagreen Wind Energy Ltd)

SSE Renewables
1 Waterloo Street
Glasgow
G2 6AY

[redacted]

SCHEDULE Regulation 8

Form

PRE-APPLICATION CONSULTATION REPORT

Marine (Scotland) Act 2010: Section 24

1. Proposed Licensable Marine Activity

Please describe below or, where there is insufficient space, in a document attached to this form the proposed licensable marine activity, including its location

Please see Inch Cape Offshore Wind Farm 'Pre-Application Consultation Report - Cofferdam' Section 3.2 titled 'Proposed Licensable Marine Activity (Question 1)'.

2. Applicant Details

Title	Initials	Surname
Mr	K	Thomson

Trading Title
(if appropriate)

Inch Cape Offshore Limited

Address

40 Princes Street, Edinburgh EH2 2BY

Name of contact
(if different)

Position within Company
(if appropriate)

Lead Consents Manager

Telephone No. (inc. dialing code)	Fax No. (inc. dialing code)
0131 5577101	

Company Registration No.	Email
SC373173	info@inchcapewind.co.uk

Is this prospective applicant the proposed licensee?

YES [X] NO [ ]

If NO, please complete Section 3 below.

3. Proposed Licensee Details

Title	Initials	Surname

Trading Title
(if appropriate)

Address

Name of contact
(if different)

Position within Company
(if appropriate)

Telephone No. (inc. dialing code)	Fax No. (inc. dialing code)

Company Registration No.	Email

4. Pre-application Consultation Event

Please describe below or, where there is insufficient space, in a document attached to this form the pre-application consultation event

Please see Inch Cape Offshore Wind Farm 'Pre-Application Consultation Report - Cofferdam' 3.4 titled 'Pre-Application Consultation Event (Question 4)'.

5. Information provided by the Prospective Applicant at the Pre-application Consultation Event

Please provide below or, where there is insufficient space, in a document attached to this form details of any information provided by the prospective applicant for a marine licence at the pre-application consultation event

Please see Inch Cape Offshore Wind Farm 'Pre-Application Consultation Report - Cofferdam' 3.5 titled 'Information provided by Prospective Applicant at the Pre-application Consultation Event (Question 5)'.

6. Information received by the Prospective Applicant at the Pre-application Consultation Event

Please provide below or, where there is insufficient space, in a document attached to this form details of any comments and objections received by the prospective applicant for a marine licence at the pre-application consultation event

The in-person consultation events were attended by nine people. Two feedback forms were completed at the second event and one direct email was received

Images from the in-person event are provided in Appendix E of the 'Inch Cape Offshore Wind Farm Pre-Application Consultation Report - Cofferdam'.

7. Amendments made, or to be made, to the Application for a Marine Licence by the Prospective Applicant following their Consideration of Comments and/or Objections received at the Pre-application Consultation Event

Where any amendments are made, or are to be made, by the prospective applicant for a marine licence to the marine licence application as a direct result of their consideration of comments and/or objections received at the pre-application consultation event, please provide below or, where there is insufficient space, in a document attached to this form details of such amendments

The consultation event generated very little interest and feedback on the Cofferdam was positive, recognising the need case. SSE Renewables (SSER), on behalf of Seagreen 1A responded by email directly with regard to the project boundaries. Discussion with SSER is held regularly and currently, no amendments to the application have been made. Feedback forms and correspondence can be found in Appendix F.

8. Explanation of Approach taken by the Prospective Applicant where, following Relevant Comments and/or Objections being received by the Prospective Applicant at the Pre-application Consultation Event, no Relevant Amendment is made to the Application for a Marine Licence

Where, following comments and/or objections having been received by the prospective applicant for a marine licence at the pre-application consultation event, no relevant amendment is made to the application for a marine licence by the prospective applicant, then please provide below or, where there is insufficient space, in a document attached to this form an explanation for the approach taken

Please see Inch Cape Offshore Wind Farm 'Pre-Application Consultation Report - Cofferdam' 3.4 titled 'Explanation of Approach taken by the Prospective Applicant where, following Relevant Comments and/or Objections being received by the Prospective Applicant at the Pre-application Consultation Event, no Relevant Amendment has been made to the Application for a Marine Licence (Question 8)'.

CERTIFICATION

Insert name	Keith Thomson
Insert Address	5th Floor, 40 Princes Street
Town	Edinburgh
County	City of Edinburgh
Postcode	EH2 2BY

I certify that I have complied with the legislative requirements relating to pre-application consultation and that the pre-application consultation has been undertaken in accordance with the statutory requirements.

Signature _____ Date 18th January 2024