Spittal-Peterhead HVDC Subsea Link

Ground Investigation Works - Marine Environmental Assessment

PREPARED FOR
Scottish and Southern Electricity Networks Transmission (SSENT)

DATE
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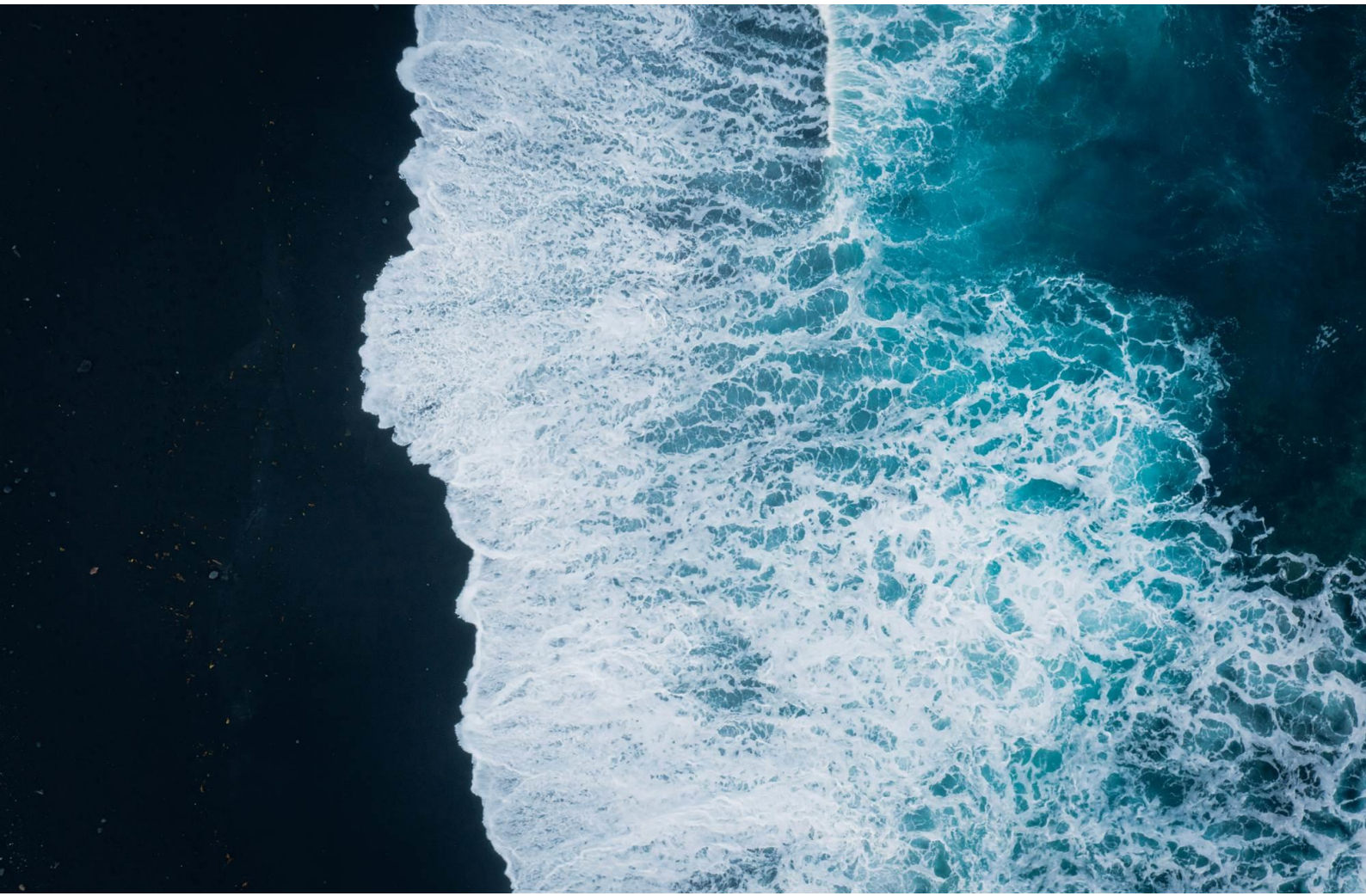

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Ground Investigation Works - Marine Environmental Assessment

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GLOSSARY

Term	Description
Additional Mitigation	Additional mitigation beyond that of the embedded mitigation is suggested on a receptor-specific basis to avoid or minimise likely significant effects.
The Applicant	Scottish Hydro Electric Transmission plc.
Cable Corridor	A 500 m wide corridor (250 m either side of a centreline) where geotechnical and benthic surveys were undertaken. Note that there is a section of the cable corridor wider than 500 m near to Rattray Head to provide some route-engineering choices, due to the existing infrastructure constraints.
Cumulative Impact	Impacts that result from changes caused by other past, present or reasonably foreseeable actions, together with the Project.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource, in accordance with defined significance criteria.
Embedded Mitigation	Mitigation measures considered to be incorporated within the Project Design.
Habitats Regulations Appraisal (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European conservation sites and Ramsar sites. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of Imperative Reasons of Over-Riding Public Interest (IROPI) and compensatory measures.
Impact	An impact is considered to be the change to the baseline as a result of an activity or event related to the Project. Impacts can be both adverse or beneficial impacts on the environment, and be either temporary or permanent.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and 200 m landwards of Mean High Water Spring (MHWS) tide. The landfall locations are Sinclair's Bay (north) and Rattray Head (south).
Licensable Activity	The term applied to the specific works associated with the permanent deposit of up to 8 boreholes for the proposed borehole campaign, requiring a marine licence application.
Marine Environmental Assessment (MEA)	A statutory process, similar to an Environmental Impact Assessment (EIA) but less detailed, by which the likely significant effects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of Part 4 of the Marine (Scotland) Act 2010 to obtain a Marine Licence.
Project Design	A description of the range of possible elements that make up the Spittal to Peterhead HVDC Link project design options under consideration. The Project Design is used to define the parameters considered within the MEA.
Proposed Borehole Campaign	The Ground Investigation works, associated with up to 8 boreholes, proposed to inform the precision of the engineering design for the Horizontal Directional Drilling campaigns of the Project.
Residual Effect	The final assessment of the level of significance, after taking into account both embedded and additional mitigation.

Term	Description
Significance of Effect	The overall risk rating, determined on a receptor specific basis, resulting from a combination of the magnitude of impact and receptor sensitivity.
Spittal to Peterhead HVDC Link Project ('the Project')	The HVDC electricity transmission link between Caithness (Spittal) and Aberdeenshire (Peterhead), collectively known as the Spittal to Peterhead HVDC Link Project (also referred to as the Project).
Substation	The New Spittal 400 kV Substation and New Peterhead 400 kV Substation each comprises a compound containing the electrical components for transforming the power supplied from the Spittal to Peterhead HVDC Link Project, and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid.
Realistic Worst-case Parameters	Parameters identified within the Project Design which are expected to result in the 'realistic worst-case scenario' for a receptor based on subject matter expertise.

ACRONYMS AND ABBREVIATIONS

Acronym	Description
AA	Appropriate Assessment
BGS	British Geological Survey
BWD	Bathing Waters Directive
CAR	Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan
CIA	Cumulative Impact Assessment
CPT	Cone Penetration Tests
DDV	Drop Down Video
EEA	European Environment Agency
EIA	Environmental Impact Assessment
EMODnet	European Marine Observation and Data Network
EPS	European Protected Species
ERM	Environmental Resources Management
ESRP	Emergency Spill Response Plan
EU	European Union
EUNIS	European Natural Information System
FeAST	Feature Activity Sensitivity Tool
GCR	Geological Conservation Review
GEP	Good Ecological Potential
GES	Good Ecological Status
GI	Ground Investigation
GT	Gross Tonnes
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Appraisal
HVDC	High Voltage Direct Current
IMO	International Maritime Organisation
INNS	Invasive non-native species
IROPI	Imperative Reasons of Overriding Public Interest
ISO	International Organisation for Standardisation

Acronym	Description
IUCN	International Union for Conservation of Nature
JUP	Jack Up Platform
km	Kilometres
kV	Kilovolt
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effects
m	Metres
MarESA	Marine Evidence based Sensitivity Assessment
MARPOL	The International Convention for the Prevention of Pollution from Ships
MCZ	Marine Conservation Zone
MD-LOT	Marine Directorate Licensing Operations Team
MEA	Marine Environmental Assessment
MHWS	Mean High Water Springs
MLA	Marine Licence Application
mm	Millimetres
MNNS	Marine Non-Native Species
MPA	Marine Protected Area
NCMPA	Nature Conservation Marine Protected Area
nm	Nautical Miles
NtMs	Notice to Mariners
OCNS	Offshore Chemical Notification Scheme
ODN	Ordnance Datum Newlyn
PDE	Project Design Envelope
PMF	Priority Marine Feature
PTS	Permanent Threshold Shift
RBMP	River Basin Management Plan
RCP	Representative Concentration Pathway
RHPE	Rattray Head Physical Environment
SAC	Special Area of Conservation
SBPE	Sinclair’s Bay Physical Environment
SEPA	Scottish Environment Protection Agency
SLVIA	Seascape, Landscape and Visual Amenity

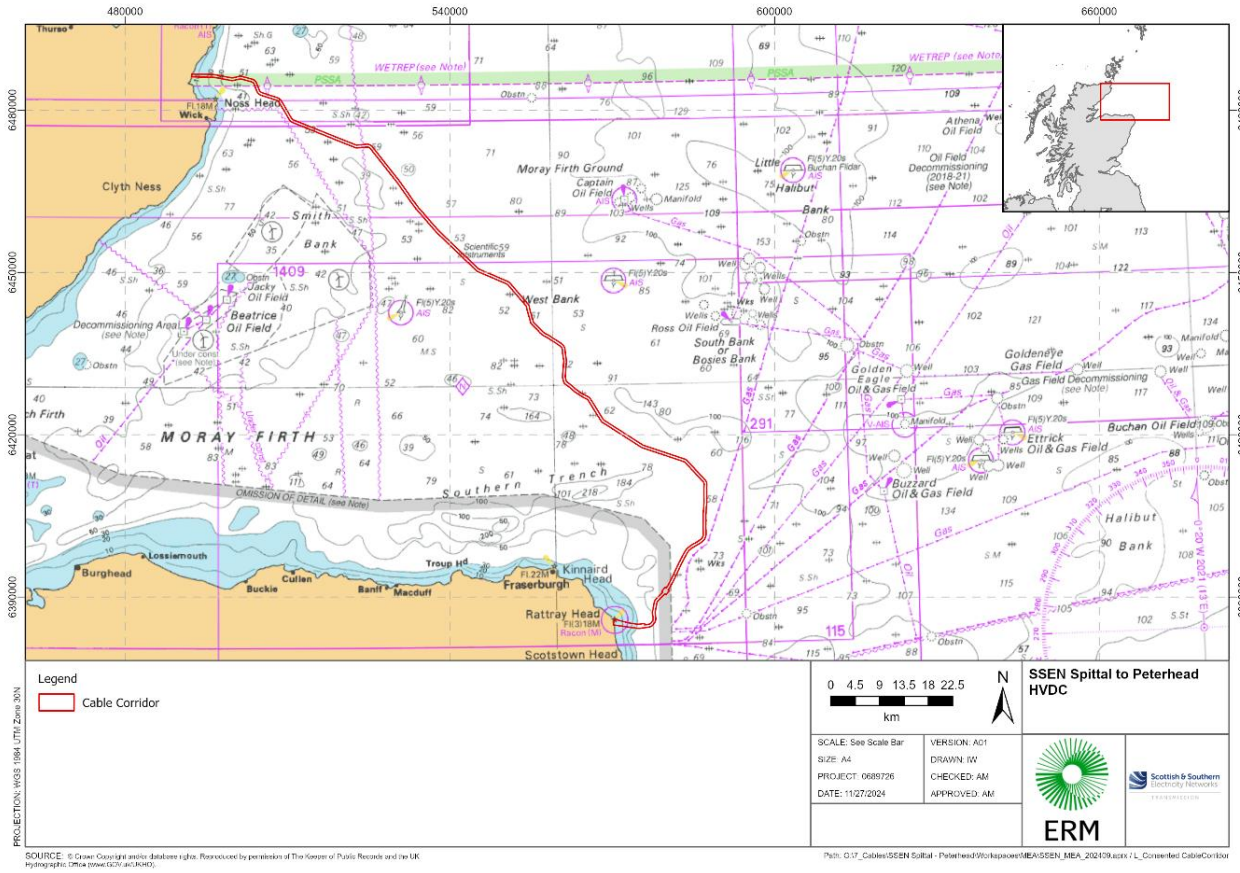
Acronym	Description
SMS	Safety Management System
SMU	Seal Management Unit
SMWWC	Scottish Marine Wildlife Watching Code
SOPEP	Shipboard Oil Pollution Emergency Plan
SPA	Special Protection Area
SSC	Suspended Sediment Concentration
SSENT	Scottish and Southern Electricity Networks Transmission
SSSI	Site of Special Scientific Interest
SWD	Shellfish Waters Directive
TO	Transmission Owner
TTS	Temporary Threshold Shift
UKHO	United Kingdom Hydrographic Office
WEWS	Water Environment and Water Services (Scotland) Act 2003
WFD	Water Framework Directive

1. INTRODUCTION

Scottish and Southern Electricity Networks Transmission (SSENT, 'The Applicant') is the trading name for Scottish Hydro Electric Transmission plc, part of the SSE plc Group. SSENT is the licensed electricity Transmission Owner (TO) in the north of Scotland and is responsible for the electricity transmission network in this region. SSENT owns and operates >5,000 kilometres (km) of high voltage underground cables, overhead lines, and subsea cables, that provide electricity to people across northern Scotland.

In January 2025, the Applicant submitted a Marine Licence Application (MLA) under Part 4 of the Marine (Scotland) Act 2010, to the Marine Directorate Licensing Operations Team (MD-LOT) for the installation and operation of a 525 kilovolt (kV) High Voltage Direct Current (HVDC) transmission cable system between Spittal and Peterhead ('the Project') (**Figure 1-1**). The Applicant contracted Environmental Resources Management Limited (ERM) to undertake a Marine Environmental Assessment (MEA) of the Project (LT360-SSEN-XX-XX-RP-MC-001) to support this initial MLA.

FIGURE 1-1: SPITTAL TO PETERHEAD HVDC CABLE INSTALLATION CORRIDOR LOCATION



1.1 PROJECT NEED AND BACKGROUND

To support the Project, The Applicant is proposing Ground Investigation (GI) works of up to 8 nearshore boreholes (three plus one contingency at each landfall site), 'the proposed borehole campaign'. The boreholes will characterise the overburden and rock geology at the two proposed landfalls and will inform the precision of the engineering design for the Horizontal

Directional Drilling (HDD) campaigns of the Project. The boreholes will be drilled to an approximate depth of -40 m Lowest Astronomical Tide (LAT) and backfilled according to offshore regulatory standards to ensure borehole integrity. Sediment samples from the boreholes will be taken onshore for laboratory analysis.

As detailed below in **Section 2.1**, the actual borehole drilling activity and removal of sediments is exempt from requiring a marine licence. However, in order to provide a robust assessment of this activity alongside the eventual backfilling, it has been assessed within this MEA.

The backfilling of these boreholes with a permanent deposit of grout does require a marine licence, and is hereby known as 'the licensable activity'. The boreholes will be backfilled with cement and bentonite (a swelling clay material), up to the surface of the bed rock. This allows the risings of the seabed to naturally backfill with sediment, promoting recovery of benthic habitats and associated communities to baseline condition.

2. PLANNING AND POLICY LEGISLATION FRAMEWORK

2.1 MARINE LICENCE

Under Part 4 of the Marine (Scotland) Act 2010, a marine licence is required for the permanent deposit of substances below Mean High Water Springs (MHWS) in Scottish Territorial Waters (within 12 nautical miles (nm)).

Under Part 3, Article 18B of The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011 (as amended), sediment sampling (i.e. the removal of sediment from the seabed for scientific or investigative purposes) is exempt from the requirement for a marine licence, where:

- The volume of sediment removed is less than 1 m^3 (per grab);
- The activity is not likely to cause a danger or obstruction to navigation; and
- The activity is not likely (either alone or in combination with other plans or projects) to have a significant effect on a European site; a Ramsar site; the protected features of a Marine Protected Area (MPA); or any process on which the conservation of any protected feature of a MPA is dependent.

It should be noted that the actual borehole drilling activity and removal of sediments is exempt from requiring a marine licence. However, in order to provide a robust assessment of this activity alongside the eventual backfilling, it has been assessed within this MEA and will be included within the MLA.

2.2 EUROPEAN PROTECTED SPECIES LICENCE

The potential disturbance to marine mammals and ornithological receptors through noise, vibration and collision risk, and disturbance to ornithology receptors is anticipated to be negligible and, therefore, no European Protected Species (EPS) Licence will be required.

2.3 OTHER LICENCE AND PERMIT REQUIREMENTS

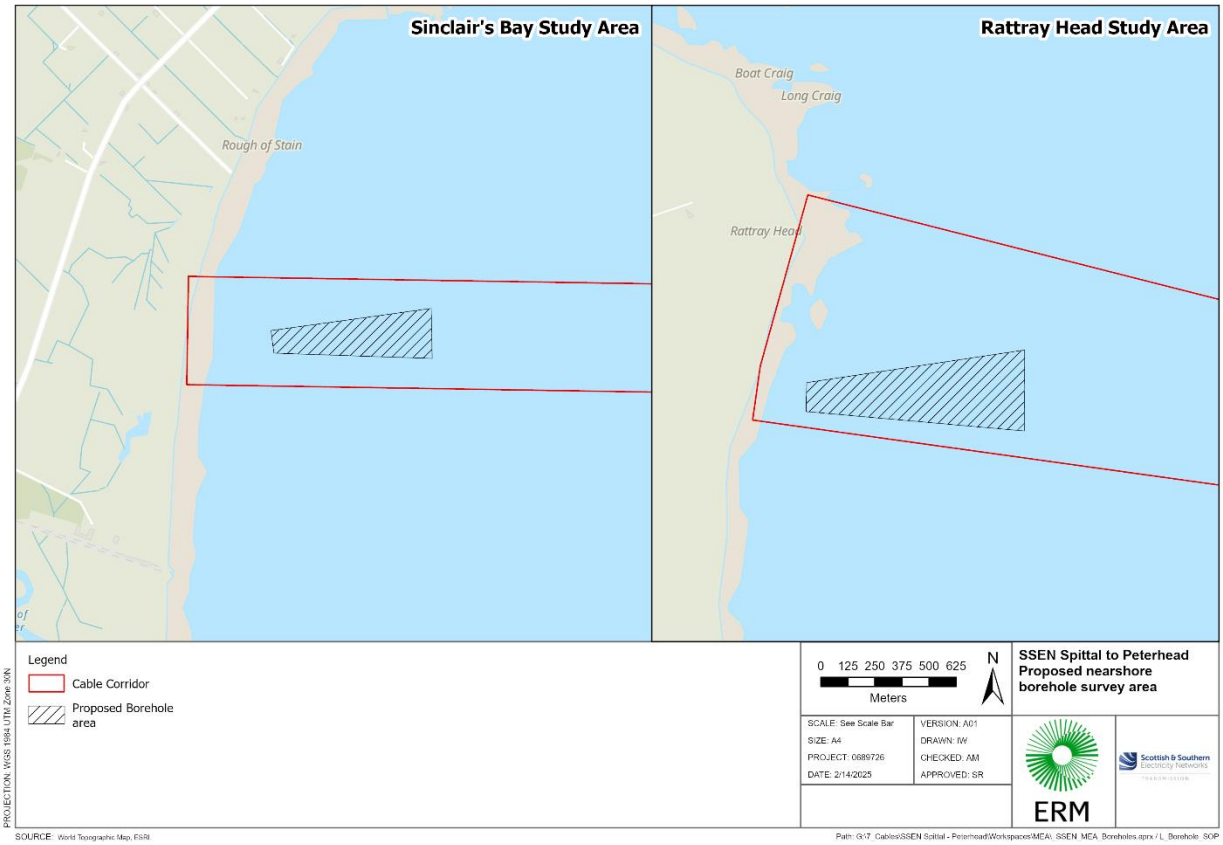
Under Part I of the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR), notice of intent to undertake an activity liable to cause pollution of the waterbody is not required. This regulation does not apply to the deposit of any chemical used in connection with any scientific experiment or survey within 12 nm.

3. PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The proposed boreholes are located at Sinclair's Bay to the North of the Project, and Rattray Head Peterhead at the South of the Project; the areas where these boreholes will be located are shown in **Figure 3-1**. Three boreholes (plus one contingency borehole) are proposed at each landfall site.

FIGURE 3-1: PROPOSED AREAS FOR THE BOREHOLES AT EACH LANDFALL SITE



The northern landfall site, Sinclair's Bay, is characterised by a long, wide, soft-sediment bay, with a limited sand dune system. There are no reported environmental/nature conservation designations at the bay, and currently few engineering constraints for the proposed boreholes campaign. There are also no major offshore constraints.

The landing site at the southern end of the cable corridor at Rattray Head is characterised by a wide soft-sediment bay with a more extensive dune system. The proposed borehole campaign locations are located in close proximity to the shoreward boundary of the Southern Trench Nature Conservation Marine Protected Area (NCMPA) (approximately 0.5 km between the nearest extent of proposed borehole campaign area and the closest shoreward boundary of the NCMPA). Potential landfall sites along this stretch of coast are limited by existing and planned third-party installations of pipelines.

3.1.1 SITE SELECTION

Site selection of the proposed borehole campaign considered the HDD exit locations at each landfall site of the Project. The boreholes aim to characterise the subsurface conditions across the two proposed landfalls and will aim to inform the precision of the engineering design for HDD campaigns association with the Project.

Deep ground investigation data will be used to compliment the shallow geophysical survey and shallow Cone Penetration Tests (CPT) and vibrocores. These were obtained during the subsea cable route survey campaign, which was completed in early 2024.

3.2 PLANNED ACTIVITIES

Six to eight nearshore boreholes will be drilled to an approximate depth of -40 m LAT. The drill rig shall be capable of operating both cable percussive and sonic drilling systems in superficial soils and rotary coring in bedrock. All chemicals planned for these operations are subject to control under the Offshore Chemical Notification Scheme (OCNS) and are certified/registered by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) for dispersion into the marine environment.

Geotechnical borehole works are likely to be carried out by a modular Jack Up Platform (JUP) with a leg size diameter of 1.8 m, suitably converted or purpose built, and equipped to undertake geotechnical nearshore operations. One additional support vessel is proposed for the movement, positioning, or safety standby of the JUP. Operations for the proposed borehole campaign are estimated to take 54 days, which includes 16 days for operations and 38 days for weather down days and transit between sites. Both landfalls are proposed to be undertaken under a single campaign.

The boreholes will be backfilled in accordance with relevant offshore regulatory standards, including International Organisation for Standardisation (ISO) 19901-8:2023. This is to ensure borehole integrity, safety, and environmental protection. The grouting material will be a cement and bentonite bound grout which shall be resistant to water ingress and compatible with the surrounding soil and water conditions.

The grout mixture is exempt under the REACH guidance and, therefore, there are no chemical permitting requirements. There is, however, a requirement to submit a MLA for the deposit of the grout within the boreholes, and the potential impact to the environment from this activity will be assessed within the MEA.

3.3 PROJECT DESIGN ENVELOPE

As detailed in **Sections 1.1** and **2.1**, even though the actual borehole drilling and removal of sediments does not require a marine licence, this activity has been assessed within the MEA, alongside the licensable activity (the backfilling of the borehole) and will be included in the MLA.

The proposed Project Design Envelope (PDE), i.e. the basis of assessment for the proposed borehole/backfilling campaign, is shown in **Table 3-1**.

TABLE 3-1: PROJECT DESIGN ENVELOPE (PDE) PARAMETERS

PARAMETER	UNIT	VALUE
Boreholes		
Number of Boreholes	No.	8
Radius of Borehole	mm	51
Diameter of Borehole	mm	102
Area of borehole (singular)	m^2	0.008
Area of boreholes (total)	m^2	0.064 (0.008 x 8)
Depth of Borehole	m	40
Volume of Borehole (singular)	m^3	0.320
Volume of Boreholes (total)	m^3	2.560
Jack Up		
Jack Up Platform Feet/Stabilisers	No.	8
Jack Up Platform Feet/Stabilisers Footprint Area (per foot/stabiliser)	m^2	2.545
Jack Up Platform Feet/Stabilisers Footprint Area (total for the entire Jack Up Platform per borehole)	m^2	20.360 (2.545 x 8)
Jack Up Platform Feet/Stabilisers Footprint Area (total campaign)	m^2	162.880 (20.360 x 8)
Seabed Disturbance		
Worst-case Total Footprint Area of Seabed Disturbance (total for an individual borehole)	m^2	20.368 (0.008 + 20.360)
Worst-case Total Footprint Area of Seabed Disturbance (total for entire proposed borehole campaign)	m^2	162.944 (20.368 x 8))

PARAMETER	UNIT	VALUE
Drill Arisings		
Diameter of Annular Ring of Deposited Drill Arisings (sand/gravel) plus Borehole diameter (singular)	mm	502 Borehole radius of 51 mm and assuming additional drill arising annular footprint width of 200 mm, then borehole itself plus drill arisings r=251 mm so d=502 mm
Area of Annular Ring of Deposited Drill Arisings (sand/gravel) including Borehole Area (singular)	m^2	0.198
Area of Annular Ring of Deposited Drill Arisings (sand/gravel) minus Borehole Area (singular)	m^2	0.190 (0.198 – 0.008)
Worst-case Total Footprint Area of Temporary Disturbance via Associated Deposition of sand/gravel from Drill Arisings (total for entire proposed borehole campaign)	m^2	1.520 (0.190 x 8)
Deposits (Licensable)		
Deposit Material	-	Cement-based Grout compliant with ISO 19901-08 guidelines
Volume of Material to be Backfilled (singular borehole)	m^3	0.971
Volume of Material to be Backfilled (total)	m^3	7.768
Equipment/Methods for Ground Investigation Works		
Drilling Techniques	-	**In Superficial Soils:** Cable Percussive Drilling Sonic Drilling **In Bedrock:** Rotary Coring
Rotary Drilling Underwater Noise	dB	170-180

PARAMETER	UNIT	VALUE
Source Level (SLs) (Underwater)	dB re 1µPa @ 1 m	140 - 155
Timings and Duration of Ground Investigation Works		
GI Works Start Date	Date	Provisionally Q1 2026
Total Duration of Proposed Works (works at all boreholes, transits between both sites and weather downtime)	Days	54
Proposed Campaign	Unit	1 GI works for the proposed borehole campaign will be undertaken in a single campaign
Vessels		
Number of Vessels	Number	1 Jack Up Platform (JUP) 1 Support Vessel

Based on the details of the proposed borehole campaign, as described in **Section 3**, the parameters defined in **Table 3-1** detail the realistic worst-case PDE associated with the proposed works. These parameters will inform the environmental assessment conducted within **Section 0** that forms this MEA.

The parameters in **Table 3-1** have been defined in accordance with the Precautionary Principle and, therefore, represent a conservative estimate of the extent of the proposed borehole campaign. The Precautionary Principle is a core EU environmental principle, now enshrined in domestic legislation as a guiding principle that the Scottish Ministers must have regard to when making policies (UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021). The Precautionary Principle is utilised in **Table 3-1**, as parameters are yet to be finalised i.e. the detailed design and refinement of the project is ongoing. As such, it is highly likely that the as-built PDE will be more refined and smaller in magnitude compared to the PDE described in this report.

Once the borehole parameters have been finalised, notification of the locations, diameter and depths will be submitted to MD-LOT prior to the commencement of the licensable activity.

4. STAKEHOLDER ENGAGEMENT

Consultation has been a key element in the development of the proposed borehole campaign. This section provides a summary of the consultation undertaken during the development of the borehole campaign, and consultation relevant to the content of the Marine Environmental Assessment (MEA) (this document). All consultees were issued a technical note as part of the consultation process. A summary of consultations undertaken, to date, is provided in **Table 4-1** below. The MCA was also consulted, but at the time of writing this document no response has been received. It is envisaged that they will respond during the application process.

TABLE 4-1 SUMMARY OF CONSULTATION

Consultee	Date	Response
MD-LOT	17 March 2025	MD-LOT could not advise on the scope, advised consulting NatureScot, but the application appeared straightforward. Confirmed a 14 week application turnaround time.
NatureScot	18 March 2025	The technical note appears to be comprehensive; NatureScot will respond to consultation during the application process.
NLB	04 March 2025	NLB would expect to see reference to you issuing a Notice to Mariners to cover the activities in both areas and circulated to relevant stakeholders

5. IMPACT ASSESSMENT METHODOLOGY

5.1 OVERVIEW

This MEA assesses whether the proposed borehole campaign is likely to result in any significant impacts on the environment. The impact assessment methodology uses a standardised approach to assess the environmental risk of the activities associated with the proposed borehole campaign. This is across all topics/receptors scoped into the assessment and aligns with best practice rationale and underpinning principles for an Environmental Impact Assessment (EIA):

- Avoidance: consider options that will avoid harm to ecological features;
- Potential environmental impacts: identify significant effects which could result from the Project;
- Mitigation: significant effects will be avoided or minimised through mitigation measures that are either designed into the Project or are later applied;
- Assessment of the level of significance of residual effects: significant effects will be assessed taking account of committed mitigation measures; and
- Compensation: where there are residual significant effects despite mitigation measures in place, compensatory measures will be implemented.

Although an EIA is not required alongside this Marine Licence application, this MEA has been carried out using similar EIA terms and definitions for clarity and simplicity.

5.2 STUDY AREA

A study area has been defined at each landfall site: Sinclair's Bay Study Area (the northern location), and Rattray Head Study Area (the southern location) (as shown in **Figure 3-1**). These Study Areas include 4 proposed borehole locations (at each landfall), plus a minimum 50 m borehole buffer. Chapter-specific Study Areas are also defined, where these are appropriate for the level of assessment required for the respective chapter.

5.3 TOPICS SCOPED IN AND OUT OF THE ASSESSMENT

Topics have been assessed and either scoped in or scoped out of this MEA. The potential impacts that may arise from the proposed borehole drilling and backfilling and their effects on receptors within each topic have been considered when reaching a scoping decision for each. Topics scoped in include:

- Physical Processes (**Section 6.1**);
- Benthic and Intertidal Ecology (**Section 6.1**);
- Marine Megafauna (**Section 6.3**);
- Ornithology (**Section 6.4**);
- Other Marine Users (**Section 6.5**);
- Marine Archaeology (**Section 6.6**);
- Habitats Regulations Appraisal (HRA) (**Section 6.7**);
- Nature Conservation Marine Protected Areas (NCMPA) Assessment (**Section 6.8**);
- Water Framework Directive Compliance (**Section 6.9**);

- Cumulative Impacts Assessment (**Section 6.10**).

Table 5-1 outlines each topic that has been scoped out of the assessment and provides a justification for each decision.

TABLE 5-1: TOPICS SCOPED OUT OF THE MARINE ENVIRONMENTAL ASSESSMENT

Topic	Scoping Decision	Justification For Scoping Decision
Fish and Shellfish Ecology	Scoped Out	Potential impacts associated with the proposed works upon fish and shellfish include temporary disturbance to seabed habitats and temporary disturbance via SSC. Due to the highly localised nature of the proposed borehole drilling and backfilling activities (including the footprint of JUP feet), and the proximity of the proposed works to the shoreline, potential impacts of the proposed works are not considered likely to result in any significant effects (XODUS, 2022). Therefore, it is proposed that fish and shellfish ecology receptors are **scoped out** from further consideration within the MEA.
Aviation and Radar	Scoped Out	Given the nature of the proposed borehole campaign and that there will be no infrastructure above sea level, aviation and radar impacts have been **scoped out** of the assessment.
Noise and Vibration	Scoped Out	Noise and vibration has been **scoped out** of the assessment in terms of an individual chapter topic. However, the impacts of noise and vibration will be considered under 'marine megafauna' due to their functional ecological connectivity to this topic.
Seascape, Landscape and Visual Amenity (SLVIA)	Scoped Out	There will be no infrastructure above sea level and any impacts to SLVIA receptors will be associated with the presence of additional vessels. Impacts to SLVIA receptors will be temporary and restricted to only the duration of the work, therefore SLVIA has been **scoped out** of the assessment.

5.4 ASSESSMENT METHODOLOGY FOR IMPACTS REQUIRING FURTHER CONSIDERATION

This MEA provides an assessment of the potential impacts resulting from the GI works of the proposed borehole campaign effects on receptors in the marine environment. In order to implement a systematic assessment of impacts between the different receptors, an overall approach to the assessment of impacts to determine their significance has been implemented. The process considers:

- Sensitivity and value of the receptor;
- Magnitude of effect; and
- Determination and qualification of the significance of impact.

5.4.1 SENSITIVITY

The sensitivity of a receptor is defined by how susceptible it may be to an impact with consideration to its resilience (tolerance, adaptability and recoverability) and, where applicable, its value (conservation significance, ecological importance and/or quality). The scale of sensitivity is as follows: negligible, low, medium and high, defined in **Table 5-2**.

TABLE 5-2: DEFINITION OF SENSITIVITY RATINGS

Sensitivity	Definition
Negligible	The receptor is generally tolerant and can accommodate a particular effect without the need to recover or adapt.
Low	The receptor has some tolerance to accommodate a particular effect or will be able to recover or adapt
Medium	The receptor has a low tolerance to accommodate a particular effect with a low ability to recover or adapt
High	The receptor has a very low/no tolerance to accommodate a particular effect with a low/no ability to recover or adapt

5.4.2 MAGNITUDE

Categorisation of the magnitude of effect will vary for specific topics. The magnitude categories used are negligible, low, medium and high, as defined in **Table 5-3**.

TABLE 5-3: DEFINITIONS OF MAGNITUDE

Magnitude	Environmental impact
Negligible	The effect is highly localised and short term, with full rapid recovery expected to result in very slight or imperceptible changes to baseline conditions or a receptor population.
	The effect is very unlikely to occur; if it does, it will occur at a very low frequency or intensity.
Low	The effect is localised and temporary or short term, leading to a detectable change in baseline conditions or a noticeable effect on a small proportion of a receptor population.
	The effect is unlikely to occur or may occur but at low frequency or intensity
Medium	The effect occurs over a local to medium extent with recovery likely within 1-2 years following cessation of activities, or localised medium term degradation with recovery in 2-5 years, OR the impact affects a moderate proportion of a receptor population.
	The effect is likely to occur and/or will occur at a moderate frequency or intensity.
High	Occurs over a large spatial extent, resulting in widespread, long term (>5 years following cessation of activity) or permanent changes of the baseline conditions, OR the effect affects a large proportion of a receptor population.
	The effect is very likely to occur and/or will occur at a high frequency or intensity.

5.4.3 IMPACT ASSESSMENT MATRIX

Once the sensitivity and magnitude have been determined using the scoring above, they are combined to conclude the significance of impact as detailed in the impact assessment matrix shown in **Table 5-4**.

TABLE 5-4: OVERALL IMPACT ASSESSMENT MATRIX

		Sensitivity			
		Negligible	**Low**	**Medium**	**High**
Magnitude	**Negligible**	Negligible	Negligible	Negligible	Minor
	Low	Negligible	Negligible	Minor	Minor
	Medium	Negligible	Minor	Moderate	Moderate
	High	Minor	Minor	Moderate	Major

The outcome of the overall risk assessment equates to a significance rating. An overall risk determined to be **Negligible** or **Minor** is 'Not Significant', and an overall risk determined to be **Moderate** or **Major** is 'Significant' and will require further mitigations to be implemented to minimise or remove the risk.

5.5 CUMULATIVE IMPACT ASSESSMENT

The Cumulative Impact Assessment (CIA) considers the combined impacts of the Project with the impacts from other projects, on the same single receptor/resource. It follows a two-stage approach:

- Stage 1 – Identify activities, receptors and pressures from other projects which share a pressure-receptor pathway with the Project; and
- Stage 2 – Define and assess the interactions of receptor-pressure pathways identified in Stage 1 to individual topic chapters scoped in this MEA.

5.6 EMBEDDED MITIGATION

Certain measures are incorporated into the proposed borehole campaign design as adherence to best practices or embedded mitigation/management measures in accordance with standard industry practice. Details on these types of mitigation are presented in **Table 5-5**.

Table 5-5.

TABLE 5-5: EMBEDDED MITIGATION

Measure	Details
Production of a Construction Environmental Management Plan (CEMP).	Measures will be adopted to ensure that the potential for environmental impact is minimised through the implementation of appropriate mitigation.
All project personnel will be trained and informed of their responsibility to implement the environmental and ecological mitigation outlined in the CEMP.	Toolbox talks, inductions, and awareness notices will be used to disseminate this information among all relevant project personnel.
Production of an Emergency Spill Response Plan (ESRP).	An Emergency Spill Response Plan will help to ensure that the potential for release of pollutants is minimised.
Control measures and shipboard oil pollution emergency plans (SOPEP) will be in place and adhered to under The International Convention for the Prevention of Pollution from Ships (MARPOL) Annex I requirements for all vessels. In the event of an accidental fuel release occurring appropriate standard practice management procedures will be implemented accordingly.	As per the MARPOL 73/78 requirement under Annex I, all ships of 400 Gross Tonnes (GT) and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization under Marine Environmental Protection Committee act. Production of this plan will help to ensure that the potential for release of pollutants from vessel operations is minimised.
Vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) to International Maritime Organisation (IMO) MARPOL Annex IV Prevention of Pollution from Ships standards.	Measures will be adopted to ensure that the potential for release of pollutants from vessel operations is minimised.
Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention).	The BWM Convention, adopted in 2004, aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Measures will be adopted to ensure that the risk of Marine Non-Native Species (MNNS) introduction during vessel operations is minimised.
Vessels will adhere to the IMO guidelines for the control and management of ships' biofouling to minimise the transfer of invasive aquatic species (Biofouling Guidelines) (resolution MEPC.207(62).	The Biofouling Guidelines provide a consistent approach to minimising the risk of MNNS introduction via biofouling on ship's hulls.
Production of a Marine Non-Native Species (MNNS) Plan.	A document detailing how the risk of potential introduction and spread of MNNS will be minimised is to be produced. The plan will outline measures to ensure vessels comply with the International Maritime Organization (IMO) ballast water management guidelines. It will consider the origin of vessels and contain standard housekeeping

Measure	Details
	measures for such vessels as well as measures to be adopted in the event that a high alert species is recorded.
All vessels will adhere to the Scottish Marine Wildlife Watching Code (SMWWC).	NatureScot (formally SNH) developed the Code as part of its duties under the Nature Conservation (Scotland) Act 2004. The Code was first published in 2006 and was revised in 2017. The code aims to: a. Help minimise disturbance to marine wildlife; b. Help to enjoy watching marine wildlife; c. Improve chances of seeing wildlife; d. Provide a standard for the wildlife watching industry; and e. Help to stay within the law.
Lighting on board all vessels will be kept to a minimum.	Lighting on-board all vessels will be kept to the minimum level required to ensure safe operations.
Deployment of anchor chains on the seabed will be kept to a minimum.	Reduces the potential for disturbance to benthic habitats and species including any commercial fish species which utilise the seabed.
Initial route design has avoided sensitive ecological areas and designated sites wherever possible.	Minimising ecological impacts.
Implementation of a 500 m radius safety zone around vessels.	A 500 m exclusion zone will remain in place during installation activities and applies to all vessels to ensure navigational safety.
Notice to Mariners (including local), Kingfisher bulletins, Radio Navigational Warnings, NAVTEX, and/or broadcast warnings will be promulgated in advance of any proposed works. The notices will include the time and location of any work being carried out, and emergency event procedures.	Ensure navigational safety and minimise the risk and equipment snagging.
Compliance with International Regulations for the Prevention of Collision at Sea (IMO, 1972) and the International Regulations for the Safety of Life at Sea (SOLAS).	SOLAS is an international maritime treaty which sets minimum safety standards in the construction, equipment and operation of merchant ships. The convention requires signatory flag states to ensure that ships flagged by them comply with at least these standards. In relation to the Project its compliance will ensure navigational safety and minimise the risk of equipment snagging.
As built survey data will be provided to the UK Hydrographic Office (UKHO) and Kingfisher for inclusion on Admiralty Charts and KIS-ORCA Awareness Charts.	Ensure navigational safety and minimise the risk and equipment snagging.

Measure	Details
A Safety Management System (SMS) will be in place throughout the Project.	Ensures that vessels comply with mandatory safety rules and regulations and follows appropriate codes, guidelines and standards.
Equipment and Training for Site Personnel.	Site personnel will be suitably equipped and trained for work offshore including in firefighting, first aid and offshore survival.
There will be adverse weather working policies and procedures for periods of construction and operational investigations.	This will ensure preparations are in place for adverse weather conditions.
A communications strategy will be developed for the Project.	To outline communication protocols between the Project and other marine stakeholders.
Avoidance of known Marine Historic Assets.	Avoidance of anthropogenic contacts and anomalies is feasible, and the installation corridor is designed to do this.
Protocol for Accidental Discoveries of Marine Historical Assets	The Protocol will define procedures to be taken in the event of a discovery in order to avoid impact to any marine historic assets.

6. ENVIRONMENTAL ASSESSMENT

6.1 PHYSICAL ENVIRONMENT

6.1.1 INTRODUCTION

This section characterises the baseline Physical Environment within the Physical Environment Study Area. This chapter has been informed by a desk-based literature review which has included collation and review of open-source bathymetric and geology data, as well as analysis of site-specific geophysical and geotechnical data collected to inform the engineering and environmental aspects of the Project and proposed borehole campaign (REACH Subsea, 2024a-e). The Physical Environment includes the bathymetry, regional geology, superficial sediments, hydrodynamic processes, sediment transport, coastal characteristics, and designated nature conservation sites that are designated for geological or geomorphological features.

The baseline characterisation is used to inform the Physical Environment Marine Environment Assessment in **Section 6.1.3**.

6.1.2 PHYSICAL ENVIRONMENT STUDY AREA

The Project is located within the Moray Firth, which is a large inlet opening to the northern North Sea. As part of the Project and proposed borehole campaign, there is a borehole Study Area near each of the 2 landfalls within the Spittal to Peterhead cable corridor: the Sinclair's Bay Study Area (in the north) and the Rattray Head Study Area (in the south). These borehole Study Areas include 4 proposed borehole locations (at each landfall), plus a minimum 50 m borehole buffer. However, since Physical Environment pathways include changes to waves, tides, and sediment transport pathways, potentially extending beyond the Study Areas, an extended Physical Environment Study Area is proposed.

For the purpose of this report, therefore, the Physical Environment Study Area is the Study Area (as detailed in **Section 5.2**) plus a minimum 1 km buffer (below MHWS). Henceforth, the Rattray Head Physical Environment Study Area will be referred to as RHPE Study Area and the Sinclair's Bay Physical Environment Study Area will be referred to as SBPE Study Area (**Figure 6-1**).

6.1.2.1 PUBLICLY AVAILABLE DATA SOURCES

Table 6-1 summarises key Physical Environment publicly available data sources used to characterise the baseline environment.

TABLE 6-1: KEY BASELINE PUBLICLY AVAILABLE DATA SOURCES FOR THE PHYSICAL ENVIRONMENT

Source	Summary	Coverage
The European Marine Observation and Data Network (EMODnet) for thematic mapping of bathymetry, seabed substrate and geology	Baseline mapping of bathymetry, seabed substrate and sub-surface geology to provide an overview of seabed conditions, complementing site-specific surveys	Full Study Area
British Geological Survey (BGS)	Quaternary geology, bedrock geology, and seabed sediments	Full Study Area

Source	Summary	Coverage
Copernicus Marine	Baseline mapping of (amongst other things) wind, wave and temperature characteristics	Global coverage
Cefas	Wavenet - Hourly timeseries of metocean data including wave height, period, peak direction, and sea temperature	Nearest buoy is Moray Firth Wavenet, in the inner Firth
ABPmer - Seastates	Long term (back to 1979) wave hindcast hourly model of wave parameters, including significant wave height, maximum wave height, wave period and wave direction	Full Study Area
United Kingdom Hydrographic Office (UKHO) seabed mapping service	Recent and historic seabed bathymetry data – HI1710,	Coverage of Sinclair's Bay landfall at 2 m resolution.
Various scientific literature	Papers include those relating to the bedrock and Quaternary geology, past sea-level and ice sheets, metocean conditions, sediment transport, and coastal systems	Various

6.1.2.2 SITE-SPECIFIC SURVEY DATA AND STUDIES

Table 6-2 summarises the site-specific survey reports (and associated data) and studies already undertaken for the Project that are used to characterise the borehole campaign area Physical Environment baseline.

TABLE 6-2: SITE-SPECIFIC SURVEY REPORTS AND STUDIES

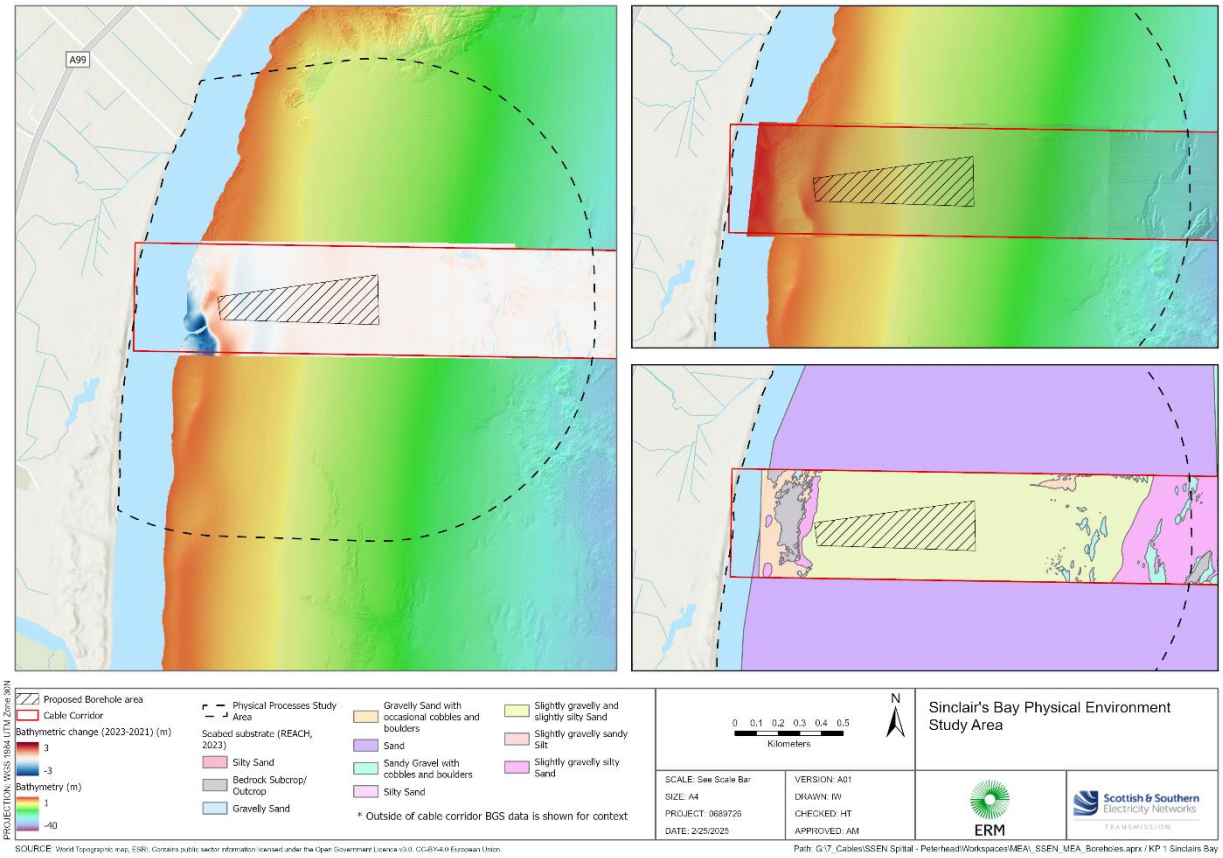
Source	Report no.	Reference
SSEN Transmission Spittal to Peterhead Marine Cable Route Survey Geophysical Interpretation Report (and associated data)	REACH-7506-SR-001	Reach Subsea, 2024b
SSEN Transmission Spittal to Peterhead Habitat Assessment and Environmental Baseline Report (and associated data)	REACH-7506-SR-EBS-02	Reach Subsea, 2024a
SSEN Transmission Spittal to Peterhead Geotechnical Results Report	REACH-7506-SR-003-R01	Reach Subsea, 2024e
SSEN Transmission Spittal to Peterhead Geotechnical Laboratory Test Report	REACH-7506-SR-004-02	Reach Subsea, 2024d
SSEN Transmission Spittal to Peterhead Integrated Report	REACH-7506-SR-002 Integrated Report_Rev2	Reach Subsea, 2024c
Spittal-Peterhead HVDC Subsea Link Sediment Mobility Assessment	0689726	ERM, 2024a
Spittal to Peterhead Cable Burial Risk Assessment	0689726	ERM, 2024b
Spittal to Peterhead Marine Link Burial Assessment Study	0689726	ERM, 2024c

6.1.3 BASELINE ENVIRONMENT

6.1.3.1 BATHYMETRY

Within the SBPE Study Area the bathymetry ranges between approximately 0-26 m below Lowest Astronomical Tide (LAT) (**Figure 6-1**).

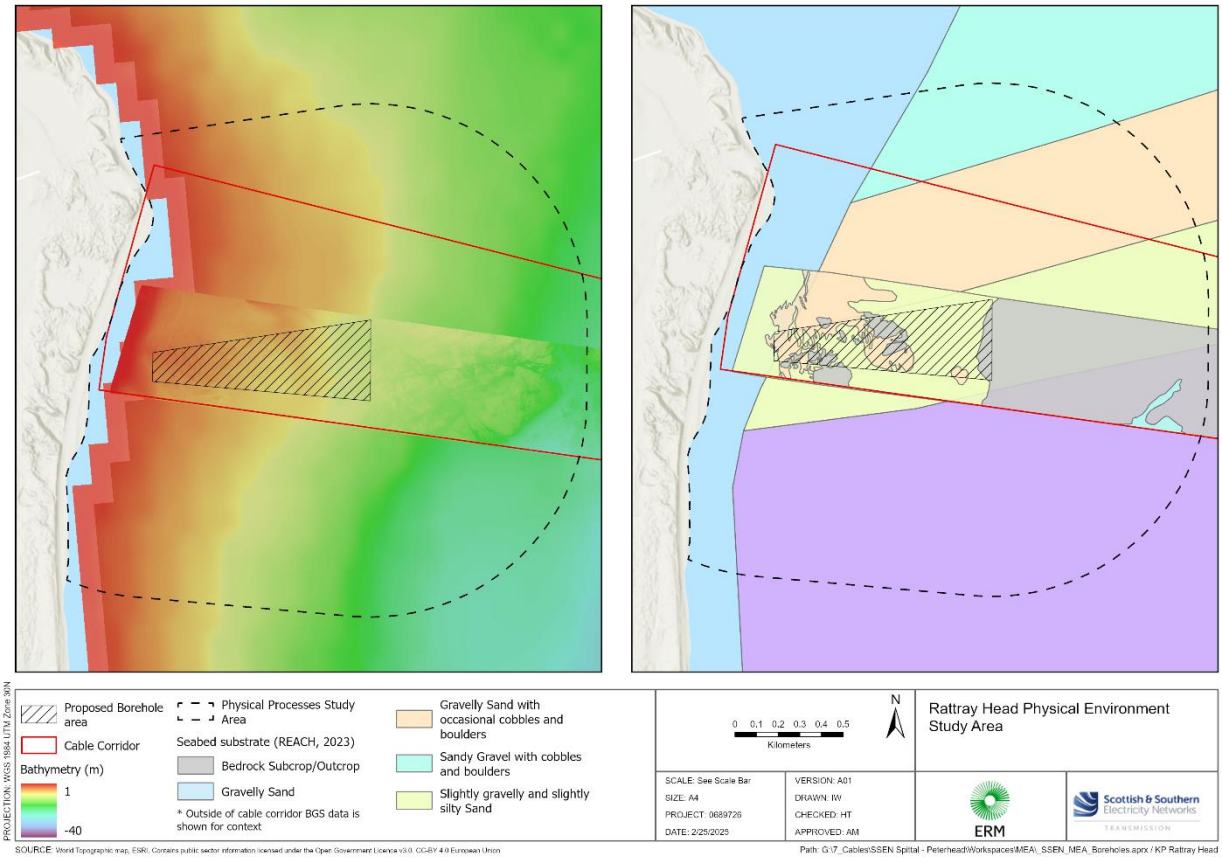
FIGURE 6-1: SEAFLOOR BATHYMETRY; BATHYMETRIC CHANGE BETWEEN 2021-2023; AND SEABED SUBSTRATE AT THE SINCLAIR'S BAY LANDFALL (SOURCE: EMODNET, 2020; REACH SUBSEA, 2024c)



The seabed deepens away from the coastline, with the deepest points corresponding to scoured depressions at the offshore edges of the SBPE Study Area. A comparison of the site-specific data with the UKHO HI710 bathymetry undertaken in the Sediment Mobility Assessment (ERM, 2024a) showed that these scour patches appear to be active, changing in form and dimensions. Generally, changes were within ±1 m over the course of 11 years. However, at the nearshore limit of the data there was significant erosion, up to 3 m, in 2.5 years. Beyond this a mound has formed, with a more gradual slope on the eastward slope.

Within the RHPE the bathymetry ranges between approximately 0-23 m below LAT, with the seabed generally deepening away from the coast (**Figure 6-2**). Bedrock outcrop or shallow subcrops are visible in the site-specific bathymetry data, and seabed mobility in the RHPE is minimal.

FIGURE 6-2: SEAFLOOR BATHYMETRY AND SEABED SUBSTRATE AT THE RATTRAY HEAD LANDFALL (SOURCE: EMODNET, 2020; REACH SUBSEA, 2024c)



6.1.3.2 REGIONAL GEOLOGY

Bedrock Geology

The bedrock geology in the Moray Firth predominantly consists of interbedded sedimentary units. Areas of hard substrate (BGS, 2023) that correspond to bedrock outcrop are identified within Argyll Metasedimentary deposits near the RHPE Study Area. The bedrock beneath the SBPE Study Area is Devonian Mudstone and Siltstone.

Quaternary Geology

The Quaternary evolution of the Inner Moray Firth Basin is linked to a complex interplay between climactic variation, ice sheet dynamics, and sea level change. Thick Quaternary deposits reflect early deltaic sedimentation, followed by predominantly glacial and glaciomarine conditions. These are buried by a thin cover of Holocene sediments. Across most of the Study Areas the Quaternary thickness is 5-20 m, however parts of the RHPE Study Area have <5 m Quaternary thickness (BGS, 2022).

Superficial Sediments

The seafloor within the Study Areas predominantly consists of Holocene sediments, whose distribution reflects the glacial and sea-level history of the area, as well as the present hydrodynamic regime. The primary source of seabed sediments is the reworking of offshore Pleistocene deposits, with negligible sediment input from the land (Andrews *et al.*, 1990).

According to BGS (2023), seabed sediments within the Study Areas range from sand to sandy gravel. Hard substrate is identified within the RHPE Study Area (BGS, 2023). The seabed sediments and geology identified by the Project-specific survey (REACH Subsea, 2024) include slightly gravelly and slightly silty sand, gravelly sand with occasional cobbles and boulders, sandy gravel with cobbles and boulders, and bedrock outcrop/subcrop at the RHPE Study Area (**Figure 6-2**). At the SBPE Study Area the project-specific data indicate presence of slightly gravelly and slightly silty sand, slightly gravelly silty sand, gravelly sand with occasional cobbles and boulders, gravelly sand with occasional cobbles and boulders, and bedrock outcrop/subcrop (**Figure 6-1**).

6.1.3.3 HYDRODYNAMICS

Tidal Currents

The tidal environment within the Moray Firth is semi-diurnal. Mean Spring Peak Flows are greatest near both the landfall sites; up to approximately 1.5 m/s near the Rattray Head landfall site, and 0.9 m/s near the Sinclair's Bay landfall site (ABPmer *et al.*, 2008). The spring tidal range is approximately 3.30 m at Rattray Head and 2.87 m at Sinclair's Bay (UHKO, 2023).

The tidal axis (the long-axis orientation of the tidal ellipse) within the Study Areas is, generally, aligned approximately north to south, approximately parallel to the adjacent coastlines (ABPmer *et al.*, 2008). This results in a generally southerly flood tide and northerly ebb tide.

Storm surges

Storm surges are produced when high winds build up a wall of water, which is exacerbated by the effects of atmospheric pressure (Prichard, 2013). Storm surge propagation has been extensively studied in the North Sea and is generally well understood. The estimated extreme sea level (generated by storm surge and astronomical tides), with a 10-year return period, is 2.71 m above Ordnance Datum Newlyn (ODN) near the northern landfall site (Sinclair's Bay), and 3.00 m above ODN near the southern landfall site (Rattray Head) (EA, 2018). For further information regarding potential future changes to the hydrodynamic environment, as a result of climate change, see **Section 6.1.1.**

Waves

Waves within the Study Areas are a combination of waves locally generated by wind, and waves generated elsewhere in the North Sea. Long term hindcast records of wave data have been derived from ABPmer's SEASTATES model (ABPmer, 2018).

At the northern landfall site (Sinclair's Bay), the mean wave height is 0.9 m and the predominant wave directions are from the northeast and southeast (each >30% of the time). At the southern landfall site (Rattray Head), the mean wave height is 1.4 m and the predominant wave directions are southeast (approximately 30% of the time) and northeast (approximately 20% of the time). Mean wave height generally increases with distance from the coast.

For further information regarding potential future changes to the hydrodynamic environment, as a result of climate change, see **Section 6.1.1.**

6.1.3.4 SEDIMENT TRANSPORT

Tidal and wind-driven currents in the Moray Firth region induce a sufficiently high shear stress to exceed the critical bed stress and initiate sediment movement. At a regional scale, there is a general net sediment transport to the southwest, towards the inner Moray Firth (Holmes *et al.,* 2004). Bedforms offshore the Sinclair's Bay landfall are consistent with a net southerly sediment transport direction. Additionally, near the RHPE Study Area, there is a bedload convergence zone, to the south of which there is northerly net sediment transport.

Greater complexity in sediment transport exists near both landfall sites, due to the effects of local currents. These are noted in a sediment mobility study by ERM (ERM, 2024a). The drift direction is northwards at the southern landfall site (Rattray Head), but comparable data do not exist for the northern landfall site (Sinclair's Bay) (Dynamic Coasts, 2024).

The sediment mobility report highlighted notable bathymetric changes in the SBPE Study Area between bathymetric data acquired in different years (ERM, 2024a). The bathymetric changes were associated with active scour patches, which changed in form and dimensions between surveys. Generally, changes in the nearshore area are within ±1 m over the course of 11 years. The most notable exception is at the nearshore limit of the survey data where there has been significant erosion, up to 3 m, in 2.5 years. Seaward of this a mound has formed, with a more gradual slope on the eastward slope. Between 2021 and 2023 the scour patch has extended southwards, encompassing more of the cable corridor, and deepened. Given the short timestep (2 years) between bathymetry datasets, it is not possible to assess whether this is a continuous or storm-driven process, or to assess whether the shoreline recovers, over time, back to a baseline.

6.1.3.5 COASTAL CHARACTERISTICS

The coastline included in the Physical Environment Study Areas includes approximately 1 km of coastline at each landfall.

The coastline at the southern landfall (Rattray Head) includes extensive sandy beaches, backed by dune systems, that are part of a more extensive geomorphological assemblage that includes Loch Strathbeg, the UK's largest paramaritime freshwater lake (Soulsby *et al.*, 1997). According to the Dynamic Coast research, at the southern landfall site (Rattray Head), the MHWS moved ~50 m landward between the 1890s and 1970s, before retreating ~25 m to its present location (Dynamic Coasts, 2024).

The coastline included in the SBPE Study Area consists of a long stretch of beach, where the proposed northern landfall site is located. The beach in the Study Area narrows significantly to the north. The beach includes dune environments, which become less extensive to the south. Development has occurred in the vicinity of the dunes, as part of the Subsea7 pipeline launch facility, located in Westerloch, Wick. The facility fabricates and launches sections of pipeline up to 7.7 km long, with indications that there will be numerous pipeline bundle launches planned for between 2025-28.

There are some sea defences, indicating this coastline is subject to erosion. Additionally, World War II coastal defences are collapsing onto the beach as a result of the sand dunes around the structures being eroded. According to the Dynamic Coast research, at the northern landfall site (Sinclair's Bay), the MHWS moved ~30 m landwards between the 1890s and 1970s (Dynamic Coasts, 2024).

6.1.3.6 DESIGNATED SITES

The Physical Environment Study Area includes nationally and internationally designated nature conservation sites. Many of the sites are primarily designated for habitats rather than the presence of geological or geomorphological features, however changes to the physical environment at these sites may impact the habitats they support and are considered in their relevant chapters. The sites protected for geological or geomorphological features within the Study Areas include:

- Loch Strathbeg (Geological Conservation Review (GCR); Site of Special Scientific Interest (SSSI)); and
- Southern Trench Nature Conservation Marine Protected Area (NCMPA).

The most significant protected site to note is the Southern Trench NCMPA, which overlaps with the RHPE Study Area. Protected geological features within the Southern Trench NCMPA include sub-glacial tunnel valleys, moraines, slide scar, shelf deep, and burrowed mud. However, these geological features are outside of the Study Areas.

6.1.4 MARINE ENVIRONMENTAL ASSESSMENT

The proposed borehole campaign may, potentially, result in effects on the Physical Environment. It is noted that in most cases the Physical Environment is not, in itself, a receptor. Generally, Physical Environment changes are, instead, pathways that have the potential to indirectly impact other environmental receptors. The magnitude of effect on these pathways is considered in this section. The sensitivity of associated (non-Physical Environment) receptors to these changes, and the determination of the significance of those effects, are not assessed in this section, but are addressed in the relevant, receptor-specific, sections of this MEA.

Effects and impacts are often used interchangeably, but for the purpose of this report they have different meanings; an effect is a physical change resulting from project activities, and an impact is the resultant change on a receptor. Therefore, an effect does not result in an impact if there is no sensitive receptor. The relevance of these potential effects is considered against the baseline conditions, which would be expected to occur if no development took place.

The following potential effects, that may affect marine Physical Environment have been assessed:

- Change in wave regime and tidal currents;
- Increase in suspended sediment concentration;
- Change to sediment transport system;
- Change in geomorphology of protected features; and
- Change in coastal morphology.

The potential effects have been assessed based on the worst-case parameters outlined within the Project Description (**Section 3.3**).

The proposed works involve the placement of a JUP at each borehole location, followed by the drilling of a borehole, extraction of sediment, and the subsequent back-fill of each borehole with a bentonite-cement grout. The grout will be filled to the top of the bedrock, above which it will be left to naturally backfill through sedimentary processes.

The temporary localised disturbance of seabed habitats in relation to footprint of JUP feet/stabilisers and the boreholes is 162.944 m² calculated as:

Temporary localised disturbance = (individual footprint of JUP (20.360 m²) x number of boreholes (8)) + (borehole area (0.008 m²) x number of boreholes (8))

The temporary infrastructure that may result in changes in the hydrodynamic regime is 162.880 m^2 calculated as:

Temporary localised hydrodynamic disturbance = footprint of JUP (20.360 m²) x number of boreholes (8)

6.1.4.1 CHANGE IN WAVE REGIME AND TIDAL CURRENTS

Temporary infrastructure in the inter-tidal/shallow sub-tidal areas (such as JUP barges or flat-bottom vessels) may result in indirect changes to the physical environment including causing the blockage of waves, tides and sediment transport processes and, potentially, resulting in localised scour. However, the effects are highly localised and very small-scale, so the magnitude of change is **Negligible**.

6.1.4.2 CHANGE IN SUSPENDED SEDIMENT CONCENTRATION

The proposed work involves seabed disturbance, which will result in some sediment suspension and a temporary increase in suspended sediment concentration.

The seabed substrate in the SBPE Study Area is 'slightly gravelly and slightly silty Sand'. The seabed substrate in the RHPE Study Area is 'slightly gravelly and slightly silty Sand', 'gravelly sand with occasional cobbles and boulders' and bedrock outcrop/subcrop. The sand and coarse sediment will likely fall out of suspension immediately adjacent to the areas of seabed disturbance (estimated as within a precautionary 200 mm distance). The finer material may be transported further, but likely only a few hundred metres (m). Therefore, potential effects are highly localised and small-scale, so the magnitude of change is **Negligible**.

6.1.4.3 CHANGE IN SEDIMENT TRANSPORT SYSTEM

Temporary infrastructure in the inter-tidal/shallow sub-tidal areas (such as JUP) may result in indirect changes to the physical environment including causing the blockage of waves, tides and sediment transport processes. Additionally, the infilled borehole could, potentially, result in a lateral change in the sediment properties in the sediment units that may, potentially, be transported by natural processes such as waves and tide action.

The depth to the bedrock and (and thus the thickness of the potentially mobile sediment unit) is at least 1 m in much of the SBPE Study Area. In this area there are scour patches that change in depth and location, where the sediment has been eroded (locally up to 3 m change within 2.5 years). The embedded project mitigation includes leaving natural risings above the bedrock, allowing it to infill by natural sedimentary processes, ensuring comparable sediment properties. Therefore, the potential change in the sediment transport systems is likely to be very small-scale and highly localised, so the magnitude of change is **Negligible**.

6.1.4.4 CHANGE IN SEABED MORPHOLOGY

Presence of the JUP and boreholes may result in localised changes to the seabed morphology. Since the borehole campaign is allowing the borehole above the bedrock to backfill naturally with surrounding sediment, any changes are likely to quickly return to baseline conditions by the natural sediment transport processes. Therefore, potential effects are highly localised and very small-scale, so the magnitude of change is **Negligible**.

6.1.4.5 CHANGE IN COASTAL MORPHOLOGY

Changes in coastal morphology may arise as a result of changes in the sediment transport regime in the nearshore region due to presence of the JUP. However, since changes to the sediment transport regime are negligible, resultant changes in the coastal morphology are also considered to be **Negligible** in magnitude.

6.1.5 ASSESSMENT SUMMARY

Since the Physical Environment is not, in itself, a receptor, it was assessed as a pathway and only the magnitude of potential effects was assessed. All the effects on the Physical Environment from the proposed borehole campaign were deemed to be **Negligible** in magnitude.

6.2 BENTHIC ECOLOGY

6.2.1 INTRODUCTION

This section provides detail on benthic and intertidal habitats and species located within the Sinclair's Bay and Rattray Head Study Areas. An assessment of potential impacts on key sensitive habitats and species is presented within **Section 6.2.4** to assess the likely expected effects resulting from the proposed borehole campaign.

6.2.2 BENTHIC ECOLOGY STUDY AREA

The Benthic Ecology Study Area aligns with the Study Areas presented in **Section 5.2** and **Figure 3-1**.

6.2.3 BASELINE ENVIRONMENT

Subtidal baseline surveys to inform the Project and proposed borehole campaign were conducted by Benthic Solutions Ltd (BSL, 2024a-e). The objective of the surveys was to characterise the benthic habitats throughout the proposed subsea cable corridor. The offshore subsea cable corridor was divided into Blocks 1 to 8, from Sinclair's Bay to Rattray Head, with Blocks 1 and 8 representing the nearshore, and Blocks 2 to 7 representing the offshore region.

The proposed borehole campaign will take place within the Sinclair's Bay Study Area and the Rattray Head Study Area (**Figure 3-1**). These Study Areas overlap with Blocks 1 and 8, respectively. For the purposes of the proposed borehole campaign environmental baseline, the subtidal baseline survey results for the nearshore Blocks 1 and 8 are presented.

6.2.3.1 CHARACTERISTICS OF THE STUDY AREAS

Biological Environment

The nearshore waters of Sinclair's Bay (Block 1) consisted mostly of sandy sediments characterised by the polychaetes *Leiochone, Owenia, Scoloplos armiger, Sthenelais limicola* the amphipods *Ampelisca brevicornis* and *Bathyporeia elegans*, the molluscs *Abra prismatica*, *Antalis entails*, *Euspira nitida* and the pea urchin *Echinocyamus pusillus.*

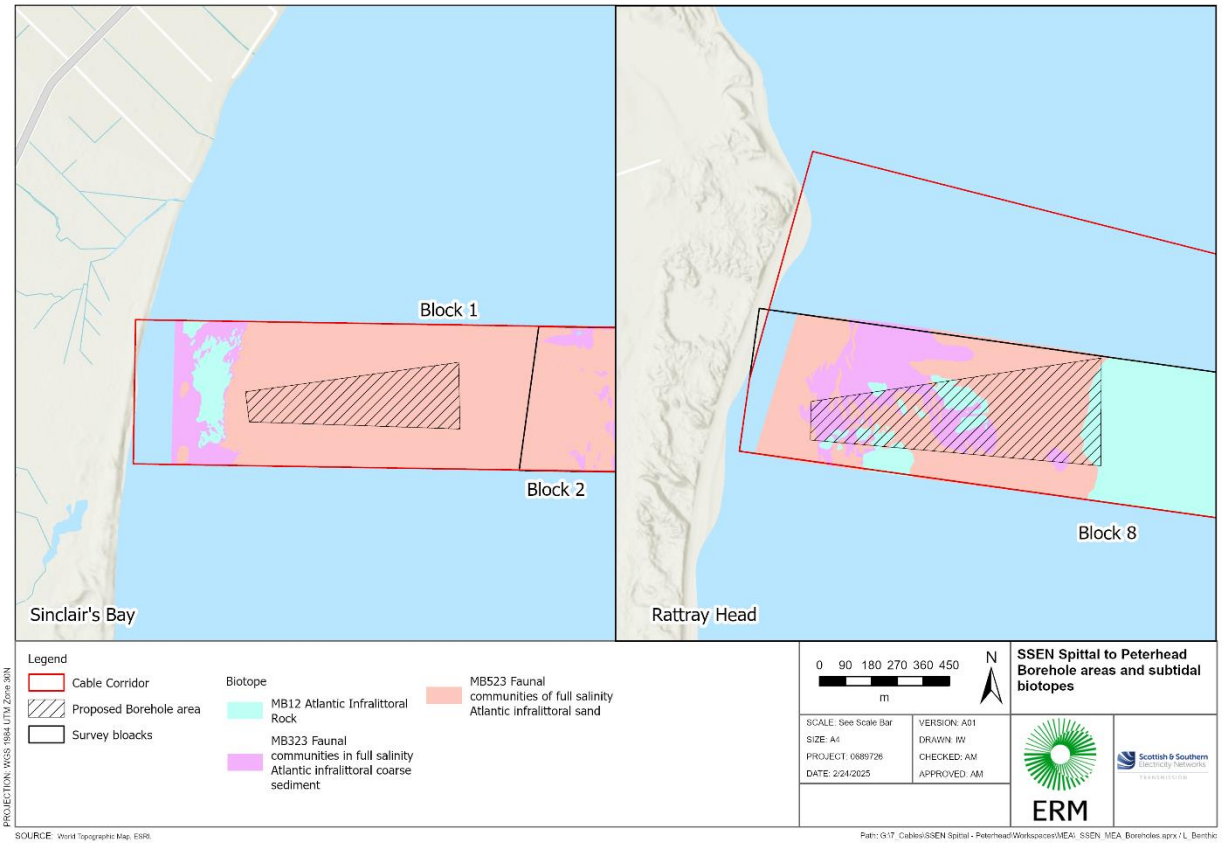
The seabed in the nearshore waters off Rattray Head (Block 8) comprised a mixture of sand, coarse sediment and hard substrata. Grab samples recorded from sandy substrata were characterised by the polychaetes *Nephtys cirrosa*, *Paraonis fulgens*, *Scolelepis bonnieri* and the amphipods *Bathyporeia pelagica* and *Pontocrates altamarinus*. Hard substrata recorded in the nearshore waters are colonised by algae and kelp communities (*Laminaria hyperborea,* Rhodophyta sp. and coralline algae).

Biotope Mapping

The nearshore waters of Sinclair's Bay (Block 1) are mostly characterised by MB523 'Faunal communities of full salinity Atlantic infralittoral sand', with small areas of MB323 'Faunal communities in full salinity Atlantic offshore infralittoral coarse sediment' and MB12 'Atlantic infralittoral rock' scattered throughout (**Figure 6-3**). Ground truthing using Drop Down Video (DDV) across Block 1 identified the biotope MB5233 '*Nephtys cirrosa* and *Bathyporeia* spp. Atlantic infralittoral sand'. The Sinclair's Bay Study Area consists entirely of biotope MB523 (**Figure 6-3**).

The nearshore waters off Rattray Head (Block 8) are dominated largely by MB12 and, to a smaller extent, MB523 and MB323 (**Figure 6-3**). The biotope MB5231 'Sparse fauna in Atlantic infralittoral mobile clean sand' was also identified from DDV ground truthing.

FIGURE 6-3: SPATIAL DISTRIBUTION OF BIOTOPES WITHIN THE PROPOSED BOREHOLE CAMPAIGN STUDY AREAS



Ground truthing of the nearshore sub cropping rock in Block 8, identified the following level 5 rock biotopes:

- MC1224 'Faunal and algal crusts on exposed to moderately wave-exposed Atlantic circalittoral rock';
- MC1216 'Flustra foliacea and colonial ascidians on tide-swept moderately wave-exposed Atlantic circalittoral rock';
- MC1281 '*Sabellaria spinulosa* encrusted Atlantic circalittoral rock';
- MB121B 'Dense foliose red seaweeds on moderately exposed Atlantic infralittoral silty rock'; and
- MB1218 '*Laminaria hyperborea* on tide-swept Atlantic infralittoral rock'.

The Rattray Head Study Area overlaps all three broadscale biotopes MB12, MB523 and MB323.

6.2.4 MARINE ENVIRONMENTAL ASSESSMENT

There will be a direct interaction between the activities associated with the proposed borehole campaign and the benthic sedimentary habitats within the Sinclair's Bay and Rattray Head Study Areas. The proposed borehole campaign will only occur over sedimentary habitats and

will avoid hard substrata. Therefore, the activities will not directly overlap bedrock and stony habitats.

The following potential impacts relevant to Benthic Ecology are assessed:

- Temporary localised disturbance of seabed habitats; and
- Temporary disturbance via increased Suspended Sediment Concentrations (SSC) and associated deposition (smothering - Siltation rate changes (light)).

Based on the details of the proposed works for the proposed borehole campaign, as described in **Section 3**, the parameters defined in **Table 3-1** detail the realistic worst-case PDE associated with the proposed works.

The temporary localised disturbance of seabed habitats in relation to footprint of JUP feet/stabilisers and the boreholes is 162.944 m² calculated as:

Temporary localised disturbance = (footprint of JUP (20.360 m²) x number of boreholes (8)) + (borehole area (0.008 m²) x number of boreholes (8))

The temporary disturbance via increased SSC and associated deposition (smothering - Siltation rate changes (light)) of drill arisings is 1.520 m² calculated as:

Temporary disturbance via smothering from deposition of drill arisings = (area of annular ring of deposited drill arisings minus borehole area (0.190 m²)) x number of boreholes (8))

For the purpose of this assessment, biotopes within Sinclair's Bay and Rattray Head Study Areas with the potential to be impacted by the proposed borehole campaign have been grouped (as per below) due to similarities in their sensitivities:

- **Receptor Group 1 (Infralittoral Sand):** MB523, MB5233, MB5231; and
- **Receptor Group 2 (Infralittoral Coarse Sediment):** MB323.

6.2.4.1 TEMPORARY LOCALISED DISTURBANCE OF SEABED SEDIMENTS

Activities associated with the proposed borehole campaign have the potential to cause temporary localised disturbance of seabed habitats. Sensitivity to surface abrasion, subsurface/penetration and physical removal (extraction of substratum) has been determined for each receptor group.

Sensitivity of Receptors

The Scottish Government's Feature Activity Sensitivity Tool (FeAST) includes a matrix which provides information on the sensitivity of key marine habitats and species (e.g. interest features of NCMPAs) to pressures in the marine environment (FeAST, 2025). Much of the evidence presented within FeAST has been derived from sensitivity assessments originally undertaken by the Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters *et al*., 2023).

FeAST determines continental shelf sands to have a low to medium sensitivity to surface abrasion and sub-surface abrasion/penetration and a low to high sensitivity to physical removal (extraction of substratum) based on Tillin *et al*. (2010) assessment of subtidal sands. The

sensitivity assessments on MB523, MB5233 and MB5231 have been referenced from MarESA (Tillin *et al*., 2023a, b).

The MarESA assessments determined a low sensitivity to both surface abrasion and subsurface abrasions for the biotopes and a medium sensitivity to physical change (extraction of substratum). These biotopes are present in mobile sand and the associated species are generally present in low abundances and adapted to frequent disturbance suggesting that resistance to pressures would be high. The amphipods characteristic of the biotopes are agile swimmers and are characterised by their ability to withstand sediment disturbance (Elliot *et al*., 1998). Overall, **Medium** sensitivity to temporary, localised, disturbance of seabed sediments has been considered for **Receptor Group 1 Infralittoral Sand**.

In contrast, FeAST determines that continental coarse sediments have a sensitivity ranging from not sensitive to high sensitivity for surface abrasion. A sensitivity of low to medium to sub-surface abrasion/penetration, and low to high sensitivity to physical change (extraction of substratum) (Tillin *et al.*, 2010). The degree to which particular example of the habitat is sensitive to pressure will be dependent on the species present. However, as specific species information is lacking for the infralittoral coarse sediments within Sinclair's Bay and Rattray Head Study Areas the precautionary use of high sensitivity has been applied. As such, overall sensitivity of **Receptor Group 2 Infralittoral Coarse Sediment** to temporary, localised disturbance of seabed sediments has been considered as **High**.

Magnitude of Effect

The magnitude of temporary localised disturbance of seabed habitats is determined using the maximum extent of seabed footprint associated with the JUP and the boreholes (see **Section 3.3**). As such, the total footprint extent of temporary localised disturbance of seabed sediments is 162.944 m².

In total 4,027,688 m² (4.03 km²) of Infralittoral Sand was mapped within the proposed Spittal-Peterhead subsea cable corridor (EMODnet, 2024). Assuming all temporary localised disturbance of seabed sediments occur within Infralittoral Sand, this would represent 0.0004% of the mapped area of Infralittoral Sand.

The mapped spatial extent of Infralittoral coarse sediment within the Spittal-Peterhead subsea cable corridor was smaller, covering an area of 578,962 m² (0.58 km²) (EMODnet, 2024). Assuming all temporary localised disturbance of seabed sediments occur within Infralittoral Coarse Sediment, this would represent 0.0025% of the mapped area of Infralittoral Coarse Sediment.

Overall, the disturbance of seabed habitats will be highly localised and will occur over a short period of time (54 days). Presence of the JUP and borehole will not result in any measurable changes to the seabed morphology. Since the proposed borehole campaign is allowing the borehole above the bedrock to backfill naturally with surrounding sediment, any changes are likely to quickly return to baseline conditions by the natural sediment transport processes (**Section 6.1.4.4**). Therefore, potential effects are highly localised and small-scale, so the magnitude of change in seabed morphology is **Negligible**.

As the habitats and characterising biotopes are, the magnitude of temporary localised disturbance of seabed habitats impact has been assessed as **Negligible** for both receptor groups.

Assessment Conclusion

The Medium sensitivity of **Receptor Group 1 Infralittoral Sand** combined with the Negligible magnitude of temporary localised disturbance of seabed sediments, is assessed as having a **Minor** effect. As such, the impact of temporary localised disturbance of seabed sediments on Infralittoral Sand is assessed as **Not Significant**.

The High sensitivity of **Receptor Group 2 Infralittoral Coarse Sediment** combined with the Low magnitude of impact from temporary localised disturbance of seabed sediments, is assessed as having a **Negligible** effect. As such the impact from temporary localised disturbance of seabed sediments on Infralittoral Coarse Sediment is assessed as **Not Significant**.

6.2.4.2 TEMPORARY DISTURBANCE VIA INCREASED SUSPENDED SEDIMENT CONCENTRATIONS (SSC) AND ASSOCIATED DEPOSITION (SMOTHERING)

The proposed borehole campaign will involve drilling of up to 8 boreholes and associated deposition of drill arisings from extraction of the sediment. Sensitivity to smothering – 'Siltation rate changes (light)' was determined for each receptor.

The benchmark for light smothering – 'Siltation rate changes (light)' is a deposition of up to 5 cm of fine material added to the seabed in a single event [or continuous deposition of fine material].

Sensitivity of Receptors

FeAST determines continental shelf sands to have a low sensitivity to light smothering based on Tillin *et al*. (2010) assessment of subtidal sands. Using the Tillin *et al*. (2010) assessment of subtidal coarse sediments FeAST determines a range in sensitivity from not sensitive to medium for continental shelf coarse sediments. Due to the paucity of species-specific data for infralittoral coarse sediments within Sinclair's Bay and Rattray Head Study Areas the precautionary medium sensitivity is used for assessment.

Therefore, **Receptor Group 1 Infralittoral Sand** is determined to have a **Low** sensitivity to light smothering and **Receptor Group 2 Infralittoral Coarse Sediment** to have a **Medium** sensitivity to light smothering.

Magnitude of Effect

The magnitude of temporary disturbance via light smothering from deposition of drill arisings is determined using the maximum extent of seabed footprint of 1.520 m².

Overall, the deposition of drill arisings will be incredibly small, highly localised and will occur over a short period of time. Any additions of drill arisings to the seabed surrounding the boreholes will be subject to the physical processes and high energy environments in each of the Study Areas. Depositions are likely to quickly return to baseline conditions within 1-2 tidal cycles due to shallow water depth, influences of wave action and by the natural sediment transport processes (**Section 6.1.4.4**). Therefore, potential effects are highly localised and very small-scale, so the magnitude of change in seabed morphology is **Negligible**.

As the habitats and characterising biotopes are common, and considering the highly localised and very small-scale of footprint, the magnitude of smothering impact has been assessed as **Negligible** for both receptors groups.

Assessment Conclusion

The Low sensitivity of **Receptor Group 1 Infralittoral Sand** combined with the Negligible magnitude of temporary localised disturbance of seabed sediments, is assessed as having a **Negligible** effect. As such, the impact of temporary localised disturbance of seabed sediments on Infralittoral Sand is assessed as **Not Significant**.

The Medium sensitivity of **Receptor Group 2 Infralittoral Coarse Sediment** combined with the Negligible magnitude of impact from temporary localised disturbance of seabed sediments, is assessed as having a **Negligible** effect. As such the impact from temporary localised disturbance of seabed sediments on Infralittoral Coarse Sediment is assessed as **Not Significant**.

6.2.4.3 IMPACT TO HABITATS OR SPECIES AS A RESULT OF POLLUTION OR ACCIDENTAL DISCHARGE

Considering the level of vessel traffic in the region, and the fact that only 2 vessels, JUP and service vessel, will be present, the proposed borehole campaign will be unlikely to cause measurable change in the risk to pollution or accidental discharge. The risk will be limited to a restricted period for each individual vessel movement, and all movements will occur over the short duration of the campaign period (54 days). Furthermore, in consideration with embedded mitigation adoption of best practice, and the relatively strong currents in the region, the magnitude of the impact is assessed to be **Negligible** for both receptor groups.

Assessment Conclusion

Not Significant.

6.2.4.4 INCREASED RISK OF INTRODUCTION AND SPREAD OF MARINE NON-NATIVE SPECIES

The site-specific survey did not record any Marine Non-Native Species (MNNS) within the subsea cable corridor (BSL, 2024e).

An increase in vessel density from project related vessel activities will increase the number of vectors for MNNS. It is not currently known which port(s) these vessels may transit between. In any port there exists the risk that Invasive non-native species (INNS) of concern, as listed by NatureScot (2024), may be present and could be transported to the wider marine environment.

The MarESA review for the **Priority Marine Features** (**PMF) Offshore Subtidal Sands and Gravels** deemed the habitat types similar to **Receptor Group 1 Infralittoral Sand** and **Receptor Group 2 Infralittoral Coarse Sediment** as not sensitive to the introduction and spread of MNNS (De-Bastos, 2023, Tyler-Walters *et al.*, 2016).

Considering the level of vessel traffic in the region, and the fact that only 2 vessels, JUP and service vessel, will be present, the proposed borehole campaign will be unlikely to cause measurable change in the risk of introduction of MNNS. The risk will be limited to a restricted period for each individual vessel movement, and all movements will occur over the short duration of the campaign period (54 days). Furthermore, in consideration with embedded mitigation adoption of best practice, and the relatively strong currents in the region, the magnitude of the impact is assessed to be **Negligible** for both receptor groups.

Assessment Conclusion

Not Significant.

6.2.5 ASSESSMENT SUMMARY

In summary, the impacts assessed were deemed **Not Significant** for the two receptor groups that are expected to overlap with the proposed borehole campaign. As such no additional mitigation, beyond embedded techniques, or monitoring is required.

6.3 MARINE MEGAFAUNA

6.3.1 INTRODUCTION

The baseline is defined as the present nature of the marine megafauna communities within the vicinity of the proposed borehole campaign, against the likely expected and/or predicted changes resulting from the ground investigation works. An assessment of potential impacts on key sensitive habitats and species is presented within **Section 6.3.5** to assess the likely expected effects resulting from the proposed borehole campaign.

6.3.2 MARINE MEGAFAUNA STUDY AREA

The Marine Megafauna Study Area aligns with the Study Areas defined in **Section 5.2**.

6.3.3 BASELINE ENVIRONMENT

6.3.3.1 CETACEANS

The cetacean species recorded most commonly within the Study Areas are harbour porpoise *Phocoena phocoena*, common bottlenose dolphin *Tursiops truncatus*, white-beaked dolphin *Lagenorhynchus albirostris*, short-beaked common dolphin *Delphinus delphis*, Risso's dolphin *Grampus griseus*, minke whale *Balaenoptera acutorostrata*, and orca *Orcinus orca*. There is a population of common bottlenose dolphin resident in the Moray Firth, with high-use areas concentrated at the mouths of the inner firths (Wilson *et al*., 1997).

Humpback whale *Megaptera novaeangliae*, long-finned pilot whale *Globicephala melas*, fin whale *Balaenoptera physalus*, beluga whale *Delphinapterus leucas*, and sperm whale *Physeter macrocephalus* have been sighted during land-based shore watch surveys, between 2005-2019 (Hague *et al*., 2020). However, these species are rarely known to occur in the region.

6.3.3.2 PINNIPEDS

Two pinniped species are considered resident to the UK and are present within the survey areas, these are the harbour seal *Phoca vitulina vitulina* and grey seal *Halichoerus grypus*. The proposed borehole campaign area is encompassed within Seal Management Unit (SMU) 6 (Moray Firth), with some slight overlap into SMU 7 (East Scotland) (SCOS, 2022).

August counts (2016-2021) of harbour seal at haul out sites within the Moray Firth SMU and the East Scotland SMU, resulted in n=690 individuals and n=262 individuals, respectively. Most of the counts in the Moray Firth were from haul outs between Loch Fleet and Findhorn.

The most recent August counts of grey seal at haul out sites within the Moray Firth SMU and the East Scotland SMU, resulted in counts of n=1,856 individuals and n=2,712 individuals, respectively. Most of the counts in the Moray Firth were from haul outs between Loch Fleet and Findhorn. Grey seal have shown an increasing population trend in the Moray Firth SMU and a stable trend in the East Scotland SMU (SCOS, 2022).

6.3.3.3 OTHER MEGAFAUNA

Basking shark *Cetorhinus maximus* is the largest fish species found in UK waters and is assessed as Endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Rigby *et al*., 2023).

Basking shark are very rarely sighted in the Moray Firth, particularly outside of the peak season of April-September, during which they are sighted infrequently (0.00-0.11 individuals per 5 km-by-5 km grid (NMPi, 2023)).

6.3.4 NATURE CONSERVATION FEATURES

Minke whale are present within the Moray Firth, with the Southern Trench Nature Conservation Marine Protected Area (NCMPA), which is approximately 0.5 km from the Rattray Head Study Area, designated for their conservation. The Sea of the Hebrides MPA is currently the only NCMPA in Scottish waters designated for the protection of basking shark (Witt *et al*., 2016). Bottlenose dolphin are a designated feature within the Moray Firth SAC.

6.3.5 MARINE ENVIRONMENTAL ASSESSMENT

There will be a direct interaction between the proposed borehole campaign and the marine megafauna habitats within the Sinclair's Bay and Rattray Head Study Areas. There is potential for displacement, disturbance, collision risk, and loss of foraging habitat due to seabed disturbance.

The following potential impacts relevant to Marine Megafauna are assessed:

- Temporary localised disturbance of seabed habitats;
- Vessel related disturbance, avoidance, and collision risk; and
- Underwater and above water noise related disturbance.

The potential impacts have been assessed based on the worst-case parameters outlined within the Project Description (**Section 3**).

For marine megafauna the worst-case for temporary localised disturbance of seabed habitats is 162.944 m² calculated as:

Temporary localised disturbance = footprint of JUP rig (20.360 m²) x number of boreholes (8) + borehole area (0.008 m²) x number of boreholes (8)

The noise disturbance will be generated using percussive and sonic drilling in the superficial soils and rotary coring in the bedrock. These will generate both under and above water noise, which can cause disturbance and displacement to marine megafauna within the vicinity. Percussive drilling combines rotary and hammer effects and, therefore, has a higher potential for underwater noise impacts on marine megafauna. Rotary drilling is considered as a source of continuous noise, whereas hammering is considered an impulsive noise effect. Percussive drilling combines both of these effects and is considered as a continuous noise source due to the high rate of percussion (Amey, 2017; Barham, 2017; Guan and Miner, 2020). Guidance and examples of underwater noise from percussive drilling are limited in literature, and estimates are based on previous works utilising similar techniques. Through this evaluation, the worst-case underwater noise source level is predicted to be 170–180 dB re 1 µPa @ 1 m (Amey, 2017; Barham, 2017; Royal HaskoningDHV, 2020).

It is important to incorporate weighting when considering underwater noise impacts on marine mammals. Based on the criteria defined by Southall *et al.* (2019) on marine mammal hearing groups, weighted estimates for percussive drilling range from 149.3-168.6 dB re 1 µPa @ 1 m (Subacoustech, 2020).

There is also a risk of collision with marine megafauna with the operation vessels (1 x JUP and 1 x support vessel) whilst in transit to the borehole locations.

6.3.5.1 SCOPED OUT RECEPTOR GROUPS

Basking shark have been scoped out of the impact assessment. Although basking shark are known for inhabiting coastal areas in the spring/summer period (Shark Trust, 2025), the operation period is provisionally schedule for Q1 2026 which is on the edge of the seasonal migration for basking shark. If basking shark are present at the time of the operations, it is more likely they will be found off the west coast of Scotland (Shark Trust, 2025) (See **Section 6.3.4**). Due to basking shark being present outside of the proposed borehole campaign period, basking shark have been scoped out.

Humpback whale *Megaptera novaeangliae*, long-finned pilot whale *Globicephala melas*, fin whale *Balaenoptera physalus*, beluga whale *Delphinapterus leucas*, and sperm whale *Physeter macrocephalus* have been scoped out due to their rarity and unlikelihood to be present in the Study Area during the time of operations.

6.3.5.2 SCOPED IN RECEPTOR GROUPS

For the purpose of this assessment, marine megafauna known to occur within Sinclair's Bay and Rattray Head Study Areas have been grouped into receptor groups. The grouping is determined due to similarities in their sensitivities:

- **Receptor Group 1**: Cetaceans; harbour porpoise, common bottlenose dolphin, white-beaked dolphin, common dolphin, Risso's dolphin, minke whale, and orca; and
- **Receptor Group 2**: Pinnipeds; harbour seal and grey seal.

6.3.5.3 TEMPORARY LOCALISED DISTURBANCE OF SEABED HABITATS

Activities associated with the proposed borehole campaign have the potential to cause temporary localised disturbance of seabed habitats. Sensitivity to loss of seabed habitat for prey (**Section 6.1**) and was determined for each receptor.

Cetaceans – Receptor Group 1

Due to the location of the boreholes being predominantly in the shallower coastal waters and the operations taking place in Q1 2026, before the spring migration of cetaceans, resident cetaceans are likely to be further out to sea; therefore, cetaceans have been scoped out of assessment of temporary localised disturbance of seabed habitats.

Pinnipeds – Receptor Group 2

Sensitivity of Receptor Group 2

Harbour seal can use different foraging strategies to hunt in different environments. Harbour seal forage up to 60 km away from their haul out zones with variation in their foraging areas and terrestrial distribution (Thompson *et al*., 1996). Grey seal typically hunt in deeper waters, and more exclusively on benthic prey than harbour seal (McConnell *et al*., 1999). Both species' diets consist of sandeels, gadoids, flatfish, and cephalopods (Thompson *et al*., 1996), all of which may be impacted by the operations, reducing prey availability through benthic habitat loss. Whilst there are haul out zones within both species' foraging range, there is a wide range of alternative habitat available.

For all receptors this is the worst-case scenario, as impacts are temporary and localised and the habitats are expected to return to baseline conditions once the work is completed. As mentioned in **Section 6.2** there are **No Significant** effects or mitigation required for benthic habitats and biotopes. Fish communities are scoped out of assessment. Furthermore, the operations area is only a very small percentage of the total foraging range available to pinnipeds. Therefore, they can easily adapt to, and recover from, temporary, localised disturbance of seabed habitats. The sensitivity for pinnipeds to temporary localised disturbance of seabed habitats is **Low**.

Magnitude of Effect

The magnitude of temporary localised disturbance of seabed habitats is determined using the maximum extent of seabed footprint associated with the JUP and the boreholes (see **Section 6.2.4.1**). As such, the total footprint extent of temporary localised disturbance of seabed sediments is 162.944 m².

Overall, the disturbance of seabed habitats will be highly localised and will occur over a short period of time (54 days) For both grey and harbour seal, this is outside of the pupping season and there is a vast range of alternative foraging habitat available. The magnitude of effect was assessed in **Section 6.1** as **Negligible**, reflecting there will be no long-term impact to the receptors prey availability.

The combinations of these factors determine the magnitude of temporary localised of seabed habitats impact has been assessed as **Negligible** for **Receptor Group 2 - Pinnipeds**.

Assessment Conclusion

The Low sensitivity of **Receptor Group 2 - Pinnipeds** combined with the Negligible magnitude of temporary, highly localised disturbance of seabed habitats, is assessed as **Not Significant**.

6.3.5.4 VESSEL RELATED DISTURBANCE, DISPLACEMENT, AND COLLISION RISK

Borehole drilling in the coastal seabed requires the presence of a JUP as the primary drilling platform, supported by an additional vessel for logistics and safety. The JUP remains stationary at each borehole location, using its legs to elevate above the water surface for stability during drilling operations. A support vessel will also be present during the works. The worst-case scenario entails two vessels being present at 8 boreholes for a period of 54 days.

There is potential for short-term disturbance or displacement of receptors as a result of vessel presence and underwater noise, and there is collision with operations vessels is a possibility. Potential impacts of underwater noise are addressed in Section 6.3.5.5. Vessel related disturbance and collision risk are addressed for all marine mammal receptor groups here.

Cetaceans – Receptor Group 1

Given the time of year and the seasonality of Risso's dolphin, white-beaked dolphin, orca, and minke whale, these species are unlikely to be within the vicinity of the proposed borehole campaign and have been scoped out. Harbour porpoise, bottlenose dolphin, and common dolphin have been scoped in.

Sensitivity of Receptor Group 1

A potential source of impact from vessel activity is collision with a boat or ship, resulting in mortality, injury, or stress. However, marine mammals are highly mobile, and vessel noise is within their audible range, therefore, they are largely able to detect and subsequently avoid collision. Furthermore, collision risk is considered highest for large vessels (>80 m) that display erratic behaviour and travel at speeds >14 knots (Laist *et al*., 2001). Vessels used during borehole drilling operations will be stationary or travelling at slow speeds, thus minimising risk of collision.

Disturbance from the physical presence of vessels is a possibility and may lead to some avoidance and changes in behaviour, such as diving or swimming away from distances as far away as 4 km (Benhamma-Le Gall *et al*., 2021). Any disturbance related to vessel presence will, however, be short-term and limited to the duration of the works (maximum of 54 days). Avoidance is also likely to be localised to the area directly around the vessel; vessel avoidance distances for harbour porpoise range between 300 m and 4 km (Benhemma-Le Gall *et al*., 2021; Frankish *et al*., 2023). This represents a small proportion of the area available to marine mammals and presence of vessels will not create a barrier to movement or prevent access to foraging areas. Furthermore, a significant amount of marine traffic is present within the Moray Firth, so marine mammals will be habituated to vessel presence and the two additional vessels will not represent a significant increase above the overall baseline of vessel traffic in the area.

While some level of stress or behavioural related response is possible in relation to vessel presence, there is minimal risk of collision, and slow-moving or stationary operations vessels will not prevent access to foraging areas or lead to long-term population level impacts. Therefore, the sensitivity for cetaceans to vessel related disturbance, displacement, and collision risk is **Low**.

Magnitude of Effect

The worst-case scenario entails two vessels being present at each Study Area over a maximum period of 54 days. exposure of the receptors will be highly localised and will occur over a short time period with a wide range of alternative foraging habitat available. Therefore, the magnitude of this impact has been assessed as **Low** for all receptors.

Assessment Conclusion

The Low sensitivity of **Receptor Group 1 - Cetaceans** both combined with the Low magnitude of vessel related disturbance, displacement and collision risk, is assessed as **Not Significant**.

Pinnipeds - Receptor Group 2

Sensitivity of Receptor Group 2

There is potential that harbour and grey seal may collide with vessels deployed for the operations, or may be displaced from the area, potentially prompting a behavioural and/or stress related response, injury, or mortality. It is considered unlikely that stress or behavioural related responses could result in impacts to individual animals or will result in ecological impacts on the wider population, or the ability of those individuals to function. Furthermore, Wilson *et al*. (2017) noted that seal collisions were rare in relation to the frequency of seal encounters and identified a significant reduction in the number of seal collisions for vessels

travelling at <4 knots. Seals are also considered to be curious and intelligent, becoming habitualised to marine traffic in heavy shipping areas such as the Moray Firth (Bowles and Anderson, 2012). As a result of this they are considered to have a high tolerance to vessel presence, as well as a high adaptability due to their ability to avoid the vessel by moving away (ERM Ltd, 2010). Therefore, the sensitivity of pinnipeds to vessel related disturbance, displacement, and collision risk is **Low**.

Magnitude of Effect

The worst-case scenario entails two vessels being present at each Study Area over a maximum period of 54 days. The exposure of the receptors will be highly localised and will occur over a short time period with a wide range of alternative habitat available. Given both these factors, the likelihood of a long-term impact of collision is extremely unlikely and pinnipeds can return to the areas immediately after operations are finished. Therefore, the magnitude of this impact has been assessed as **Low**.

Assessment Conclusion

The Low sensitivity of **Receptor Group 1 - Pinnipeds** both combined with the Low magnitude of vessel related disturbance, displacement, and collision risk, is assessed as is assessed as **Not Significant**.

6.3.5.5 UNDERWATER AND ABOVE WATER NOISE RELATED DISTURBANCE

The proposed works will involve the placement of a JUP at each borehole location followed by the percussive drilling of a borehole, extraction of the sediment and the subsequent back-fill of each borehole with bentonite-grout. There will be two vessels present during the operations (JUP and support vessel). Noise from vessel presence and borehole drilling has potential to cause disturbance. Therefore, sensitivity to noise from vessels and borehole drilling has been assessed for each receptor group.

Cetaceans - Receptor Group 1

Sensitivity of Receptor Group 1

Cetaceans rely on sound for foraging, navigation, and communication. Potential impacts from exposure to underwater noise include auditory damage, masking, behavioural disturbance, and habitat avoidance (Richardson *et al*., 1995; Erbe *et al*., 2018). The extent of disturbance depends on various factors, including intensity and frequency of the noise, environmental conditions, and sensitivity of the receptor (Richardson *et al*., 1995; Erbe *et al*., 2018).

Vessel noise is predominantly low frequency and low intensity; source levels from mid-sized support vessels are between 165-180 dB re 1 µPa and most energy is below 1 kHz (OSPAR Commission, 2009). Underwater noise from borehole drilling is a comparable noise event and is predicted to range between 170-180 dB re 1 µPa.

When comparing with weighted values from available literature, percussive drilling of boreholes is below the onset thresholds of both Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) for all marine mammals identified in the area of impact (Southall *et al.*, 2019, Subacoustech, 2020). Emitted vessel noise is also determined to be below the onset thresholds for TTS and PTS (OSPAR Commission, 2009).

The noise produced will be audible to all cetacean species at 500-2000 Hz; however, it is outside of the peak hearing range of harbour porpoise (100-140 kHz; Kastelein *et al*., 2002), so there is minimal risk of masking. There is greater overlap between the hearing ranges of both short-beaked common dolphin and common bottlenose dolphin (0.4-146 kHz; Southall *et al*., 2019), so there is a greater risk of masking but both species utilise a wide-range of vocalisations for communication and foraging and are habituated to low frequency vessel noise.

There is potential for behavioural disturbance and habitat avoidance. This has been addressed in **Section 6.3.5.5** and has been assessed as **Low**.

The overall sensitivity of cetaceans to vessel and borehole drilling noise has been assessed as **Low**.

Magnitude of Effect

While some disturbance from noise is likely, impacts will be short-term; cetaceans will only be affected whilst they are within the area of effect of vessel operations and borehole drilling. The worst-case scenario entails two vessels being present for a period of 54 days.

Cetaceans are highly mobile opportunistic feeders. They have a wide foraging range available, and their distribution varies naturally depending on variations in the environment. The area of effect is negligible in the context of the total habitat available to cetaceans in the region; thus, the magnitude of effect has been assessed as **Low** for **Receptor Group 1 - Cetaceans**.

Assessment Conclusion

The Low sensitivity of cetaceans combined with the Low magnitude of temporary localised disturbance mean that exposure to underwater noise is assessed as having a **Minor** effect. As such, the impact of temporary localised disturbance on cetaceans from underwater noise is assessed as **Not Significant**.

Pinnipeds – Receptor Group 2

Grey seal and harbour seal are both present within the operations area and have been screened into the assessment.

Sensitivity of Receptor Group 2

Vessel noise is predominantly low frequency and low intensity; source levels from mid-sized support vessels are between 165-180 dB re 1 µPa and most energy is below 1 kHz (OSPAR Commission, 2009). Underwater noise from borehole drilling is comparable, with a source level of 170-180 dB re 1 µPa @ 1 m. These levels are below the onset thresholds for PTS and TTS for grey seal and harbour seal, so risk of auditory damage is minimal (OSPAR Commission, 2009).

The noise may, however, fall within the audible range for both species, so there is potential for masking of communication signals, which in water vary between 0.1-40 kHz and 0.02-24 kHz for grey seal and harbour seal, respectively (Southall, *et al*., 2019). In air, vocalisation ranges are 0.25-6 kHz and 0.1-9 kHz for grey seal and harbour seal, respectively (Southall, *et al*., 2019). Unlike cetaceans, pinnipeds are not reliant on sound for foraging. Vocalisations are social and used mainly for communication and during the breeding season. The nearest seal haul out site is 10 km from the borehole operations, works are occurring outside of the

breeding season, and both species are habituated to foraging in areas with vessel traffic. Therefore, any interference with vocalisations is anticipated to be minimal.

There is potential for behavioural disturbance and habitat avoidance. This has been addressed in **Section 6.3.5.4** and has been assessed as **Low**.

The overall sensitivity of **Receptor Group 2 - Pinnipeds** to vessel and borehole drilling noise has been assessed as **Low**.

Magnitude of Effect

The worst-case scenario entails two vessels being present for a period of 54 days. While some disturbance from noise is likely, impacts will be short-term; pinnipeds will only be affected whilst they are within the area of effect of vessel operations and borehole drilling, and the nearest haul out site is 10 km from the works.

Pinnipeds are highly mobile and are known to forage over wide ranges, up to 50 km from haul out sites for harbour seal and up to 100 km from haul out sites for grey seal (Carter, *et al*., 2022). The area of effect is negligible in the context of the total habitat available to pinnipeds in the region; thus, the magnitude of effect has been assessed as **Low** for all pinniped receptors.

Assessment Conclusion

The Low sensitivity of pinnipeds combined with the Low magnitude of temporary localised disturbance mean that exposure to underwater noise is assessed as having a **Minor** effect. As such, the impact of temporary localised disturbance on **Receptor Group 2 - Pinnipeds** from underwater noise is assessed as **Not Significant**.

6.3.6 ASSESSMENT SUMMARY

In summary, the impact assessed was deemed **Not Significant** for both Receptor Groups that are expected to overlap with the proposed borehole campaign. As such no EPS licence, additional mitigation or monitoring is required.

6.4 ORNITHOLOGY

6.4.1 INTRODUCTION

This section describes the baseline for Ornithology within the Study Areas. This has been informed by a desk-based literature review using a range of data sources, including published literature and reports, as well as data collected through the Seabird Monitoring Programme (SMP) and the Wetland Bird Surveys (WeBS). The baseline has been used to inform the Ornithology MEA in **Section 6.4.5**.

6.4.2 ORNITHOLOGY STUDY AREA

The Ornithology Study Area aligns with the Study Areas defined in **Section 5.2**.

6.4.3 BASELINE ENVIRONMENT

At Sinclair's Bay, the following nearby sites were reviewed to identify key intertidal ornithology receptors: Freswick Bay, Sinclair's Bay and River Wester, Wick Harbour, and Loch Sarclet. At Rattray Head, the nearby sites included Boyndie Bay, Deveron Estuary, Fraserburgh to Rosehearty, Fraserburgh Bay (Philorth Estuary), Rattray Head to St Combs, Loch of Strathbeg, Ugie to Rattray Head, and Ugie Estuary.

The key receptors identified as present for both sites, includes European shag *Gulosus aristotelis*, hereafter referred to as 'shag'. Other species which are present, which may be sensitive to changes to the benthic environment and associated prey species are black guillemot *Cepphus grylle,* red-throated diver *Gavia stellata,* great northern diver *G. immer*, great cormorant *Phalacrocorax carbo*, black-legged kittiwake *Rissa tridactyla*, black-headed gull *Chroicocephalus ridibundus*, common gull *Larus canus*, great black-backed gull *L. marinus*, European herring gull *L. argentatus*, lesser black-backed gull *L. fuscus*, sandwich tern *Thalasseus sandvicensis*, little tern *Sternula albifrons*, common tern *Sterna hirundo*, Arctic tern *S. paradisaea*, great skua *Stercorarius skua*, Arctic skua *S. parasiticus*, razorbill *Alca torda*, guillemot *Uria aalge,* Atlantic puffin *Fratercula arctica,* northern fulmar *Fulmarus glacialis* and northern gannet *Morus bassanus.*

6.4.4 NATURE CONSERVATION FEATURES

Protected Sites

Sinclair's Bay does not directly overlap any Special Areas of Conservation (SACs), Special Protection Areas (SPAs) or Nature Conservation Marine Protected Areas (NCMPAs). East Caithness Cliffs NCMPA which has protected ornithological features is >11 km from Block 1.

Rattray Head directly overlaps the Southern Trench NCMPA, the location of the proposed borehole campaign is approximately 0.5 km from the shoreward boundary of the NCMPA. The Southern Trench NCMPA has no designated bird features.

Ornithological Qualifying Features

SPAs with ornithological qualifying features, include North Caithness Cliffs, East Caithness Cliffs SPA, Moray Firth SPA, Dornoch Firth and Loch Fleet SPA, Cromarty Firth SPA, Inner Moray Firth, Moray and Nairn Coast SPA, Troup, Pennan and Lion's Head SPA, Buchan Ness to Collieston Coast SPA, Ythan Estuary SPA, Sands of Forvie and Meikle Loch SPA. Ramsar sites

include Dornoch Firth and Loch Fleet, Cromarty Firth, Inner Moray Firth, and Moray and Nairn Coast. Sites of Special Scientific Interest (SSSI) include Loch Fleet, Dornoch Firth, Morrich More, Cromarty Firth, Munlochy Bay, Beauly Firth, Longman and Castle Stuart Bays, Whiteness Head and Rosehearty to Fraserburgh Coast. East Caithness Cliffs NCMPA protects black guillemot as a qualifying feature.

Habitats and Species of Conservation Interest

For methodology of the assessments undertaken, refer to the habitat assessment and environmental baseline report (BSL, 2024e), and the environmental habitat assessment report (Ocean Infinity, 2024).

Sandeel *Ammodytes* sp. are protected as a taxon of commercial importance. *A. marinus* and *A. tobianus* are considered to comprise a mobile species PMF. A total of one Ammodytidae individual was recorded at survey Block 3. As there is no preferred Sandeel habitat identified within survey Block 1 and Block 8, the PMF will not be assessed.

6.4.5 MARINE ENVIRONMENTAL ASSESSMENT

There will be a direct interaction between the works associated with the proposed borehole campaign and the ornithological foraging habitats within the Sinclair's Bay and Rattray Head Study Areas. There is potential for displacement, disturbance and loss of foraging habitat due to seabed disturbance.

The following potential impacts relevant to Ornithology are assessed:

- Temporary localised disturbance of seabed habitats; and
- Vessel related disturbance and displacement

These potential impacts have been assessed based on the worst-case parameters outlined within the Project Description (**Section 3**).

For ornithology the worst-case for temporary localised disturbance of seabed habitats in relation to footprint of JUP feet/stabilisers is 162.944 m² calculated as:

Temporary localised disturbance = (footprint of JUP rig (20.360 m²) x number of boreholes (8)) + (borehole area (0.008 m²) x number of boreholes (8))

Scoped Out Receptor Groups

Due to the seasonality of little, common and Arctic terns, whose breeding seasons begin in May and extend to August (Furness, 2015), there is very limited potential for interaction. Due to the limited temporary overlap between project timeline and breeding individuals, and the negligible spatial extent of the impact, it is considered that there is no impact-receptor pathway. Therefore, these tern species have been scoped out for both aforementioned impact pathways.

Other aforementioned receptors in **Section 6.4.3** have been scoped out due to none of them being a qualified feature in any SPA close to the Study Area.

Scoped In Receptor Groups

For the purpose of this assessment, ornithological species known to occur within Sinclair's Bay and Rattray Head Study Areas with the potential to be impacted by the proposed borehole campaign have been grouped, below, due to similarities in their sensitivities:

- **Receptor Group 1:** black-legged kittiwake, *hereafter referred to as 'kittiwake';*
- **Receptor Group 2:** herring gull;
- **Receptor Group 3:** sandwich tern;
- **Receptor Group 4**: common guillemot, razorbill and black guillemot, *hereafter referred to as 'auks'*;
- **Receptor Group 5:** northern fulmar, *hereafter referred to as 'fulmar'*;
- **Receptor Group 6:** northern gannet, *hereafter referred to as 'gannet'*; and
- **Receptor Group 7:** European shag, *hereafter referred to as 'shag'*.

6.4.5.2 TEMPORARY LOCALISED DISTURBANCE OF SEABED HABITATS

The proposed works will involve the placement of a JUP at each borehole location followed by the drilling of a borehole, extraction of the sediment and the subsequent back-fill of each borehole with bentonite-grout. The bentonite-grout will be filled to the top of the underlying bedrock, allowing the rest of the borehole to be backfilled through sedimentary processes. Temporary localised disturbance of seabed habitat (with the potential to support prey for foraging birds) is assessed as **Not Significant** (**Section 6.1**).

Sensitivity of Receptors

The proposed borehole campaign will provisionally start in Q1 2026, when most of the birds will have started their breeding season (January-August), overlapping with the licence period (Harmer *et al*., 2007). Other birds, such as shag and black guillemot, which remain close to the coastal area during the non-breeding season (Furness, 2015; ISOWT, 2023) are more sensitive to loss of localised coastal habitats such as rocky and sandy sediments.

Receptors such as herring gull, gannet and fulmar have a large prey availability within their breeding season foraging ranges. The breeding season falls between March-August, with a 58.8±26.8 km foraging range for herring gull, March to September with a 315.2±194.2 km foraging range for gannet and January to August with a 542.3±657.9 km foraging range for fulmar, respectively (Garthe and Furness, 2001; Harmer *et al*., 2007; Furness, 2015; Woodward *et al*., 2019). These receptors are also able to adapt to loss or alteration of a small proportion of their foraging habitats, therefore, they have a **Low** sensitivity to temporary localised disturbance to seabed habitats (Cook and Burton, 2010).

Receptors including auks, kittiwake and sandwich tern, whose breeding seasons fall between March-July, April-August, and March-August, respectively (Furness, 2015), have a more limited prey selection, and removal of benthic and fish species may reduce prey availability, resulting in higher energy expenditure to source alternative prey (Burger and Simpson, 1986; Barrett and Furness, 1990; JNCC, 2021). However, as these species have such a wide habitat availability, with breeding foraging ranges of 73.2±80.5 km for guillemot; 88.7±75.9 km for razorbill, 4.8±4.3 km for black guillemot, 34.3±23.2 km for Sandwich tern, and 156.1±144.5 km for kittiwake (Woodward *et al*., 2019), they are likely to be adaptable to impacts on a small spatial extent of habitat. East Caithness Cliffs NCMPA has black guillemot as a qualifying

feature and is over 10 km away from Sinclair's Bay Study Area, therefore this does not overlap with the black guillemot breeding foraging range. Therefore, sensitivity is **Low**.

Shag is considered to be inflexible to loss of habitat due to their foraging range during the breeding season (February to August) (Furness, 2015). Shag has a foraging range of 13.2±10.5 km (Woodward *et al.,* 2019), which includes the East Caithness SPA, approximately 10 km from the Sinclair's Bay Study Area, where they are a designated feature. Higher energy expenditure would be required to find alternative foraging habitat (Cook and Burton, 2010; Furness, 2015; Woodward *et al*., 2019), however the Study Area only represents a small proportion of their foraging range and Shag would be able to return to the vicinity after works are complete. The sensitivity for shag is **Medium**.

For all receptors the worst-case scenario is highly precautionary and relates to a temporary, highly localised footprint and habitats supporting prey are expected to return to baseline conditions once the work is completed (within 2 tidal cycles at each borehole). **Section 6.2** determined there are **No Significant** effects or mitigation required for both benthic receptor groups. As a result, the sensitivity of kittiwake, herring gull, auks, fulmar, gannet receptors is considered to be **Low** to the temporary, very highly localised disturbance of seabed habitats.

Magnitude of Effect

The magnitude of temporary localised disturbance of seabed habitats is determined using the maximum extent of seabed footprint associated with the JUP and the boreholes (see **Section 3.3**). As such, the total footprint extent of temporary localised disturbance of seabed sediments is 162.944 m².

Overall, the disturbance of seabed habitats will be highly localised and will occur over a short period of time (54 days). The magnitude was also assessed for **Section 6.2: Benthic Ecology** as **Low**, reflecting there will be no long-term impact to the receptors prey availability. The combinations of these factors determine the magnitude of temporary localised of seabed habitats impact has been assessed as **Low** for all receptors.

Assessment Conclusion

The Low sensitivity of all Receptor Groups assessed combined with the Low magnitude of temporary localised disturbance of seabed sediments, is assessed as having a **Minor** effect. The medium sensitivity of **Shag** combined with the Low magnitude of habitat disturbance, is assessed as having a **Minor** effect.

As such, the temporary, localised disturbance of seabed habitats is considered **Not Significant**.

6.4.5.3 VESSEL RELATED DISTURBANCE AND DISPLACEMENT

Borehole construction in the coastal seabed requires the presence of a JUP barge as the primary drilling platform, supported by an additional vessel for logistics and safety. The JUP barge remains stationary at each borehole location, using its legs to elevate above the water surface for stability during drilling operations. A support vessel will also be present during the operation works. Both vessels will increase the background noise during operation and their presence may be disruptive or cause displacement to the receptors.

Sensitivity of Receptors

Sandwich tern and gannet are considered to have high tolerance and adaptability to vessel presence (Cook and Burton, 2010, Fliessbach *et al*., 2019). If the receptors are present in the area at the time of the operations, they are likely to be able use alternative foraging habitat. Therefore, the sensitivity for gannets and Sandwich terns to vessel related disturbance and displacement is **Low**.

Auks are considered to have a low tolerance to vessel presence (Cook and Burton, 2010; Fliessbach *et al*., 2019), however they are considered to have moderate adaptability, as there is a wide range of suitable habitat available to them outside of the Study Areas. Therefore, the sensitivity for auks to vessel related disturbance and displacement is **Low**.

Shag is known to be highly sensitive to vessel-related disturbance, often displaying flushing behaviour (Cook and Burton, 2010). Individuals will be able to return immediately to foraging in the area once the vessels are no longer present. Therefore, the sensitivity for shag to vessel related disturbance and displacement is **Medium**.

Magnitude of Effect

The exposure of the receptors will be very highly localised and will occur over a short time period with a wide range of alternative foraging habitat available. Therefore, the magnitude of this impact has been assessed as **Negligible** for all receptors.

Assessment Conclusion

The Low sensitivity of Auks and Gannets combined with the Negligible magnitude of vessel related disturbance and displacement, is assessed as **Not Significant**.

The medium sensitivity of Shag combined with the Negligible magnitude of vessel related disturbance and displacement, is assessed as **Not Significant**.

6.4.6 ASSESSMENT SUMMARY

In summary, the impacts assessed are deemed **Not Significant** for all Receptor Groups that are expected to overlap with the proposed borehole campaign. As such no mitigation or monitoring is required.

6.5 OTHER MARINE USERS

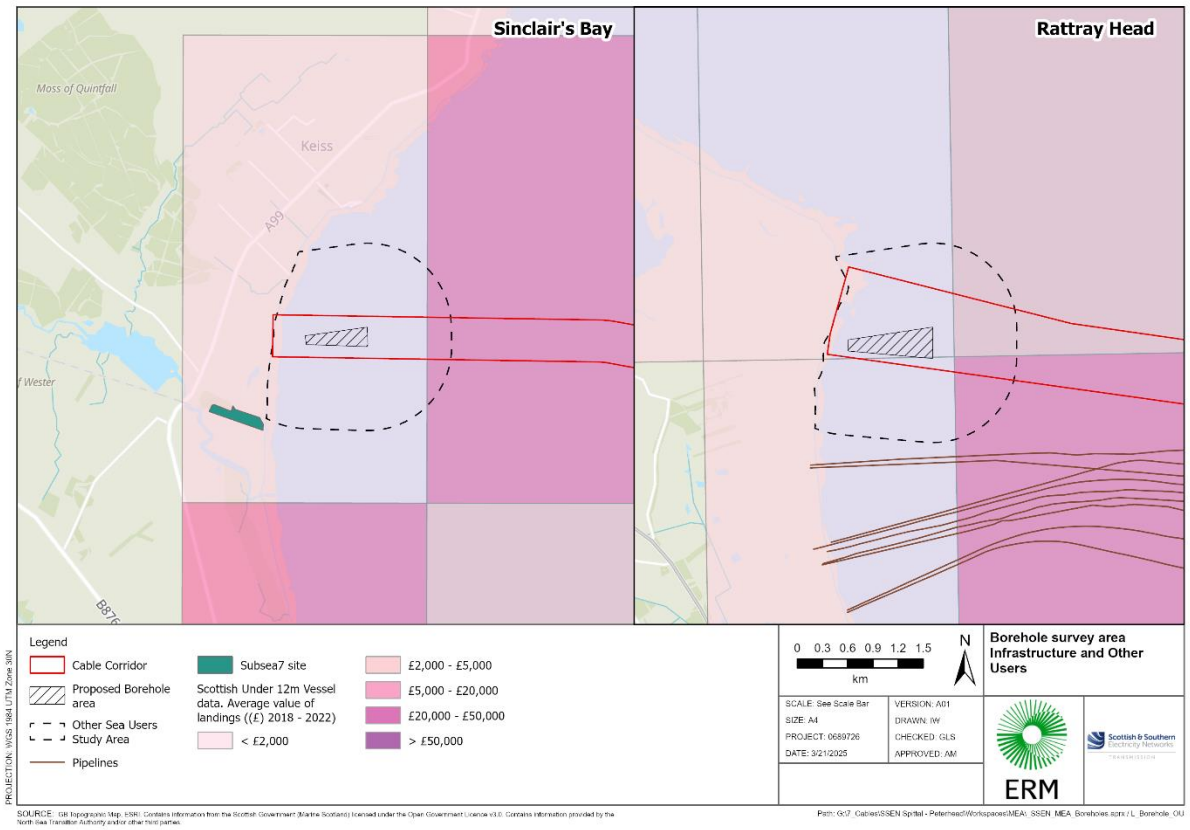
6.5.1 INTRODUCTION

This section provides the baseline and assessment of impacts as a result of the proposed borehole campaign to other marine users, including infrastructure, commercial fisheries and shipping and navigation.

6.5.2 OTHER MARINE USERS STUDY AREA

The Other Marine Users Study Area comprises a distance of 1 km, up to MHWS, surrounding the Sinclair's Bay Study Area and Rattray Head Study Area (**Figure 6-4**). The Other Marine Users Study Area has been used to identify receptors in the vicinity of the proposed borehole campaign which may interact with the associated activity.

FIGURE 6-4: OVERVIEW OF OTHER MARINE USERS AND INFRASTRUCTURE IN STUDY AREA



6.5.3 BASELINE ENVIRONMENT

6.5.3.1 OTHER MARINE USERS AND INFRASTRUCTURE

Much of the oil and gas infrastructure, including wells, hydrocarbon fields and provisional licensed blocks, are located offshore within the Moray Firth and central North Sea Region (NSTA, 2024). This is outside of the Other Marine Users Study Area for this MEA.

There are currently three operational offshore wind farms located within the Moray Firth in proximity to the proposed borehole campaign. These are Beatrice, Moray East and the Hywind

Scotland Pilot Park. However, the array areas and export cables of these projects do not intersect the Other Marine Users Study Area (Marine Scotland, 2024; KIS-ORCA, 2024).

No subsea power or telecommunications cables intersect the Other Marine Users Study Area. The closest subsea cable to the proposed borehole campaign is the Caithness-Moray HVDC power cable which makes landfall at Wick, south of the Sinclair's Bay Study Area (**Figure 6-4**).

No pipelines are identified in proximity to the Sinclair's Bay Study Area. There are a total of nine pipelines (including five active and four disused) which make landfall outside the southern boundary of the Rattray Head Study Area (**Figure 6-4**).

The Subsea7 pipeline fabrication facility and launch site is located at Wick, approximately 1 km from the Sinclair's Bay Study Area (**Figure 6-4**) (NASH, 2024). Pipeline bundles are built at the Subsea7 site before being launched and towed out to sea (NASH, 2024). Launches occur a few times a year and take between 12 and 36 hours to complete (NASH, 2024).

Marine recreation is generally low at both the Sinclair's Bay Study Area and Rattray Head Study Area, and includes low levels of motor cruising, sailing, yachting, canoeing, surfing and windsurfing (Marine Scotland, 2025). One SCUBA diving site is located in proximity to the Sinclair's Bay Study Area.

6.5.3.2 COMMERCIAL FISHERIES

Most of the commercial fisheries operating in the inshore region (defined as 6 nm from the shore) make up the under 10 m vessel fleet, and use pots and traps to target crab and lobster (MMO, 2023). Potting vessels are generally active throughout the year and show little seasonality in landings. The annual average value (2018-2022) landed by Scottish fishing vessels under 12 m using creels, pots and traps is £2,000 or less within the Rattray Head Study Area, and ranges between <£2,000 to £20,000 within the surrounding Other Users Study Area (**Figure 6-4**). The annual average value landed within the Sinclair's Bay Study Area is <£2,000 and also ranges between <£2,000 to £20,000 within the surrounding Other Users Study Area (**Figure 6-4**) (Marine Scotland, 2022).

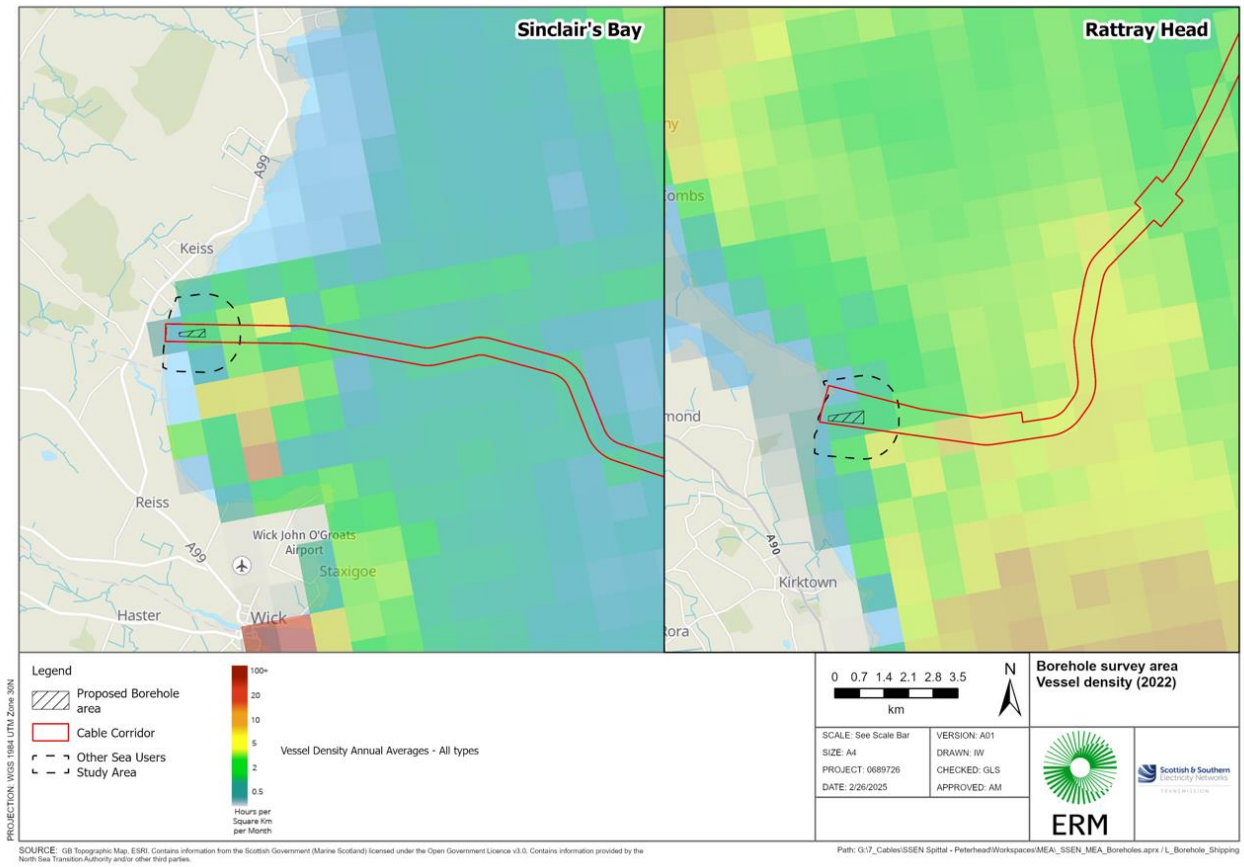
Other mobile fisheries such as dredges, otter trawls and beam trawls largely operate offshore (beyond 6 nm from the shore). These fisheries do not actively fish within the Other Users Study Area, therefore there is no pathway for impacts to occur. As such mobile offshore fisheries are not considered further.

6.5.3.3 SHIPPING AND NAVIGATION

In terms of annual average vessel density, low-density vessel activity is present surrounding the Other Users Study Area at Rattray Head (~1-5 hours per km^2 per month), which is predominantly attributed to cargo, tanker and passenger vessels from Peterhead and Fraserburgh ports (**Figure 6-5**) (NASH, 2024). Slightly lower density vessel activity is observed around the Other Users Study Area at Sinclair's Bay (~0.5-3 hours per km^2 per month), except for a high-density patch adjacent to Wick Harbour (>20 hours per km^2 per month), mostly related to fishing and recreational vessels (**Figure 6-5**) (NASH, 2024).

There are no anchorage areas located within the Other Sea Users Study Area.

FIGURE 6-5: ANNUAL AVERAGE VESSEL DENSITY



6.5.4 MARINE ENVIRONMENTAL ASSESSMENT

6.5.4.1 LOSS OF ACCESS OR DISPLACEMENT TO OTHER MARINE USERS

There is potential for loss of access or displacement to other marine users, commercial fisheries and shipping and navigation as a result of the proposed borehole campaign. The proposed borehole campaign is estimated to take 54 days and will be undertaken by 1 x JUP, plus 1 x support vessel, surrounded by a temporary 500 m exclusion zone. In line with standard industry best practice, Notices to Mariners (NtMs) will be issued and updated on Kingfisher bulletins. These NtMs will be promulgated in advance of any proposed works and will include the time and location of works, and emergency event procedures.

Given the mobile nature of other marine users, they are considered tolerant and can adapt to temporary changes if needed, therefore their sensitivity is **Low**. Any loss of access or displacement to other marine users will be very short-term, temporary and over a small spatial scale compared to the surrounding area used by other marine users, therefore the magnitude will be **Negligible**. As such, **No Significant Effects** are predicted for loss of access or displacement to other marine users as a result of the proposed borehole campaign.

6.5.4.2 IMPACTS TO VESSEL ROUTING AND ACCESS TO PORTS AND HARBOURS

As per **Section 6.5.4.1**, the magnitude is considered to be **Negligible** due to the very short-term, temporary nature of the proposed GI works and as it will be undertaken within a small spatial scale compared to the surrounding area used by other marine users. It is not expected

that other marine users vessels will have to reroute significantly to avoid the JUP and support vessel and their associated temporary 500 m exclusion zone area. Nor will access to ports and harbours be restricted. The sensitivity of other marine Users is considered to be **Low**, the same as per **Section 6.5.4.1**.

As such, **No Significant Effects** are predicted for impacts to vessel routing and access to ports and harbours as a result of the proposed borehole campaign.

6.5.4.3 VESSEL-TO-VESSEL COLLISION RISK

Whilst there is a potential for vessel-to-vessel collision risk during the proposed GI works with the presence of 1 x JUP and 1 x support vessel, adequate sea room and embedded mitigation measures will ensure that there will be no interaction between other marine users and the proposed borehole campaign vessels. These measures include promulgation of NtMs and Kingfisher updates in advance of the works, temporary 500 m exclusion zone surrounding the proposed GI works. They also ensure compliance with International Regulations for the Prevention of Collision at Sea (IMO, 1972) and the International Regulations for the Safety of Life at Sea (SOLAS).

In the unlikely event of a collision, the realistic worst-case scenario would include the potential for loss of life and damage to both the proposed borehole campaign vessel and other marine users vessel involved. In this event the receptor would be unable to recover or adapt. Other marine users vessels are therefore considered to be a **High** sensitivity in relation to collision risk. Given the implementation of the above mitigations, a collision is considered to be highly unlikely. If a collision were to occur, its effects would be localised, and the risk of collision will be restricted to within the vicinity of working vessels. Therefore, the magnitude is considered to be **Negligible**. As such, **No Significant Effects** are predicted for vessel-to-vessel collision risk as a result of the proposed borehole campaign.

6.5.4.4 DIRECT DAMAGE TO INFRASTRUCTURE

No physical infrastructure has been identified within the Sinclair's Bay Study Area or Rattray Head Study Area in **Section 6.5.3.1** and therefore there will be no impacts to physical infrastructure.

6.5.5 ASSESSMENT SUMMARY

Overall, the other marine users assessment concluded **No Significant Effects** for the proposed borehole campaign. Due to the assessment concluding **No Significant Effects** to other marine users receptors, no additional mitigation is proposed.

6.6 MARINE ARCHAEOLOGY

6.6.1 INTRODUCTION

Marine archaeology is the study of past cultures' interaction with waterbodies, encompassing a range of topics which may include, submerged archaeological sites (hereafter referred to as assets), assets located in the intertidal zone, or even assets onshore as they relate to activities, transport, and trade by the sea i.e. lighthouses and pill boxes (Historic Environment Scotland (HES), 2024).

This section describes the baseline for Marine Archaeology and Cultural Heritage within a defined Study Area, informed by a desk-based analysis and survey results, and concludes with an appraisal of the potential effects introduced by ground investigation works for the proposed borehole campaign. Details on the baseline are provided in the following subsections, covering assets at both the Sinclair's Bay (northern) and Rattray Head (southern) landfall.

This assessment considers the potential impact on Marine Archaeology and Cultural Heritage assets, as designated, non-designated, or potential sites. Designated sites include World Heritage sites, registered battlefields, registered gardens and designed landscapes, scheduled monuments, listed buildings and conservation areas. Non-designated assets consist of known sites identified in national and local records, such as the United Kingdom Hydrographic Office (UKHO) and Canmore databases, and Historic Environment Records (HER), as well as from site-specific survey data. Potential sites will be assessed through an understanding of the area, the local history and the current known sites.

Potential effects identified include:

- Direct physical damage to the fabric of an asset (i.e. damage or removal of asset);
- Indirect physical effects to an asset (i.e. through burial and sediment dispersal); and
- Direct effects to settings (i.e. through changes in the seascape).

A review of the Project Design alongside the receptors is undertaken to confirm the impacts from the proposed borehole campaign, the impacts are then scoped in or out (**Section 6.6.4**). To investigate sensitivity of receptors, magnitude of change and determination of effect, the assessment will use the methodology as outlined in **Section 3** of this MEA.

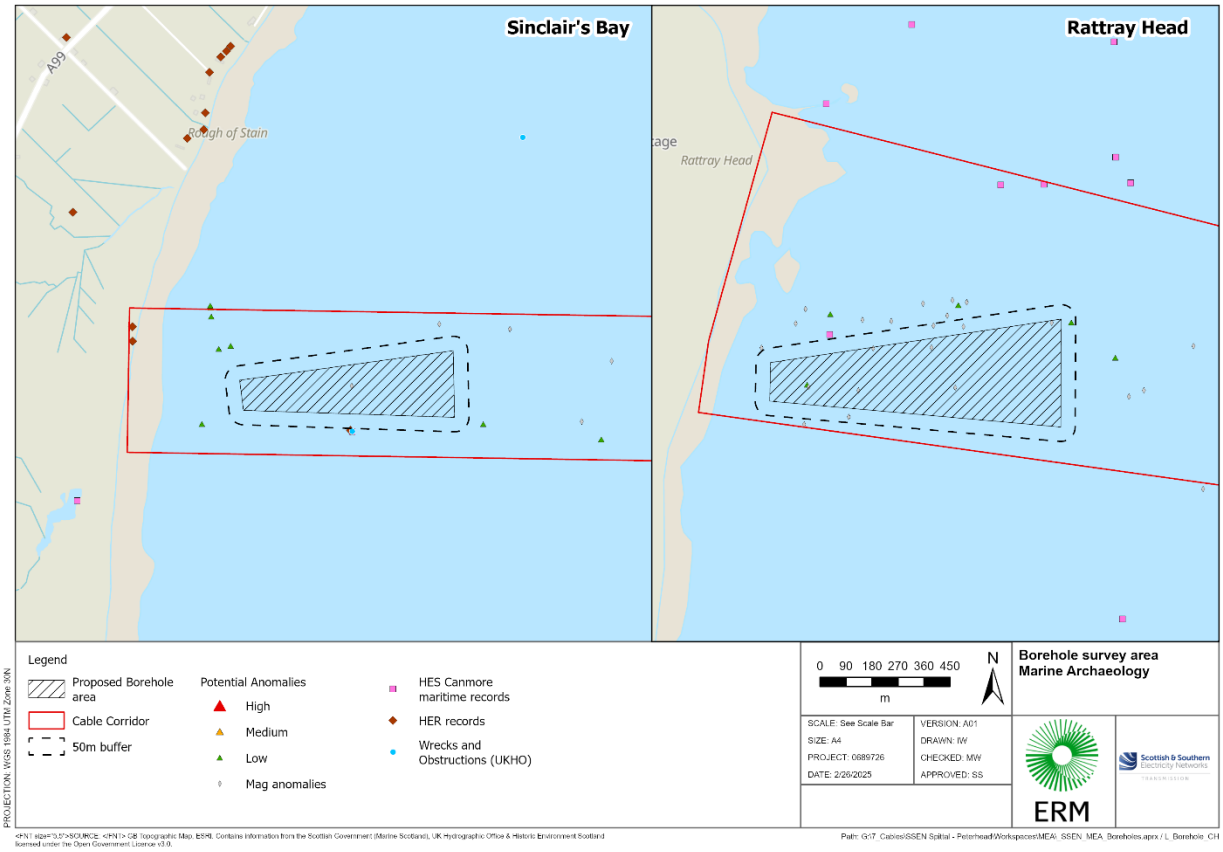
6.6.2 MARINE ARCHAEOLOGY STUDY AREA

The proposed borehole campaign within the northern (Sinclair's Bay) and southern (Rattray Head) landfall of the Project is defined by SSENT, and a 50 m buffer to all sides of these two areas was applied to create the Study Area to understand where the JUP feet/stabilisers and anchoring of the support vessel may extend, as a worse-case scenario.

To assist in discussion, the Marine Archaeology and Cultural Heritage Study Area is divided into two sections (**Figure 6-6**):

- Northern Landfall – Sinclair's Bay Study Area. Proposed borehole campaign area footprint and 50 m buffer area; and
- Southern Landfall – Rattray Head Study Area. Proposed borehole campaign area footprint and 50 m buffer area.

FIGURE 6-6: MARINE ARCHAEOLOGY AND CULTURAL HERITAGE STUDY AREA



6.6.3 BASELINE ENVIRONMENT

For a full discussion of the Project's survey and baseline results from which this assessment is derived please see the Spittal-Peterhead HVDC Subsea Link MEA (ERM, 2024d). The results of the geophysical assessment (MSDS, 2024) have been included in the identification of receptors. No review of sub-seabed data has been completed to date.

6.6.3.1 MARINE ARCHAEOLOGY AND CULTURAL HERITAGE RECEPTORS

No designated assets were identified within the Study Areas. Non-designated assets are outlined in detail in **Table 6-3**, and include the following:

Sinclair's Bay Study Area;

- 1 asset was identified
- 1 asset was identified within a 50 m buffer.

Rattray Head Study Area;

- 7 assets were identified; and
- 4 assets were identified within a 50 m buffer.

TABLE 6-3: SUMMARY OF BOREHOLE WORKS BASELINE ASSETS

Project Location	Site Type	Within Boreholes Work Area[1]	Wider 50 m Buffer Area[2]	Comments (where deemed necessary)
Sinclair's Bay Study Area	Marine	1 magnetic anomaly with no surface representation – unable to assign potential (MSDS, B1_M006)	1 dead shipwreck location (MHG14772/Canmore 101902; and UKHO 917)	MSDS recommended awareness of the magnetic contact MSDS, B1_M006 MHG14772/Canmore 101902; and UKHO 917 is considered an indicative location after review of site specific data, no further mitigation was recommended
Rattray Head Study Area	Marine	1 Low potential, likely geological asset (MSDS, SPTL_121) 6 Magnetic anomalies with no surface representation – unable to assign potential (MSDS, B8_M016, B8_M027, B8_M024, B8_M031, B8_M020, and B8_M029)	1 Low potential (MSDS, SPTL_119) 3 magnetic anomalies with no surface representation – unable to assign potential (MSDS, B8_M023, B8_M019, and B8_M030)	MSDS recommended awareness of the magnetic contacts, with no Archaeological Exclusion Zones recommended

6.6.4 MARINE ENVIRONMENTAL ASSESSMENT

6.6.4.1 OVERVIEW

The proposed works have the potential to result in environmental impacts upon the receptor groups described in **Section 6.6.3.1**, and in **Table 6-3** that are located within the Study Areas.

The potential effects and their associated impacts to marine archaeology are outlined in **Table 6-4**, and an identification of if the impact is required to be scoped in or out of the

[1] All non-designated except when specified
[2] All non-designated except when specified

assessment was made in reference to the planned activities associated with the proposed borehole campaign (**Section 3.2**).

TABLE 6-4: POTENTIAL IMPACTS ASSOCIATED WITH THE PROJECT

Topic	Impact	Scoped In/Out
Marine Archaeology	Direct physical impact via disturbance of the seabed on the archaeological/heritage features	Scoped In
	Indirect physical impact via changes in hydrodynamics, sediment transport and suspended sediment concentrations (plumes)	Scoped Out
	Impact to settings	Scoped Out

Only direct physical impacts to assets, limited to the vicinity of the works are considered and are assessed in **Section 6.6.4** below.

The nature of the marine archaeological resource is such that there is a high level of uncertainty concerning remains on the seabed. Often data regarding the nature and extent of sites are limited or out of date and, as such, the precautionary principle is applied to all aspects of archaeological impact assessments, and a conservative assessment of risk is applied.

6.6.4.2 DIRECT PHYSICAL IMPACT - SEABED DISTURBANCE

Seabed disturbance as a result of works associated with the proposed borehole campaign have to the potential to damage, partially or wholly remove to Marine Archaeology and Cultural Heritage assets.

The sensitivity of these known and unknown assets' is variable and depends on the archaeological potential and value. Direct physical impacts have the potential to be one off, non-reversible and permanent, equating to a **High** magnitude of effect. The only exception to this is from direct physical impacts on known and potential palaeogeographical receptors, where the rating of magnitude is lower, as the features are, generally, spatially more extensive and, therefore, the scale of the impact is relatively small.

Where mitigation is proposed, and the principle of avoidance is adopted in the first instance, through survey and assessment and identification, these mitigation measures will significantly reduce the predicted residual effect of this impact on the cultural heritage.

6.6.5 ASSESSMENT SUMMARY

Overall, the Marine Archaeology assessment concludes **No Significant Effects** throughout the proposed borehole campaign to potential known assets.

6.7 HABITATS REGULATIONS APPRAISAL

6.7.1 STAGE 1 SCREENING OF STATUTORY DESIGNATED SITES AND FEATURES

6.7.1.1 APPROACH TO SCREENING FOR LIKELY SIGNIFICANT EFFECT

To maintain an approach that encompasses the potential footprint of effects associated with the project, but also ensuring screening and assessment remain proportionate to the scale and magnitude of the project, screening buffers have been applied to the HRA process. Sites outside of these screening buffers are considered sufficiently distanced from the project that it is reasonable to conclude No Likely Significant Effect. A summary of the approach used for each receptor group is provided in **Table 6-5**.

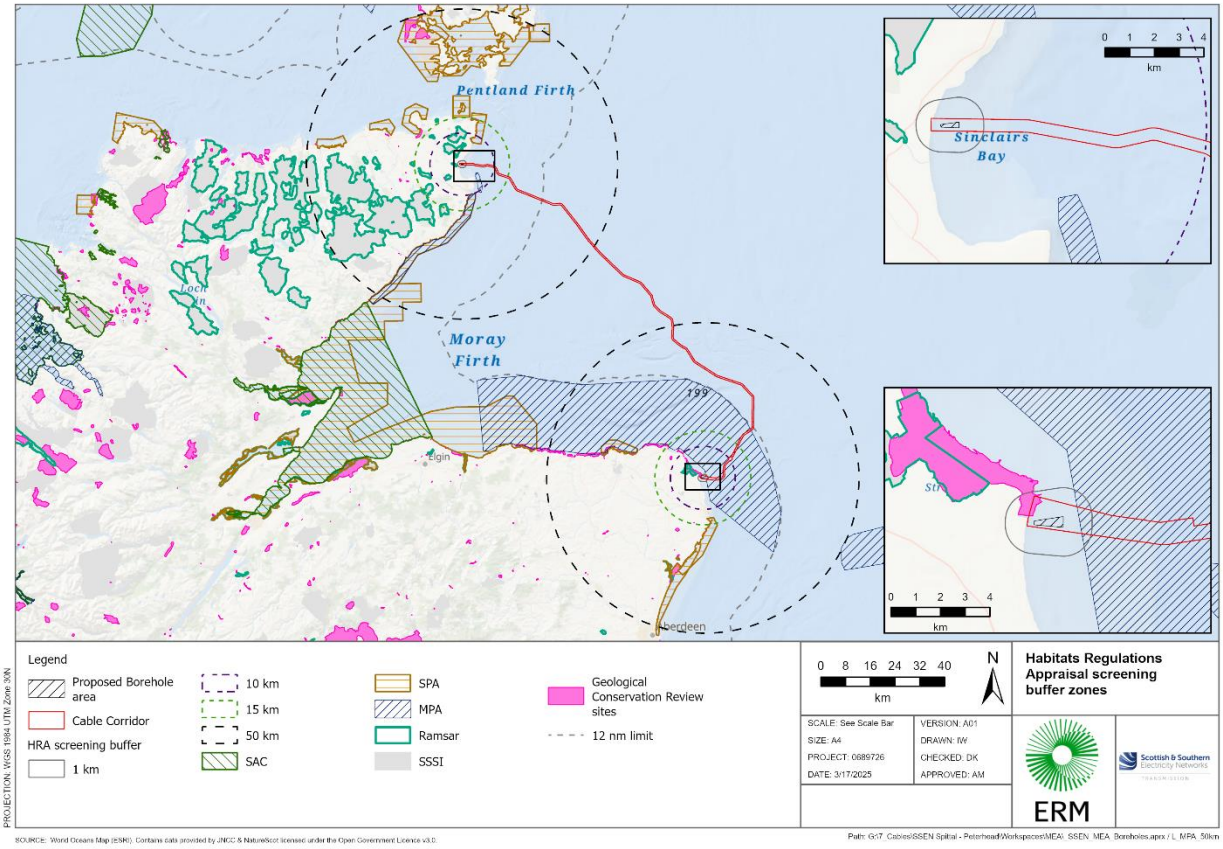
TABLE 6-5: BUFFERS ADOPTED FOR LIKELY SIGNIFICANT EFFECT SCREENING

Receptor	Screening Methodology
Annex I Benthic Habitats (Special Areas of Conservation; SACs)	**1 km** screening buffer. This buffer has been set in recognition of the small scale and nature of the proposed works and limited potential for any sediment plume effects (suspended sediment, deposition and smothering) to extend beyond immediately local benthic habitats and species.
Annex II Migratory Fish (SACs)	**10 km** screening buffer. This buffer is considered sufficient to ensure that Project activities do not create any barrier to species movement.
Annex II Marine Mammals (SACs)	**50 km** screening buffer. This buffer is applied to encompass foraging distances, and movement of mobile marine mammal features outside of the boundaries of the SACs of which they are a qualifying feature.
Special Protection Area (SPA) Classified Bird Populations and Ramsar Sites	**50 km** screening buffer for breeding features. Although this buffer is smaller than the species-specific foraging ranges presented by Woodward *et al*. (2019), it is considered sufficient to encompass all important foraging and supporting habitats at nearby SPAs. **15 km** screening buffer for non-breeding features. If an SPA supports breeding (Annex I seabirds, with a buffer of 50 km) and non-breeding (Annex I seabirds with a buffer of 15 km), the area is screened based on the 50 km buffer, covering both types of features and No Likely Significant Effect (No LSE). **0 km** screening buffer for terrestrial features. Features that do not make use of the marine environment are only screened in where there is direct overlap between the Project and the SPA (this can only occur at landfall locations). Where an SPA is classified for terrestrial and marine features, No LSE is concluded for all terrestrial features if there is no direct overlap.

For sites that are within the distance buffers presented in **Table 6-5**, feature-specific sensitivity to pressures associated with the proposed activity is considered. NatureScot's 'FeAST' (Feature Activity Sensitivity Tool) has been used, where possible. However, it should be noted that sensitivity assessments were not available for all qualifying features.

Figure 6-7 presents the location of SACs, SPAs, and Ramsar Sites considered within the assessment, in relation to Rattray Head and Sinclair's Bay Study Areas and the relevant buffer regions. One SAC and 11 SPAs/Ramsar Sites are situated within the screening distances.

FIGURE 6-7: RATTRAY HEAD AND SINCLAIR'S BAY STUDY AREAS, HABITATS REGULATIONS APPRAISAL SCREENING BUFFER ZONES (1 KM, 10 KM, 15 KM AND 50 KM), AND THE SPECIAL AREAS OF CONSERVATION, SPECIAL PROTECTION AREAS, AND RAMSAR SITES WITHIN SCREENING DISTANCE



6.7.2 SCREENING OUTCOMES

6.7.2.1 PROJECT ALONE ASSESSMENT

Screening has been undertaken on a two-stage iterative basis, where, initially, screening distances (**Table 6-5**) have been used to identify sites within the vicinity of the project. Following this, sites within screening distance were assessed to a higher level of detail.

The screening distances laid out in **Table 6-5** identified the following European sites, which are taken forward for further consideration within the screening process:

SACs Designated for Annex I Benthic Habitats:

- No sites are located within the screening threshold distance;

SACs Designated for Annex II Migratory Fish Species:

- No sites are located within the screening threshold distance;

SACs Designated for Annex II Species:

- Moray Firth SAC (UK0019808).

SPAs with Classified Bird Populations:

- North Caithness Cliffs SPA (UK9001181);

- East Caithness Cliffs SPA (UK9001182);
- Scapa Flow SPA (UK9020321);
- North Orkney SPA (UK9020314);
- Ythan Estuary, Sands of Forvie and Meikle Loch SPA (UK9002221) and Ythan Estuary and Meikle Loch Ramsar Site (UK13061);
- Moray Firth SPA (UK9020313);
- Hoy SPA (UK9002141);
- Buchan Ness to Collieston Coast SPA (UK9002491);
- Copinsay SPA (UK9002151); and
- Troup, Pennan and Lion's Head SPA (UK9002471).

Table 6-6 presents the results of the screening exercise for the sites listed above. The qualifying features of each site are presented alongside the assessment and justification for determination of LSE.

Where applicable, assessment of feature sensitivity is based on FeAST (NatureScot, 2023); however, the tool does not yet include assessments for any marine bird species, other than black guillemot *Cepphus grylle*, and does not consider common bottlenose dolphin *Tursiops truncatus*. It is understood that 36 sensitivity assessments for marine birds have been conducted (Rogerson *et al.,* 2021). However, at the time of drafting this assessment, it is unclear if these sources have been published. Therefore, where appropriate, the methodology report (Rogerson *et al*., 2021), and references therein, has been used alongside alternative published reports and studies, in order to determine whether features are likely to be sensitive to pressures associated with the project.

As detailed in **Table 6-6**, **No Likely Significant Effect is concluded for all sites and qualifying features**. This is due to the very small magnitude of Project effects, and localised extent of these, both in terms of geographic extent but also extent of effects within the water column. In addition it is noted that where effects do occur, there will be rapid recovery following cessation of activities. No qualifying features were assessed as having greater than negligible sensitivity to the proposed works.

TABLE 6-6: SCREENING FOR LIKELY SIGNIFICANT EFFECT (LSE) CONCLUSIONS

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
Special Areas of Conservation (SAC)			
Moray Firth SAC (UK0019808)	• Common bottlenose dolphin *Tursiops truncatus*	>50 km (from Sinclair's Bay Study Area) >50 km (from Rattray Head Study Area)	The Moray Firth SAC is located in excess of 50 km from the Sinclair's Bay Study Area and the Rattray Head Study Areas. Cetacean species have been recorded in the region covered by the cable installation corridor (Evans *et al.,* 2011; Reid *et al.*, 2003). Specifically, it has been reported that bottlenose dolphin are regularly present within the vicinity of the cable installation corridor (Evans *et al.,* 2011). Of the potential pressures from project activities, bottlenose dolphin are only considered to be sensitive to underwater noise, which may "*cause marine mammals to relocate, interfere with communication, navigation, foraging, and may disrupt social bonds*" (NatureScot, 2024). The proposed borehole drilling and grouting activities are expected to produce low levels of acoustic disturbance, and any noise would be expected to attenuate within a small distance from the source. Given that animals affected by pressures associated with the proposed works will have travelled >50 km from the Moray Firth resident population, the area of effect is considered to represent a negligible portion of their available foraging area. Therefore, for the purposes of this assessment, bottlenose dolphin are screened out. Considering the proposed project and the localised level of operations, these species will not be affected by the proposed project. Therefore, **No LSE** is predicted.
Special Protection Areas (SPAs) and Ramsar Sites			
North Caithness Cliffs SPA (UK9001181)	• Breeding populations of: ○ Black-legged kittiwake *Rissa tridactyla*; ○ Common guillemot *Uria aalge*; ○ Razorbill *Alca torda*;	<10 km (from Sinclair's Bay Study Area)	The North Caithness Cliffs SPA is over 50 km from the Rattray Head Study Area, as such **No LSE** is predicted. However, this SPA is in close proximity to the Sinclair's Bay Study Area (6.7 km); thus, there is potential for interaction to occur for all features except peregrine falcon, where **No LSE** is determined.

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
	○ Atlantic puffin *Fratercula arctica*; ○ Northern fulmar *Fulmarus glacialis*; ○ Peregrine falcon *Falco peregrinus**.	>50 km (from Rattray Head Study Area)	For seabird features (black-legged kittiwake, common guillemot, razorbill, Atlantic puffin, and northern fulmar), there is potential for the project activities to affect foraging areas, supporting habitat, and affect individual foraging birds. Due to the nature of the project, effects will be limited to within the immediate vicinity of the ongoing works and will be temporary and short term. The project may result in disturbance of a small number of individuals during periods when vessels are active. However, disturbance will be highly localised and affect a negligible proportion of the foraging range for these species, which ranges from 95.2 km for razorbill, to 1,200.2 km for northern fulmar (Woodward *et al.*, 2019). The drilling of boreholes and subsequent grouting will involve direct disturbance of a small area of supporting habitat, however, the recovery period is expected to be short term and impacts to benthic species were not significant **(Section 6.1: Benthic Ecology).** Therefore, the project is not expected to result in any measurable effect on the qualifying features and **No LSE** is concluded. **No Likely Significant Effect** is determined for the North Caithness Cliffs SPA and its qualifying features.
East Caithness Cliffs SPA (UK9001182)	• Breeding populations of: ○ Black-legged kittiwake; ○ Great black-backed gull *Larus marinus*; ○ European herring gull *Larus argentatus*; ○ Common guillemot; ○ Razorbill; ○ Northern fulmar; ○ Great cormorant *Phalacrocorax carbo*; ○ European shag *Gulosus aristotelis*;	<10 km (from Sinclair's Bay Study Area) >50 km (from Rattray Head Study Area)	The East Caithness Cliffs SPA supports similar species to the North Caithness Cliffs SPA, with the addition of great black-backed and herring gulls, great cormorant and European shag. For black-legged kittiwake, common guillemot, razorbill, Atlantic puffin, and peregrine falcon, the same rationale and conclusions as made for the North Caithness Cliffs SPA are also appliable. Therefore, **No LSE** is determined. Great black-backed gull and European herring gull are surface-feeding gulls, which feed in the upper water column only. Therefore, there is no potential for interactions with the seabed to affect these species. The species are also insensitive to vessel-related disturbance (Cook and Burton,

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
	○ Peregrine falcon; • Seabird assemblage.		2010; Furness *et al.*, 2013). Should temporary disturbance or habitat loss occur, gulls are opportunistic species which can make use of a wide variety of marine and terrestrial habitat and prey species; thus, show high adaptability and tolerance. Therefore, **No LSE** is concluded for these species. Great cormorant and European shag make use of the nearshore marine environment, having respective foraging ranges of 25.6 ± 8.3 km, and 13.2 ± 10.5 km (Woodward *et al.*, 2019). There is potential for interaction with the project; however, due to its small magnitude and spatial footprint, interaction will be very limited. Both species forage on small pelagic fish species, and the project is not predicted to affect any prey species. Cormorant and shag show some sensitivity to vessel related disturbance (Furness *et al.*, 2013; MMO, 2018). However, a limited number of vessels are expected to be present at any given time during the proposed project. Therefore, it is expected that disturbance will be restricted to the immediate vicinity of the works and will be short term in nature. Additionally, the increase in vessels, when compared with background vessel traffic in the region, is likely to be negligible and not expected to result in a measurable effect on foraging seabirds. Therefore, **No LSE** is concluded. **No Likely Significant Effect** is determined for the East Caithness Cliffs SPA and its qualifying features.
Scapa Flow SPA (UK9020321)	• Breeding populations of: ○ Red-throated diver *Gavia stellata*. • Non-breeding populations of: ○ Common eider *Somateria mollissima**; ○ Long-tailed duck *Clangula hyemalis*; ○ Red-breasted merganser *Mergus serrator*; ○ Slavonian grebe *Podiceps cristatus**;	30 km (from Sinclair's Bay Study Area) >100 km (from Rattray Head Study Area)	Scapa Flow SPA is located 30 km from the Sinclair's Bay Study Area and over 100 km from the Rattray Head Study Area, thus is outside the screening distance for non-breeding features (15 km). As such, **No LSE** is concluded for all non-breeding qualifying features of the SPA. Red-throated diver has a foraging range of up to 9 km during the breeding season (Woodward *et al.*, 2019). Therefore, with the SPA being 30 km from the project, there is no potential for interaction. As such, **No LSE** is determined for the breeding red-throated diver feature of the Scapa Flow SPA. **No Likely Significant Effect** is determined for the Scapa Flow SPA and its qualifying features.

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
	○ Black-throated diver *Gavia arctica*; ○ Great northern diver *Gavia immer*; ○ European shag.		
North Orkney SPA (UK9020314)	• Breeding populations of: ○ Red-throated diver. • Non-breeding populations of: ○ Velvet scoter *Melanitta fusca*; ○ Slavonian grebe*; ○ Great northern diver.	46 km (from Sinclair's Bay Study Area) >100 km (from Rattray Head Study Area)	North Orkney SPA is located 46 km from the Sinclair's Bay Study Area and over 100 km from the Rattray Head Study Area, thus is outside the screening distance for non-breeding features (15 km). As such, **No LSE** is concluded for all non-breeding qualifying features of the SPA. Red-throated diver has a foraging range of up to 9 km during the breeding season (Woodward *et al.*, 2019). Therefore, with the SPA being 46 km from the project, there is no potential for interaction. As such, **No LSE** is determined for the breeding red-throated diver feature of the North Orkney SPA. **No Likely Significant Effect** is determined for the North Orkney SPA and its qualifying features.
Ythan Estuary, Sands of Forvie and Meikle Loch SPA (UK9002221) and Ythan Estuary and Meikle Loch Ramsar Site (UK13061)	• Breeding populations of: ○ Sandwich tern *Thalasseus sandvicensis*; ○ Common tern *Sterna hirundo*; ○ Little tern *Sternula albifrons*. • Non-breeding populations of: ○ Pink-footed goose *Anser brachyrhynchus**; ○ Common eider*; ○ Northern lapwing *Vanellus vanellus**; ○ Common redshank *Tringa totanus**; • Waterfowl assemblage*.	>100 km (from Sinclair's Bay Study Area) 21.1 km (from Rattray Head Study Area)	The Rattray Head Study Area is located 21.1 km from this SPA and associated Ramsar Site and the Sinclair's Bay Study Area is located in excess of 100 km from this SPA. Therefore, it is outside the screening distance for non-breeding and terrestrial features. As such, there is no potential for interaction and **No LSE** is concluded for these qualifying features of the SPA. The project is outside the foraging range of little tern (5 ± 0 km; Woodward *et al.*, 2019), thus there is no potential for interaction and **No LSE** is determined. Although the project is within species specific foraging ranges (Woodward *et al.*, 2019) of common tern (18.0 ± 8.9 km) and Sandwich tern (34.3 ± 23.2 km), borehole drilling and subsequent grouting will disturb a minor proportion of tern foraging habitat for a very short period. Furthermore, project activities are not predicted to have a significant effect on benthic species and habitats or on tern prey items (refer to **Section 6.1**). Terns show some sensitivity to vessel-related

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
			disturbance. However, as per the project specifications, a limited number of vessels will be operating over a short time. Temporary (short-term) displacement may occur on a highly localised scale, which will not result in a measurable effect on tern foraging success. As such, due to the highly localised effects and small scale and magnitude of the proposed works, **No LSE** is determined. **No Likely Significant Effect** is determined for the Ythan Estuary, Sands of Forvie and Meikle Loch SPA and its qualifying features.

Moray Firth SPA (UK9020313)	• Breeding populations of:
	  ○ European shag.
	• Non-breeding populations of:
	  ○ Greater scaup *Aythya marila**;
	  ○ Common eider*;
	  ○ Common scoter *Melanitta nigra*;
	  ○ Velvet scoter;
	  ○ Long-tailed duck;
	  ○ Common goldeneye *Bucephala clangula**;
	  ○ Red-breasted merganser*;
	  ○ Slavonian grebe*;
	  ○ Red-throated diver;
	  ○ Great northern diver;
	  ○ European shag.
		>40 km (from Sinclair's Bay Study Area)
		
		>50 km (from Rattray Head Study Area)
			The Moray Firth SPA is located in excess of 40 km from the Sinclair's Bay Study Area and 50 km from the Rattray Head Study Area thus, is outside the screening range for non-breeding and terrestrial features (15 km and 0 km, respectively). Therefore, there is no potential for interaction and **No LSE** is concluded for all non-breeding qualifying features of the SPA.
			European shag has a mean maximum foraging range of 13.2 ± 10.5 km (Woodward *et al.*, 2019), putting the project outside the foraging range of the species. Therefore, there is no potential for interaction, and **No LSE** is concluded for the breeding population of European shag.
			No Likely Significant Effect is determined for the Moray Firth SPA and its qualifying features.

Hoy SPA (UK9002141)	• Breeding populations of:
	  ○ Black-legged kittiwake;
	  ○ Great black-backed gull;
	  ○ Great skua *Stercorarius skua*;
	  ○ Arctic skua *Stercorarius parasiticus*;
	  ○ Common guillemot;
	  ○ Atlantic puffin;
		27.4 km (from Sinclair's Bay Study Area)
		
		>100 km (from Rattray
			The Hoy SPA is located 27.4 km from the Sinclair's Bay Study Area and over 100 km from the Rattray Head Study Area. The following features are, therefore, outside the species-specific foraging ranges (Woodward *et al.*, 2019) of the project: Arctic skua (2.7 km) and red-throated diver (9 km). Therefore, there is no potential for interaction and **No LSE** is concluded for these features.

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
	○ Red-throated diver; ○ Northern fulmar; ○ Peregrine falcon*; • Seabed assemblage.	Head Study Area)	Additionally, peregrine falcon is a terrestrial species with limited interaction with the marine environment. Therefore, there is no potential for interaction and **No LSE** is concluded. The other seabird features with foraging ranges (Woodward *et al.*, 2019) that introduce potential for interaction are: black-legged kittiwake (156.1 ± 144.5 km); greater black-backed gull (73 ± 0 km); great skua (443.3 ± 487.9 km); common guillemot (55.5 ± 39.7 km); Atlantic puffin (119.6 ± 131.2 km); and northern fulmar (542.3 ± 657.9 km). Whilst there is potential for interaction, the Hoy SPA is separated from the project by the peninsula at John o' Groats, reducing the potential for interaction. Additionally, these species have extensive foraging ranges from their breeding colonies, meaning there is an extensive amount of alternative foraging habitat available. The project may result in short term displacement of some foraging individuals over a small spatial extent; however, the effects are unlikely to result in a substantial increase in energy expenditure or reduction in foraging success. Furthermore, project activities and are not predicted to have a significant effect on benthic species and habitats or on prey items (refer to **Section 6.1**). Therefore, it is concluded that the project will result in **No LSE**. No Likely Significant Effect is determined for the Hoy SPA and its qualifying features.
Buchan Ness to Collieston Coast SPA (UK9002491)	• Breeding populations of: ○ Black-legged kittiwake; ○ European herring gull; ○ Common guillemot; ○ Northern fulmar; ○ European shag; • Seabird assemblage.	>100 km (from Sinclair's Bay Study Area) 12 km (from Rattray Head Study Area)	This SPA is located 12 km from the Rattray Head Study and over 100 km from the Sinclair's Bay Study Area. All seabird species are within foraging range (Woodward *et al.*, 2019), however, the interaction between the project and available foraging areas is very limited. Kittiwake, guillemot and fulmar have extensive foraging ranges (95.2 to 1,200.2 km); thus, the potential Project effects will constitute a very small proportion of any potential foraging habitat. Additionally, impacts will be short term and restricted to the immediate vicinity of the project. These birds have a vast

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
			extent of alternative foraging habitat available, thus **No LSE** is concluded. European herring gull has a foraging range of 58.8 ± 26.8 km (Woodward *et al.*, 2019). The species is insensitive to vessel related disturbance (Cook and Burton, 2010; Furness *et al.*, 2013) and feeds on a wide range of food resources. Therefore, herring gull has very high adaptability should any displacement or habitat loss occur. As such, the project is not expected to result in any measurable effect on the herring gull feature of the SPA, and **No LSE** is concluded. European shag makes use of the nearshore marine environment, having a foraging range of 13.2 ± 10.5 km (Woodward *et al.*, 2019). There is potential for interaction with the project, however, this is very limited due to the Project's predicted small magnitude of effect and spatial footprint. Shag forage on small pelagic fish, and the project is not predicted to affect availability of these prey species. Whilst shag show some sensitivity to vessel related disturbance (Furness *et al.*, 2013; MMO, 2018), a limited number of vessels are expected to be present at any given time. The increase in vessels, when compared with background vessel traffic in the region, is likely to be negligible and not expected to result in a measurable effect on foraging seabirds. Therefore, **No LSE** is concluded. **No Likely Significant Effect** is determined for the Buchan Ness to Collieston Coast SPA and its qualifying features.

Copinsay SPA (UK9002151)	• Breeding populations of:
	  ○ Black-legged kittiwake;
	  ○ Great black-backed gull;
	  ○ Common guillemot;
	  ○ Northern fulmar;
	• Seabird assemblage.
		42.4 km (from Sinclair's Bay Study Area)
		
		>100 km (from Rattray Head Study Area)
			The qualifying features of the Copinsay SPA have large foraging ranges (Woodward *et al.*, 2019), from 73 km (greater black-backed gull) to 1,200.2 km (northern fulmar). Therefore, there is potential for interaction between the Sinclair's Bay Study Area and foraging birds. However, only a negligible proportion of available foraging habitat may be affected, leaving a vast extent of alternative habitat available. Additionally, any displacement or habitat loss which may occur, will be very short term in nature and limited to the immediate vicinity of the project footprint or operating

Site Name and Code	Qualifying Features* * No Likely Significant Effect (LSE) is concluded for all terrestrial features.	Distance from Study Areas (km)	Screening for Likely Significant Effect (LSE)
			vessels. Therefore, there is no potential for the project to affect the seabird populations of the Copinsay SPA and **No LSE** is concluded. **No Likely Significant Effect** is determined for the Copinsay SPA and its qualifying features.

Troup, Pennan and Lion's Head SPA (UK9002471)	• Breeding populations of:
	  ○ Black-legged kittiwake;
	  ○ European herring gull;
	  ○ Common guillemot;
	  ○ Northern fulmar;
	  ○ European shag;
	• Seabird assemblage.
		>100 km (from Sinclair's Bay Study Area)
		
		22.2 km (from Rattray Head Study Area)
			The Troup, Pennan and Lion's Head SPA is located 22.2 km from the Rattray Head Study Area from the project, however, this is a straight line distance. The at sea distance is almost 30 km.
			All seabird species are within foraging range (Woodward *et al.*, 2019), however, the interaction between the project and foraging areas available is very limited. Kittiwake, guillemot and fulmar have extensive foraging ranges (95.2 to 1,200.2 km); thus, the project can only affect a very minor proportion of any potential foraging habitat. Additionally, impacts will be short term and restricted to the immediate vicinity of the project. These birds have a vast extent of alternative foraging habitat available, thus **No LSE** is concluded.
			For European herring gull and European shag the same rationale and conclusions as made for the **Buchan Ness to Collieston Coast SPA** are also appliable. Therefore, **No LSE** is determined.
			No Likely Significant Effect is determined for the Troup, Pennan and Lion's Head SPA and its qualifying features.

6.7.2.2 IN COMBINATION ASSESSMENT

Each of the features of the sites assessed, is screened out as having no LSE for any pressure pathways considered. In view of this, and of the small scale of the proposed works and the highly localised extent of effects predicted in the Project alone assessment, an in combination assessment has not been undertaken.

6.7.2.3 APPROPRIATE ASSESSMENT

Appropriate Assessment (HRA Stage 2) is not required, and no further assessment has been undertaken.

6.8 NATURE CONSERVATION MARINE PROTECTED AREA ASSESSMENT

6.8.1 INTRODUCTION

Marine Protected Areas (MPAs) in Scottish territorial waters are designated under Section 67 of the Marine (Scotland) Act 2010[3]. MPAs in Scottish offshore waters are designated under section 116 of the Marine and Coastal Access Act 2009[4] (MCAA). It should be noted that under section 116 (7) of the MCAA, an MCZ designated by the Scottish Ministers is to be known as an MPA. For the purposes of the following section, MPA should be considered to refer to both Nature Conservation MPA and MCZ.

Further detail is provided within **Appendix B.**

6.8.1.1 AIMS AND OBJECTIVES

This chapter has been produced to provide evidence on whether the potential impacts of the Project will:

- Be capable of affecting (other than insignificantly) a protected feature in a Nature Conservation MPA (NCMPA) or any ecological or geomorphological process on which the conservation of any protected feature in any relevant NCMPA relies; or
- If considered capable of affecting (other than insignificantly) a protected feature, ecological or geomorphological process of an NCMPA, be capable of creating a significant risk of hindering the conservation objectives on any relevant NCMPA.

The following sections describe the approach to the initial screening and main assessment stages of the process. Given that Marine Scotland's Nature Conservation Marine Protected Areas: Draft Management Handbook (Marine Scotland, 2013) remains unavailable, the following sections are based on guidance provided on Marine Conservation Zones (MCZs) and marine licensing (MMO, 2013)[5].

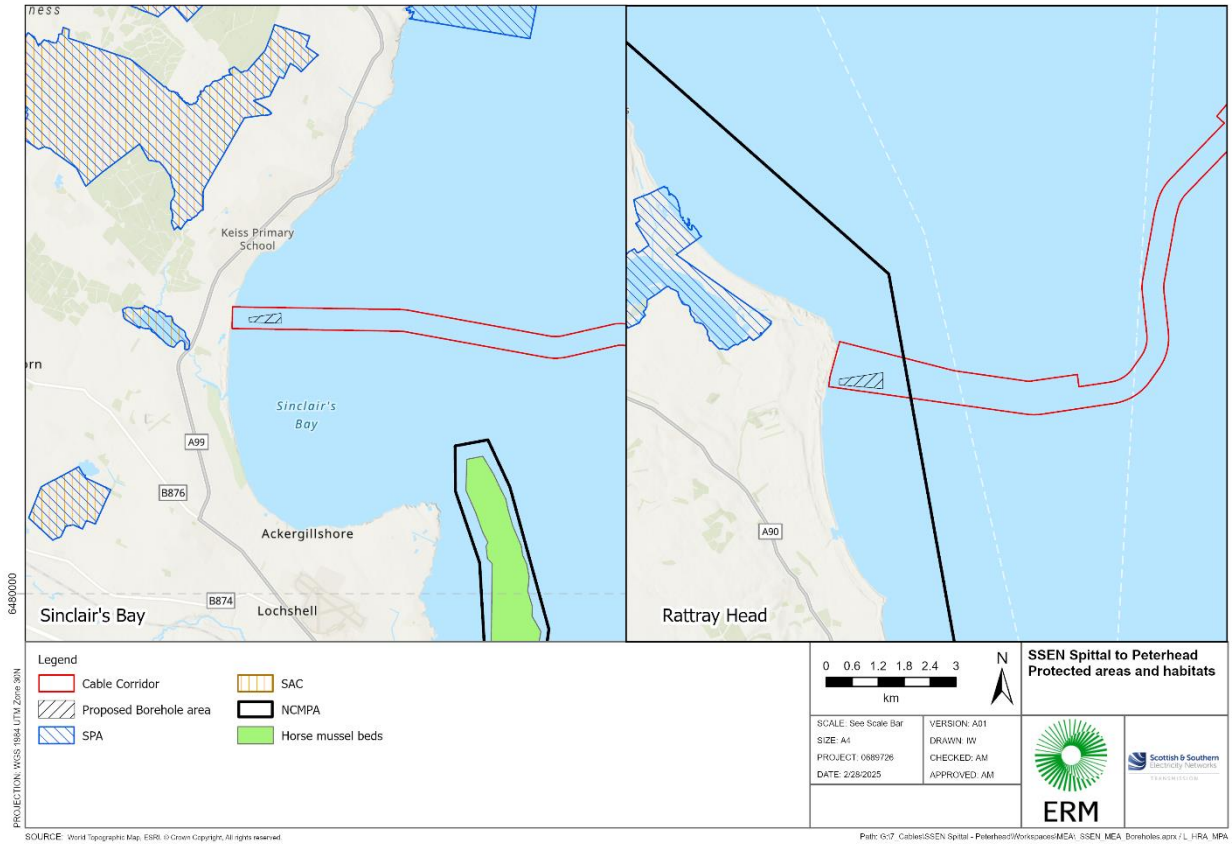
6.8.1.2 THE PROJECT-SPECIFIC SURVEYS AND ASSESSMENTS

To further inform the NCMPA assessment, where available, project-specific data sources and assessments have been consulted. Reviews of the other MEA receptor sections have also been conducted.

Figure 6-8 shows the 2 nearest NCMPAs to the 2 screening Study Areas.

[3] https://www.legislation.gov.uk/asp/2010/5/contents
[4] https://www.legislation.gov.uk/asp/2010/5/contents
[5] https://www.gov.uk/government/publications/marine-conservation-zones-mczs-and-marine-licensing

FIGURE 6-8: THE SINCLAIR'S BAY STUDY AREA AND THE BOUNDARY OF THE NOSS HEAD NATURE CONSERVATION MARINE PROTECTED AREA (LEFT) AND RATTRAY HEAD STUDY AREA AND SOUTHERN TRENCH NATURE CONSERVATION MARINE PROTECTED AREA (RIGHT)



6.8.2 SCREENING – ALONE

<u>Screening Question 1:</u> Is a licensable activity taking place within or near to an area being put forward for, or already designated as an NCMPA?

There are 4 NCMPAs within 50 km of either one of the Study Areas. These are:

- Southern Trench NCMPA;
- Noss Head NCMPA;
- East Caithness Cliffs NCMPA; and
- Turbot Bank NCMPA.

Turbot Bank NCMPA is designated for sandeel (*Ammodytes marinus*/*A. tobianus*), and whilst these are protected mobile fish species, it is their supporting habitat within the site boundary that is important for this feature. Sandeel are closely associated with sandy habitats, where they will reside in for months at a time (JNCC, 2024), and in consideration of the distance of the proposed borehole campaign Study Areas from the site boundary (22 km).

It is considered that there is no direct or indirect pathway that will interact with the supporting habitat for this feature. **Turbot Bank NCMPA is, therefore, excluded from further assessment**.

<u>Screening Question 2:</u> Is a licensable activity capable of affecting (other than insignificantly) the protected features of an NCMPA or any ecological or geomorphological process on which the conservation of any protected feature of an NCMPA is (wholly or in part) dependent?

The following sites are taken in turn for assessment.

- Southern Trench NCMPA (**Section 6.8.3**);
- Noss Head NCMPA (**Section 6.8.4**); and
- East Caithness Cliffs NCMPA (**Section 6.8.5**).

Key information used for the screening assessment is sourced from:

- Protected Nature Sites Application;
- Conservation and Management Advice Note Southern Trench NCMPA (NatureScot, 2020);
- Conservation and Management Advice Note Noss Head MPA (NatureScot, 2024);
- East Caithness Cliffs MPA(NC) Site Summary. (NatureScot, 2014a);
- Scotland's National Marine Plan Interactive (NMPi) (Scottish Government, 2023);
- Feature Activity Sensitivity Tool (FeAST, 2023);
- Scottish Natural Heritage (SNH) Descriptions of Scottish Priority Marine Features (PMFs) (Tyler-Walters et al., 2016);
- The Marine Life Information Network (MarLIN) (MarLIN, 2024); and
- Relevant published reports and peer-review scientific literature.

6.8.3 SOUTHERN TRENCH NCMPA

6.8.3.1 SITE FEATURES

The Southern Trench NCMPA (2,398 km²) was designated to protect four biodiversity features and two geodiversity features:

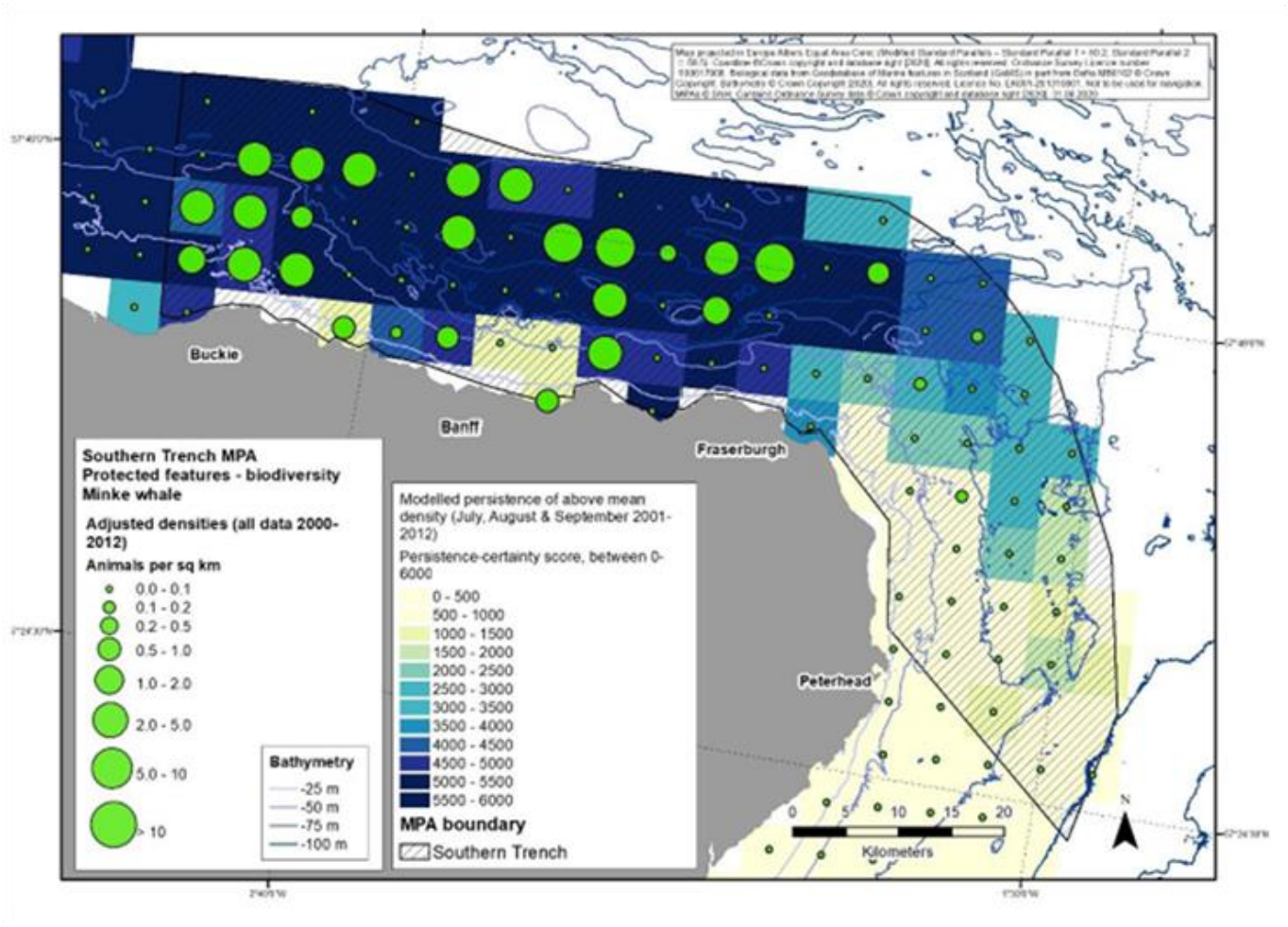
- Biodiversity Features:
  - Burrowed mud – Inshore sublittoral sediment (Marine);
  - Fronts – Large-scale feature (Marine);
  - Shelf deeps – Large-scale feature (Marine);
- Minke whale *Balaenoptera acutorostrata* - Mammals (Marine);
- Geodiversity Features:
  - Quaternary of Scotland - Quaternary geology and geomorphology; and
  - Submarine Mass Movement – Geomorphology.

6.8.3.2 FEATURES TO BE SCREENED

For the features listed above for Southern Trench NCMPA, the distances of the features from the Rattray Head and Sinclair's Bay Study Areas are all >10 km, and/or it is acknowledged that there is no likely impact pathway between the Project and the features. These have been screened out for further screening assessment under Screening Question 2. The Rattray Bay Study Area is greater than 10 km from the seabed biodiversity and geodiversity features of the

Southern Trench NCMPA and the Sinclair's Bay Study Area is greater than 50 km from the Southern Trench NCMPA.

FIGURE 6-9: SOUTHERN TRENCH NCMPA AND MINKE WHALE DENSITIES (ALL MONTHS 2000-2012) AND MODELLED PERSISTENCE OF ABOVE MEAN DENSITIES (SUMMER 2001 2012) (FROM: NATURESCOT, 2020)



Minke whale are a mobile feature. However, it is unlikely any potential direct or indirect spatial interaction with borehole drilling and grouting activities at the Study Areas and this feature. As shown in **Figure 6-9**, the densities of minke whale within the Southern Trench NCMPA is relatively low within proximity to the Rattray Head Study Area. The boreholes will be drilled in relatively shallow water where Minke whale are less likely to be present especially as they are unlikely to occur within the area during the proposed borehole campaign period in Q1 2026. The Sinclair's Bay Study Area is greater than 50 km from this NCMPA.

Considering the very small scale and temporary nature of the works, **Southern Trench NCMPA is screened out from further assessment under Screening Question 2**.

6.8.4 NOSS HEAD NCMPA

6.8.4.1 SITE FEATURES

The Noss Head NCMPA (8 km²) has been designated to protect one biodiversity feature:

- Biodiversity Feature:

- Horse mussel beds – Inshore sublittoral sediment (Marine).

6.8.4.2 FEATURES TO BE SCREENED

The distance from the NCMPA boundary to the Sinclair's Bay Study Area is 5.1 km. The distance from the NCMPA boundary to the Rattray Head Study Area is >50 km.

FeAST identified horse mussel beds to have a high sensitivity to the pressures 'Physical change to (another seabed type)'; 'Physical removal (extraction of substratum)', and 'Sub-surface abrasion/penetration'; and a medium sensitivity to the pressure 'Surface abrasion'.

No direct impact footprint associated with the proposed borehole campaign, within either Study Area overlaps with the benthic biodiversity feature.

Furthermore, the high sensitivity pressures of 'Removal of non-target species (including lethal)', and 'Removal of target species (including lethal)' are not of relevance to the proposed borehole campaign and will not be considered further. In addition, it is predicted that there is no impact pressure pathway for the medium sensitivity pressures of 'Temperature change' and 'Water flow (tidal current) changes – local'.

Assessment of secondary/indirect impacts associated with the proposed borehole campaign are associated with possible smothering due to settlement of drill arisings e.g. siltation rate changes (light). The assessments conducted for the Physical Environment in **Section 6.1.4** and Benthic Ecology in **Section 6.2.4.2** demonstrated that any smothering pressure would be very small and highly localised and indistinguishable after 1-2 tidal cycles. The footprint of effects was assessed as being less than meters for sands and gravels and few tens of meters for fines. Whilst horse mussel feature shows a Medium-High sensitivity to smothering, there is no pressure pathway with the nearest part of the feature 5.1 km distant.

It is considered that there is no direct or indirect pathway that will interact with the designated horse mussel biodiversity habitat feature. **Noss Head NCMPA is screened out from further assessment under Screening Question 2**.

6.8.5 EAST CAITHNESS CLIFFS NCMPA

6.8.5.1 SITE FEATURES

The East Caithness Cliffs NCMPA (114 km²) has been designated to protect one biodiversity feature:

- Black guillemot *Cepphus grylle*.

6.8.5.2 FEATURES TO BE SCREENED

Black guillemot are a designated feature of the East Caithness Cliffs NCMPA. The boundary of the NCMPA is 9.7 km from the closest part of the Sinclair's Bay Study Area. Unlike the other 3 auk species in Scottish waters, black guillemot have a highly restricted foraging range of 9.1 km during the breeding season (Woodward *et al.,* 2019). It is therefore unlikely that any interaction during the breeding season could occur. This Negligible magnitude of interaction is further mitigated considering the proposed borehole campaign period is anticipated to occur in March, which is before black guillemot arrive at the breeding colony (NatureScot, 2014).

The Rattray Head Study Area is greater than 50 km from the East Caithness Cliffs NCMPA.

It is considered that there is no direct or indirect pathway that will interact with the designated black guillemot biodiversity feature. **East Caithness Cliffs NCMPA is screened out from further assessment under Screening Question 2**.

6.8.6 SCREENING SUMMARY

Following screening of the proposed borehole campaign alone for Southern Trench NCMPA, Noss Head NCMPA, and East Caithness Cliffs NCMPA, all of the site features have been screened out for further assessment.

Considering the very highly localised spatial and temporal footprint of the proposed borehole campaign, and considering that all features of sites assessed are screened out as having no direct or indirect pathway of impact on the protected features of the sites, a cumulative assessment has not been undertaken.

6.9 WATER FRAMEWORK DIRECTIVE AND ENVIRONMENTAL QUALITY

6.9.1 INTRODUCTION

This section provides an overview of the baseline environment for the Water Framework Directive (hereafter WFD) and Environmental Quality within the proposed borehole campaign Study Area. The WFD 2000/60/EC is a European Directive which introduces a planning process to manage, protect and improve the surface and groundwater water environment. It applies to all rivers, lakes, estuaries, coastal waters and groundwater.

In Scotland, coastal and transitional surface waters out to 3 nm are protected under Scotland's River Basin Management Plans (RBMPs), the Water Environment and Water Services (Scotland) Act 2003 (WEWS) and the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR), implementing Directive 2000/60/EC. These acts and policies require activities which may potentially interact with surface waters, to consider compliance with the WFD, ensuring water bodies achieve/maintain 'Good Ecological Status' (GES) or 'Good Ecological Potential' (GEP).

Under the WFD, surface water status looks at both the chemical and ecological status of water bodies. Chemical and ecological status are reported separately but are combined overall. This means that if just one quality element fails good status, the overall water body classification will be less than good.

6.9.2 METHODOLOGY

The WFD and Environmental Quality assessment considers the following receptors and/or pathways:

Water quality, defined by:

- Physical properties;
- Chemical properties.

Sediment Quality, defined by:

- Physical properties;
- Chemical properties.

WFD designated water bodies, where their status is defined by quality elements, comprising;

- Hydromorphology (assessed in **Section 6.1**);
- Biology;
- Water quality;
- Sediment quality;
- Protected areas (assessed in **Section 6.7:** and **Section 6.8**); and
- Invasive non-native species (INNS).

The relevance of the potential effects and impacts identified is considered against the baseline conditions, which would be expected to occur if no development took place. Additionally, in terms of WFD compliance assessment, changes to the status of a water body have been considered significant if potential non-temporary deterioration has been predicted.

WFD Compliance Assessment

The WFD Compliance Assessment methodology is completed in the following stages:

- Stage 1 Screening: identify activities associated with the proposed borehole campaign (at each stage) that have the potential to have an impact, and identify the water bodies hydrologically connected to the proposed borehole campaign;
- Stage 2 Scoping: identify the potential risks to each water body and each receptor; and
- Stage 3 Impact Assessment: assess the hydrological connectivity (pathway) of activities associated with the proposed borehole campaign (source) on the WFD water bodies and other statutory receptors.

Topics Scoped Out of the WFD and Environmental Quality Assessment

The effects and impacts of the proposed borehole campaign for designated bathing waters and shellfish waters have been scoped out. The INNS quality element is also scoped out due to vessels complying with the IMO ballast water management guidelines and biosecurity plans. Temporary discharges from grout and bentonite deposition have also been scoped out as no potential impact pathway is anticipated on the surrounding environment.

Quality Assessment, Standards and Thresholds

In the UK, statutory seabed sediment quality standards are yet to be established. Contamination and pollution assessment are undertaken against thresholds set out in the Action Levels guidelines (MMO, 2014; Marine Scotland, 2017). Generally, contaminant levels in dredged material below Action Level 1 (AL1) are not concerning and safe for disposal, however those above Action Level 2 (AL2) are considered unsuitable for sea disposal. Compound levels that lie between AL1 and AL2, require further consideration before disposal.

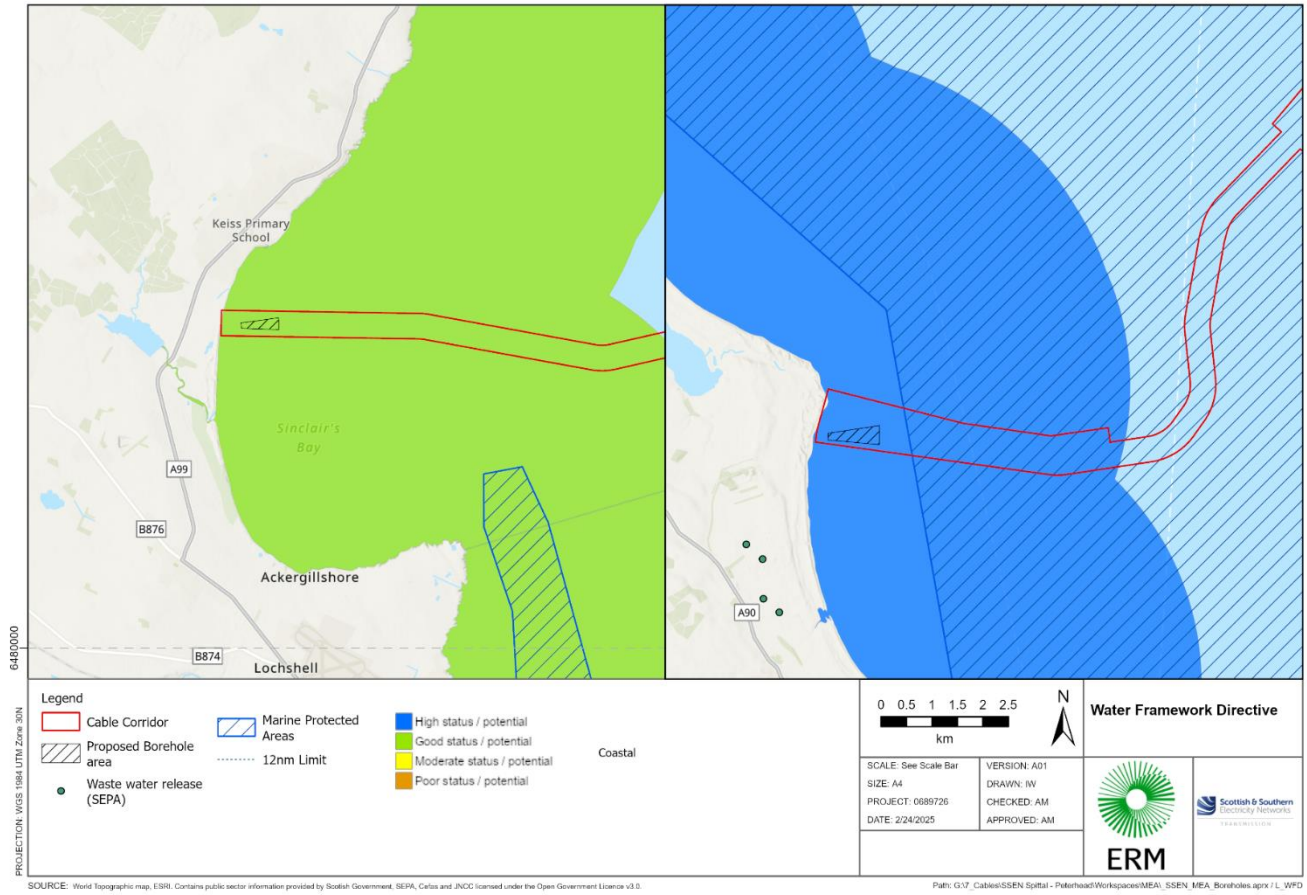
Environmental Quality

Environmental quality has been considered as both pathway and receptor. The integrity and quality of the physico-chemical elements can be directly or indirectly affected by activities associated with the proposed borehole campaign and, in turn, interact with, and function as, pathways to other biological and human receptors. Importantly, sediment and water quality are statutory quality elements of a WFD designated water body and, therefore, also considered receptors under the WFD (2000/60/EC).

6.9.2.2 STUDY AREA

The WFD and Environmental Quality Study Area, shown in **Figure 6-10**, comprises the proposed borehole campaign Study Areas plus the WFD coastal and transitional designated water bodies within 3 nautical miles (nm). These are identified based on the potential extent of sediment transport (physical and coastal process impact pathways) and sediment plume net drift and dispersion. These are in turn affected by tidal advection (determined by tidal ellipses and tidal excursion length).

FIGURE 6-10: WATER FRAMEWORK DIRECTIVE DESIGNATED WATER BODIES, THEIR STATUS, AND PROTECTED AREAS FOR SINCLAIR'S BAY AND RATTRAY HEAD (SCOTTISH GOVERNMENT, 2025).



6.9.3 BASELINE ENVIRONMENT

The Study Area includes the coastline at Sinclair's Bay (the northern landfall) and Rattray Head (southern landfall). A more detailed account of baseline physical conditions is included in **Section 6.1**. Detailed information on benthic ecology is available in **Section 6.1**.

6.9.3.1 SEDIMENT CHARACTERISTICS

Sediments in this area comprise primarily of sand and gravel, reducing the potential for metals' adsorption. In the Moray Firth region, a hazardous substances assessment in sediment and biota revealed metal inputs of some of the highest across all surveyed regions, with an increasing trend for mercury (Hg) (Marine Scotland, 2021). Surveys carried out along the cable corridor areas also revealed slightly elevated concentrations of lead (Pb). Additionally, slightly elevated arsenic (As) concentrations could, potentially, be present at the landfall areas, as it is of common occurrence in the North Sea (e.g. Salamander, 2024).

Metal contaminant concentrations within the subtidal nearshore and offshore regions reported metal concentrations below Action Level 1 (Benthic Solutions, 2024). The Total Hydrocarbon Content (THC) of sediments was low throughout the cable corridor with values ranging from 0.18 mg/kg to 9.86 mg/kg, with an average, in the subtidal region, of 2.39 mg/kg ±2.13 SD (Benthic Solutions, 2024).

Site-specific subtidal survey data show mixed source variability between the sampling locations, where PAH ranged between 0.0 µg/kg and 134.0 µg/kg (mean 15.5 µg/kg ±3.1 SD), with stations at KP 92.4 and KP 108.4 showing values above Action Level 1 (100 µg/kg). The average Total Organic Carbon (TOC) in the subtidal survey corridor was moderately low at 0.31% ±0.16 SD, with maximum TOC concentrations recorded at the offshore locations (0.94% at KP 67.4) (Benthic Solutions, 2024).

6.9.3.2 WATER CHARACTERISTICS

Sea surface salinity in the Moray Firth and the northern North Sea varies between 34 and 35.5 PSU (practical salinity units) and sea surface temperatures range between 7.5°C and 13.9°C (Marine Scotland, 2021). Suspended Solids Concentration (SSC) is generally low throughout, although seasonally variable, with annual surface concentrations averaging 0.7 mg/l (Cefas, 2018). Water samples with the highest levels of chemical contamination and nutrient concentrations are usually found at inshore estuaries and coastal sites subject to high industrial usage and urbanisation (Marine Scotland, 2021; Cefas, 2001). However, nutrient concentrations were below assessment criteria and relatively stable.

Overall, the Moray Firth showed no evidence of eutrophication as a consequence of nutrient enrichment (Marine Scotland, 2021). The water bodies have a water quality status of High and Good for the Cairnbulg Point to the Ugie Estuary and the Duncansby Head to Noss Head respectively.

6.9.3.3 WATER FRAMEWORK DIRECTIVE, DESIGNATED WATER BODIES AND WATER FRAMEWORK DIRECTIVE PROTECTED SITES

Water Bodies

The water bodies scoped into the assessment are presented below in **Table 6-7**.

TABLE 6-7: WFD WATER BODIES SCREENING

Water Body	River Basin District Name	Area	Type	Status 2022	Relation to activities
Duncansby Head to Noss Head (200219)	North Highland	173.5 km^2	Coastal	Good	Sinclair's Bay - Northern landfall
Cairnbulg Point to the Ugie Estuary (200142)	North East Scotland	127.8 km^2	Coastal	High	Rattray Head - Southern landfall

Bathing Waters

There are no designated bathing waters within 2 km of the southern landfall within the Cairnbulg Point to the Ugie Estuary waterbody, and the northern landfall site within the Duncansby Head to Noss Head water body.

Shellfish Waters

There are no designated Shellfish waters within 2 km of the Cairnbulg Point to the Ugie Estuary waterbody and the Duncansby Head to Noss Head water body.

Marine Protected Areas (MPAs)

MPAs located in the proximity to the WFD designated water bodies screened in the assessment are shown below. NCMPAs, SPA and SAC have been considered in the assessment, yellow sites represent the MPAs located within 2 km from the water bodies screened in. A more detailed account of MPAs, their designating features and the impacts are included in **Section 6.7** and **6.8**.

- The Southern Trench NCMPA - 0 km from Cairnbulg Point to the Ugie Estuary water body;
- Noss Head NCMPA – 0 km from Duncansby Head to Noss Head water body; and
- North Caithness Cliffs SPA - 0 km from Duncansby Head to Noss Head water body.

6.9.4 MARINE ENVIRONMENTAL ASSESSMENT

There will be a direct interaction between the proposed borehole campaign and the WFD and Environmental Quality receptors within the Sinclair's Bay and Rattray Head Study Areas, from drilling, extraction and backfilling.

Based on the worst-case parameters outlined in **Section 3**, Proposed Works's activities with the potential to impact the identified WFD and Environmental Quality receptors include:

Temporary localised seabed disturbance in relation to footprint of JUP feet/stabilisers is 162.944 m² calculated as:

Footprint of JUP rig (20.360 m²) x number of boreholes (8) + borehole area (0.008 m²) x number of boreholes (8)

Temporary localised disturbance via drilling of the boreholes releasing drill cuttings is 10,176 kg or 3.84 m^3 calculated as:

Estimated amount of drill cuttings released for each borehole = 1,272 kg (using 2.65 g/cm as density of drill cuttings)

Temporary disturbance via increased SSC and associated deposition (smothering - Siltation rate changes (light)) of drill arisings and bentonite discharge is 1.520 m² calculated as:

Temporary disturbance via smothering from deposition of drill arisings = (area of annular ring of deposited drill arisings minus borehole area (0.190 m²)) x number of boreholes (8))

6.9.4.1 TEMPORARY LOCALISED SEABED AND WATER COLUMN DISTURBANCE

Works associated with the proposed borehole campaign may result in direct and indirect disturbance of the seabed and water column and deterioration of the designated water bodies ecological status. Physical disturbances to the seabed substrate and the discharge of Water Based Muds (WBMs) will result in sediment suspension and a temporary increase in suspended sediment concentration in the water column. Direct sediment disturbance could also lead to the release of potentially contaminated sediments into the water column which are subsequently transported and dispersed in suspension by currents and deposited over various distances and directions.

Changes in the water quality as a pathway, can negatively impact the health of benthos, plankton and nekton (also considered WFD designated Water Bodies quality elements).

Sensitivity of Receptors

Water quality, sediment quality and WFD designated water bodies, can tolerate minor effects/impacts, enabling rapid recovery or adaption from localised disturbances due to the high energy and dynamic coastal environment. Therefore, the sensitivity of the water and sediment receptors has been assessed as **Low**. The sensitivity of the WFD designated water bodies has been assessed as **Medium**, due to the presence of sensitive benthic habitats.

Magnitude of Effect

The magnitude of temporary localised disturbance of seabed substrate is determined using the maximum extent of seabed footprint associated with the JUP ring and the boreholes, estimated at 162.944 m², corresponding to ≤0.01% of each of the WFD designated water bodies and overall, a small proportion of the seabed. The suspended sediment plume arising from the spudding and drilling activities will also remain limited in temporal and spatial extent.

The majority of the substrate in the area comprises coarser sediment such as sand, gravelly sand and sandy gravel and, therefore, although the suspended sediment concentration will be elevated immediately after the seabed disturbance, concentrations are predicted to fall to background levels within close proximity of the activity (Gooding *et al.,* 2012).

Overall, the disturbance generated by spudding and drilling of the boreholes will be highly localised and temporary (54 days duration – settled within two tidal cycles), the magnitude of this impact has been assessed as **Low** for all three receptors.

Assessment Conclusions

The Medium and Low sensitivity of the three receptors (WFD designated water bodies, water quality and sediment quality) combined with the Low magnitude of temporary localised disturbance of seabed substrate, is assessed as having a **Minor** effect. As such, the impact of temporary localised disturbance of seabed sediments is considered **Not Significant**.

6.9.4.2 PERSISTENT LOCALISED SEABED DEPOSITS

The proposed works will release drill cuttings and discharge of WBMs accumulating onto the seabed. The cuttings are likely to result in the mobilisation of seabed sediments and very short-term accumulation leading to nearly imperceptible substrate/habitat loss. This may result in the deterioration of sediment and water quality and the deterioration designated water bodies ecological status.

Sensitivity of Receptors

The sensitivity of the water quality and the sediment quality receptors to localised, persistent deposits have been assessed as **Low** respectively. The sensitivity of the WFD designated water bodies has been assessed as **Low,** due to the presence of relatively **Low** sensitive benthic habitats.

Magnitude of Effect

The magnitude of permanent (long term) localised deposits of drill cuttings on seabed substrate is determined using the predicted worst-case amount of cuttings released during the

Proposed Works, estimated at 10,176 kg or 3.84 m^3 in total, overall considered a very small amount.

The deposits generated by the release of borehole drill cuttings will be highly localised. Due to natural processes like resuspension by currents, wave climate and turbation, and nearbed transport, the footprint of any drill arisings is expected to winnow out and be redistributed and integrated into the surrounding environment, within 1-2 tidal cycles. Any impact is very short-term with a negligible seabed footprint. Additionally, the materials released are primarily composed of natural geological formations, such as rock fragments and minerals and do not contain potentially harmful compounds.

A small amount of persistent, natural deposits is expected to have minimal impact on the WFD designated water bodies, their quality elements and environmental quality receptors. The affected area will primarily be confined to the immediate vicinity of the drilling site. Overall, due to the limited spatial extent and the resilience of marine ecosystems, the magnitude of this impact has been assessed as **Low** for all three receptors.

Assessment Conclusions

The Medium and Low sensitivity of the three receptors, combined with the Low magnitude of localised persistent deposits, is assessed as having a **Minor** effect. As such, the impact of localised, persistent deposits is considered **Not Significant**.

6.9.5 ASSESSMENT SUMMARY

In summary, the impact assessed was deemed as localised and temporary, therefore **Not Significant** for the Environmental Quality receptors that are expected to overlap with the proposed borehole campaign. As such no mitigation or monitoring is required.

Furthermore, it has been determined that it is improbable that the proposed borehole campaign, will yield any significant, non-temporary effects on any WFD designated water body. The Proposed Works will not hinder and will support the achievement of WFD and RBMP objectives and therefore, the proposed borehole campaign is considered to be **WFD compliant**.

6.10 CUMULATIVE IMPACT ASSESSMENT

6.10.1 OVERVIEW

The CIA considers the combined potential impacts of the proposed borehole campaign with the impacts from other plans and projects, where they share relevant pathways of effect on appropriate receptors.

6.10.2 SCREENING OF PROJECTS FOR CONSIDERATION

Given the small scale, short-term and temporary nature of the proposed borehole campaign, only plans and projects within 1 km of the Sinclair's Bay Study Area and Rattray Head Study Area have been screened for consideration within the CIA. This area has been defined based on the area where physical changes to waves, tides, and sediment transport pathways may occur (**Section 6.1**).

Only plans and projects that are not yet operational or active, and that have the potential to overlap with the Project temporally and spatially are screened into the CIA. There are several categories of project not included, and therefore, are not considered further within the CIA. These are:

- Operational or active projects – these are considered within the baseline environment for each topic assessment; and
- Plans and projects at the pre-application stage that have not yet submitted a scoping report – these projects are in the early development stages and have not yet released finalised options or project parameters, making it difficult to determine the potential impacts that may contribute to cumulative impacts.

A list of plans and projects considered for screening is provided in **Table 6-8**.

TABLE 6-8: PLANS AND PROJECTS CONSIDERED FOR SCREENING IN THE CUMULATIVE IMPACT ASSESSMENT

Name	Current Status	Distance from Landfall Sites (km)	Screened In or OUT
Subsea7 Wick Pipeline Fabrication and Launch Site	Active	1.01	OUT
Sage pipeline	Active	1.18	OUT
36" Gas Brent A St. Fergus (FLAGS) pipeline	Active	1.93	OUT

As all plans and projects identified within 1 km of the Sinclair's Bay Study Area and Rattray Head Study Area are already operational/active they have already been considered within the baseline environment for each topic assessment and are therefore screened out of the CIA.

No plans and projects are screened into the CIA, as such there is no pathway for cumulative impacts to occur and therefore **No Cumulative Impacts** are predicted as a result of the proposed borehole campaign.

6.10.3 IN COMBINATION IMPACTS

In combination impacts have the potential to arise due to increased SSC associated with the proposed borehole campaign as well as impacts to other marine users due to increased vessel presence and loss of access to working areas of the proposed borehole campaign.

Any sand and coarse sediment suspended as a result of borehole drilling and backfilling will likely fall out of suspension immediately adjacent to the areas of seabed disturbance. The finer material may be transported further, but likely only a few hundred metres.

Materials deposited for backfilling will be composed of bentonite and compliant with ISO 19901-08 guidelines. Limited volumes of HDD drilling fluids may also be released in the instant that the drill head exits out onto the seabed. Drilling fluids will consist of bentonite clay grains and will occur only over a short time period and in small volumes.

The most sensitive benthic receptors of increased SSC, such as Annex I Biogenic (*Modiolus modiolus*) Reefs, are considered to have limited to no tolerance and low recoverability and are therefore considered to have a **High** sensitivity. However, all of the NCMPAs screened for assessment with benthic biodiversity features were screened out of assessment (**Section 6.8.2**). As such, **No Significant In combination Impacts** are predicted due to increased SSC as a result of the HDD drilling operations and the proposed borehole campaign.

Embedded mitigations such as the promulgation of information, including NtMs, and presence of guard vessels will notify other marine users of all construction and GI work for the Project and proposed borehole campaign. Any in combination impacts to other marine users would therefore be over a small spatial scale including a temporary 500 m exclusion zone. As such the magnitude will be **Negligible**.

Given the mobile nature of other marine users, they are considered to be tolerant and can adapt to temporary changes if needed, therefore their sensitivity is **Low.** Therefore, **No Significant In combination Impacts** are predicted for other marine users as a result of the HDD drilling operations and the proposed borehole campaign.

6.10.4 ASSESSMENT SUMMARY

No plans and projects are screened into the CIA, as such there is no pathway for cumulative impacts to occur and therefore **No Cumulative Impacts** are predicted as a result of the proposed borehole campaign.

No Significant In combination Impacts are predicted due to increased SSC associated with the proposed borehole campaign; as well as impacts to other marine user's vessels due to increased vessel presence and loss of access to working areas of the proposed borehole campaign.

7. CONCLUSION

The project description presented in **Section 3** outlines the marine activities proposed for the Spittal to Peterhead proposed borehole campaign. An indicative method statement has been used to inform the project description in order to give a realistic indication of the likely activities and durations of GI works that will be associated with the proposed borehole campaign. This allows for a realistic worst-case impact assessment to be undertaken, informed by specific footprints and durations, but which retains the flexibility required as the project enters detailed design and execution phases.

On the basis of known sensitivities, proposed activities and stakeholder feedback, specific impact assessments were undertaken for a number of topics:

- Physical Processes (**Section 6.1**);
- Benthic and Intertidal Ecology (**Section 6.1**);
- Marine Megafauna (**Section 6.3**);
- Ornithology (**Section 6.4**);
- Other Marine Users (**Section 6.5**);
- Marine Archaeology (**Section 6.6**);
- Habitats Regulations Appraisal (HRA) (**Section 6.7**);
- Nature Conservation Marine Protected Areas (NCMPA) Assessment (**Section 6.8**);
- Water Framework Directive Compliance (**Section 6.9**); and
- Cumulative Impacts Assessment (**Section 6.10**).

Where relevant, these impact assessments have considered interactions with protected sites, indirect impacts on other receptors and the potential for cumulative impact. As outlined in **Sections 6.1-6.10**, it is predicted that there will be **No Significant Effects** on the receptors identified as a result of the activities for the proposed borehole campaign. This is primarily due to the limited nature of the proposed activities, both temporally and spatially. A range of control and mitigation measures will also be implemented to ensure that any impacts are limited to an acceptable level. SSENT recognises that the effective implementation of these control and mitigation measures will be required to ensure that the proposed borehole campaign activities do not result in a significant impact.

A summary of impacts from this MEA can be found in **Table 7-1** below.

TABLE 7-1: SUMMARY OF IMPACTS

Topic	Assessment Conclusion
Physical Processes	No Significant Impact
Benthic Ecology	No Significant Impact
Marine Megafauna	No Significant Impact
Ornithology	No Significant Impact
Marine Archaeology	No Significant Impact
Other Marine Users	No Significant Impact
HRA	No Significant Impact
NCMPA Assessment	No Significant Impact
WFD	No Significant Impact (WFD Compliant)
Cumulative Impact Assessment	No Significant Impact

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APPENDICES

APPENDIX A HRA REGULATORY CONTEXT AND METHODOLOGY

A.1 REGULATORY CONTEXT

OVERVIEW OF THE HABITATS REGULATIONS ASSESSMENT PROCESS AND THE UNITED KINGDOM'S EXIT FROM THE EUROPEAN UNION

The Conservation (Natural Habitats, &c.) Regulations 1994 as amended , The Conservation of Habitats and Species Regulations 2017 (as amended) , and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended), transpose the EU Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known together as the Nature Directives), into UK and Scottish law.

Following the United Kingdom's exit from the European Union (EU), and the end of the transition period on 31 December 2020, legislation has been passed to transfer functions from the European Commission to the appropriate authorities in the UK and Scotland . While references in an EU context throughout the legislation have been re-defined to a UK only context, overall, the legislative changes do not result in material changes in how HRAs are undertaken in the UK. Habitat and species protection and standards will be implemented in the same or an equivalent way, maintaining existing protections for habitats and species. The environmental assessment regimes that inform planning decisions, including HRA, continue to apply post-EU exit.

HABITATS REGULATIONS SITE DESIGNATIONS

All European protected sites and species retain the same level of protection now that the UK has left the European Union. However, The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 now provide for the creation of a 'national site network' within the UK territory. This is comprised of the sites that had been already designated under the Nature Directives before exit day that formed part of Natura 2000, or, at any time on or after exit day, European sites, European marine sites and European offshore marine sites for the purposes of any of the retained transposing regulations.

Appropriate management objectives will be established for the national site network (the 'network objectives').

A.2 METHODOLOGY

STAGE 1 – SCREENING AND DETERMINATION OF LIKELY SIGNIFICANT EFFECT

The screening stage examines the likely effects of a project either alone, and/or in combination with other projects and plans on a European site and seeks to answer the question "*Can it be concluded that no likely significant effect will occur?*".

To determine if it cannot be excluded on the basis of objective evidence that the construction and/or operation of the Project[6] will have any significant effects on the designated sites, the issues listed below have been considered:

- Could the proposals affect the qualifying interest and are they sensitive/vulnerable to the effect?;
- The probability of the effect happening?;
- The likely consequences for the site's conservation objectives if the effect occurred?; and
- The magnitude, duration, and reversibility of the effect, considering any mitigation built into the Project design?

The screening stage will therefore conclude one of the outcomes listed below:

- No likely significant effect (LSE);
- A likely significant effect will occur; and
- It cannot be concluded that there will be no LSE.

Where the assessment concludes the second or third outcome, then the need for an Appropriate Assessment (AA) is triggered[7]. The screening assessment also must include a consideration of other projects and whether likely significant effects on European site may result in combination with these other projects.

STAGE 2 APPROPRIATE ASSESSMENT

Where an Appropriate Assessment (AA) is required, its aim is to determine if the effects of a project alone and/or in combination will have an adverse effect on European sites. AA should exclusively focus on the qualifying features of the European site and consider any effects on the conservation objectives of those qualifying interests. It must provide evidence for the regulator to be able to rule out all reasonable scientific doubt that the proposal would not have an adverse effect on the integrity of the site. EC guidance states that without proper reasoning the assessment does not fulfil its purpose and cannot be considered "*appropriate*". In terms of what is reasonable, guidance states:

"*to identify the potential risks, so far as they may be reasonably foreseeable in the light of such information as can be reasonably obtained*" (European Communities, 2000).

The AA contains two stages as listed below:

- A scientific evaluation of all the likely significant effects of a project alone, or in combination with other projects, on the relevant qualifying interests of a European site; and
- A conclusion, based on outcomes of the scientific evaluation, as to whether the integrity of a European site will be compromised.

The emphasis for AA is to prove that no adverse effects due to a project will occur which would undermine a European site's conservation integrity. Site integrity can be defined as:

[6] It has been assumed that any effects from decommissioning would be addressed in full by the Competent Authority closer to the time when it may occur, based on more specific information about the activities and processes involved, and also the prevailing environmental conditions.
[7] In the case of the third outcome, European guidance (Assessment of Plans and Projects Significantly affecting Natura 2000 sites (2001)) advises that sufficient uncertainty remains to indicate that an appropriate assessment should be carried out.

"*the coherence of its structure and function across its whole area that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*" (EC, 2000).

The assessment also needs to consider any measures which will be implemented to avoid or reduce the level of impact from a project. The Competent Authority may also consider the use of conditions or restrictions to help avoid adverse effects on site integrity.

If the AA concludes that there will be an adverse effect on the integrity of the European site, or that there is uncertainty and a precautionary approach is taken, then consent can only be granted through means of derogation, if there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) is applicable, and compensatory measures have been secured.

APPENDIX B NCMPA ASSESSMENT REGULATORY CONTEXT AND METHODOLOGY

B.1 LEGISLATION

Marine Protected Areas (MPAs) in Scottish territorial waters are designated under Section 67 of the Marine (Scotland) Act 2010[8]. The requirements in Section 83 of the Marine (Scotland) Act 2010, apply where the public authority has the function of determining an application (whenever made) for authorisation of the doing of any act, and whether the act is capable of affecting (other than insignificantly)—

> *"(i)a protected feature in a Nature Conservation MPA, …*
>
> *(iv)any ecological or geomorphological process on which the conservation of any protected feature in a Nature Conservation MPA [….] is (wholly or in part) dependent."*
>
> Section 83 also requires MD-LOT, as the public authority, to not grant authorisation for the doing of the act unless either—
>
> *"(a) the person applying for the authorisation satisfies the authority that there is no significant risk of the act hindering the achievement of (as the case may be)—*
>
> *(i) the stated conservation objectives for the Nature Conservation MPA,*
>
> *(b)that person is not able to satisfy the authority as mentioned in paragraph (a) but—*
>
> *(i) satisfies it that there is no other means of proceeding with the act which would create a substantially lower risk of hindering the achievement of those objectives or (as the case may be) that purpose,*
>
> *(ii) satisfies it that the benefit to the public of proceeding with the act clearly outweighs the risk of damage to the environment that will be created by proceeding with it, and*
>
> *(iii) satisfies it and the Scottish Ministers that the person will undertake, or make arrangements for, the undertaking of, measures of equivalent environmental benefit to the damage which the act will or is likely to have in or on the marine protected area concerned."*

MPAs in Scottish offshore waters (i.e. beyond 12 nautical miles (nm)) are designated under section 116 of the Marine and Coastal Access Act 2009[9] (MCAA). Section 126 of the MCAA details duties of public authorities in relation to certain decisions where a public authority has the function of determining an application (whenever made) for authorisation of the doing of an act, where the act is capable of affecting (other than insignificantly)—

> "*(i) the protected features of an MCZ (Marine Conservation Zone);*
>
> *(ii) any ecological or geomorphological process on which the conservation of any protected feature of an MCZ is (wholly or in part) dependent*."

The authority is not permitted to grant authorisation for the act in question unless the applicant seeking the authorisation has satisfied them that there is no significant risk or that the three conditions in subsection 7 have been met. These conditions are that —

[8] https://www.legislation.gov.uk/asp/2010/5/contents
[9] https://www.legislation.gov.uk/asp/2010/5/contents

"(a) there is no other means of proceeding with the act which would create a substantially lower risk of hindering the achievement of those objectives,

(b) the benefit to the public of proceeding with the act clearly outweighs the risk of damage to the environment that will be created by proceeding with it, and

(c) the person seeking the authorisation will undertake, or make arrangements for the undertaking of, measures of equivalent environmental benefit to the damage which the act will or is likely to have in or on the MCZ."

It should be noted that under section 116 (7) of the MCAA, an MCZ designated by the Scottish Ministers is to be known as an MPA.

B.2 METHODOLOGY

Under section 126 of the MCAA, and section 83 of the Marine (Scotland) Act 2010, the public authority is initially required, when determining consenting application, to consider whether the activity applied for is capable of affecting (other than insignificantly) a protected feature in an MPA or any ecological or geomorphological process on which the conservation of any protected feature in an MPA is dependent.

The overall process of this assessment has been considered in the following sub-sections.

It is understood that during the process, consultation is sought from the appropriate statutory nature conservation bodies (SNCBs)[10].

In the absence of formal guidance from MD-LOT in relation to the assessment of NCMPAs during the licence decision making process, the Marine Management Organisation (MMO) guidance (2013) for MCZ assessments has been applied here.

The MMO guidelines (2013) are a staged approach, comprising three sequential stages:

- **Screening**;
- **Stage 1 Assessment**; and
- **Stage 2 Assessment**.

The MCAA and the Marine (Scotland) Act 2010 does not provide any legislative requirement for explicit consideration of in combination or CIA to be undertaken when assessing the impacts of licensable activities upon an NCMPA (MMO, 2013). However, the MMO considers that in combination and cumulative effects must be considered for their full discharge of duties under Section 69 (1) of the MCAA.

SCREENING

Screening focusses on what can reasonably be predicted as a result of the proposal, and whether it is capable of affecting (other than insignificantly) the protected features of an NCMPA. This stage should result in removing from further consideration all pressures/operations which are not in any way connected to the protected feature(s).

[10] NatureScot for NCMPAs within 12 nautical miles (nm) or the Joint Nature Conservation Committee (JNCC) for MPAs out with 12 nm.

Screening uses information that is currently available on the activities applied for, and considers aspects such as the scale, timing, and duration of proposed activities/developments, either within an NCMPA, or beyond it, to identify suitable Zones of Influence (ZoI). It will also consider, where appropriate, the location of the feature, its mobility, and forging ranges (e.g. for ornithological features).

'Capable of affecting' is a simple test that assesses whether operations interact spatially or temporally with an NCMPA, either directly or indirectly. Understanding whether there is an effect (other than insignificantly) can involve assessing whether any features are sensitive to pressures interacting spatially and temporally.

In order to determine if the proposed activity may take place within, or near to, an area being put forward for, or already designated as, an NCMPA, the following risk-based approaches are used. An appropriate buffer, that exceeds the ZoI, is used as a screening distance that allows for a consideration of both direct and indirect potential impacts arising from the Project on NCMPAs.

To determine whether the proposed activity may be capable of affecting (other than insignificantly) the protected features of an NCMPA, or any ecological or geomorphological process on which the conservation of any protected feature of an NCMPA is (wholly or in part) dependent, the following evidence and information are then used:

- MPA Site documentation;
- MPA Conservation and Management Advice documentation;
- NatureScot Feature Activity Sensitivity Tool (FeAST) (FeAST, 2024);
- The Marine Life Information Network - Marine Evidence based Sensitivity Assessment (MarESA) (Tyler-Walters *et al*., 2023);
- Joint Nature Conservation Committee (JNCC) Marine Habitat Classification for Britain and Ireland (JNCC, 2022);
- European Environment Agency (EEA) European Natural Information System (EUNIS) habitat classification (EEA, 2022); and
- Scientific reports and peer-reviewed literature.

Screening results should include advice provided by the SNCBs and regulators on which sites should be included in the MPA Assessment.

Where it is concluded that the activity is capable of affecting (other than insignificantly) the protected features of an MPA, then a Stage 1 Assessment must be carried out to consider impact against the conservation objectives of the site features.

Based on the application of the MMO (2013) guidance to Scottish MPAs discussed above, it is considered that Section 83 of the Marine (Scotland) Act 2010 would apply if it is determined through the course of screening that:

"*the activity is capable of affecting (other than insignificantly) either: (i) a protected feature in a Nature Conservation MPA; (ii) a stated purpose for a Demonstration and Research MPA; (iii) a marine historic asset in a Historic MPA; or (iv) any ecological or geomorphological process on which the conservation of any protected feature in a Nature Conservation MPA, or on which the stated purpose for a Demonstration and Research MPA, is (wholly or in part) dependent*".

STAGE 1 ASSESSMENT

Section 83(4)(a) and (b) requires MD-LOT, as the public authority, to not grant authorisation for the doing of the act unless the authority is satisfied that there is no significant risk of the act hindering the achievement of the stated conservation objectives for the Nature Conservation MPA. Equally, Section 126(1) and (7) require a public authority to not authorise an act unless the person seeking authorisation satisfies the authority that there is no significant risk of the act hindering the achievement of the conservation objectives stated for the MCZ.

These are considered a 'Stage 1' assessment.

In determining 'significant risk of hindering', the Marine Scotland (2014a) guidance states "*The assessment should build on the initial screening assessment that considers the pressures associated with the activity and the sensitivity of the protected features, and information on the likely spatial overlap. To determine whether there is a 'significant risk of hindering' the achievement of the conservation objectives of the protected features of a nature conservation MPA aspects such as the intensity, frequency, and duration of any activities associated with the function or act should be considered*."

Within this stage of assessment, hindrance of objectives is considered to be any operation that could, either alone or in combination, directly or indirectly:

- In the case of a conservation objective of 'maintain', increase the likelihood that the current status of a feature would go downwards (e.g. from favourable to degraded) either immediately or in the future; or
- In the case of a conservation objective of 'recover', decrease the likelihood that the current status of a feature could move upwards (e.g. from degraded to favourable) either immediately or in the future.

Conservation advice is available for NCMPAs on Nature Scot's Site Link webpages (NatureScot, 2024). The Conservation and Management Advice provides advice on activities that may affect the protected features of NCMPAs, as well as on matters which are capable of damaging, or otherwise affecting, the protected features of the NCMPA, and how the Conservation Objectives of the site may be furthered or their achievement hindered.

The Stage 1 NCMPA assessment considers the direct and indirect impact-receptor pathways of each of the attributes, for all protected features of the relevant NCMPAs, to assess whether there may be a significant risk to the conservation objectives of the NCMPA. This draws on information presented within the relevant chapters of the MEA, as well as the FeAST tool, which allows understanding of the pressures and receptor sensitivities to those pressures. The assessment then considers whether the Project is likely to hinder achievement of conservation objectives for the sites.

Consultation with relevant SNCBs and other advisors may be undertaken at this stage.

Where it is concluded that the activity is capable of hindering the conservation objectives of an NCMPA, either directly or indirectly, alone or cumulatively, then a Stage 2 Assessment derogation assessment must be carried out before authorisation can occur.

STAGE 2 ASSESSMENT

The Stage 2 assessment will consider whether the conditions in Section 83(4)(b) can be met, by consideration of whether the benefit to the public of proceeding with the act, clearly outweigh the risk of damage to the environment that will be created by proceeding with it; and, if so, then whether MD LOT can be satisfied that arrangements will be made for the undertaking of measures of equivalent environmental benefit, to the damage which the act will, or is likely to, have, in or on, the NCMPA.

CUMULATIVE ASSESSMENT

Some projects may be unlikely to have significant effects on their own, but cumulative effects with other plans or projects may be significant. It must, therefore, be concluded, whether the plan or project, cumulative with other plans or projects, is capable of hindering the conservation objectives in an NCMPA.

Various key public sources can be consulted to identify a 'long list' of plans and projects in the area, and these may include the following:

- 4C Offshore Global Offshore Maps (4C Offshore, 2024);
- The Crown Estate Scotland/Outreach a'Chrùin Alba) Spatial Data Hub;
- National Marine Plan Interactive (NMPi) (Marine Scotland, 2024);
- Global Renewables Infrastructure Projects (GRIP) Database (RCG, 2024); and
- The North Sea Transition Authority (NSTA) Offshore Oil and Gas Activity (NSTA, 2023).

Those reasonably foreseeable projects and plans that are to be located within the region of the project will be considered. However, assessments will also be cognisant of highly mobile receptors, such as birds and marine mammals, that may interact with a project across wider scales. Of the 'long list' of plans or projects that are of relevance, a 'short list' is then identified. For the purpose of this assessment, projects and plans that are fully implemented and in operation are not considered under the cumulative assessment, as they will have been considered under the baseline environment. However, where it is identified that there are ongoing impacts from built and operational projects, these are to be considered within the baseline environment of each of the relevant topic chapters within the CIA section (**Section 6.10**).

It is important to note that a cumulative list of plans and projects for an NCMPA, may be different to the cumulative/in combination list for different types of assessments (e.g. HRA, EIA/MEA, and MCZ assessments).

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