Eastern Green Link 3

Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening

Prepared for: Scottish Hydro Electric Transmission plc (SHE-T)

Scottish & Southern Electricity Networks
TRANSMISSION

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Abbreviations/Glossary

Abbreviation	Description
CEA	Collaborative Environmental Advisers
CGNS	Celtic and Greater North Seas
CLV	Cable Lay Vessel
CSV	Construction Support Vessel
EEZ	Exclusive Economic Zone
EGL	Eastern Green Link
EMF	Electromagnetic Field
EUNIS	European Nature Information System
GNS	Greater North Sea
GW	Gigawatt
HDD	Horizontal Directional Drilling
HF	High Frequency
HPMA	Highly Protected Marine Area
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICG-C	Intersessional Group on Cumulative Effects
IDP	Initial Decommissioning Plan
JNCC	Joint Nature Conservation Committee
km	Kilometre
kV	Kilovolt
LF	Low Frequency
m	Metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multi Beam Echo Sounder
MCAA	Marine and Coastal Access Act 2009
MCZ	Marine Conservation Zone
MD-LOT	Marine Directorate – Licensing Operations Team
MEA	Marine Environmental Appraisal
MIG-Birds	Marine Industry Group for Ornithology
MINNS	Marine Invasive Non-Native Species
MLA	Marine Licence Application
MMO	Marine Management Organisation
MoD	Ministry of Defence
MPA	Marine Protected Area
MU	Management Unit
NCMPA	Nature Conservation Marine Protected Area
NE	Natural England
NM	Nautical Mile
OSPAR	Oslo and Paris convention for the Protection of the Marine environment of the North-East Atlantic
OWF	Offshore Wind Farm

PAH	Polycyclic Aromatic Hydrocarbons
PCW	Phocid Carnivores in Water
PEIR	Preliminary Environmental Information Report
PLGR	Pre-Lay Grapnel Run
PMF	Priority Marine Feature
PTS	Permanent Threshold Shift
pUXO	Potential Unexploded Ordnance
RLB	Red Line Boundary
ROV	Remoley Operated Vehicle
SAC	Special Areas of Conservation
SD	Standard Deviation
SHE-T	Scottish Hydro Electric Transmission
SNCBs	Statutory Nature Conservation Bodies
TTS	Temporary Threshold Shift
UK	United Kingdom
µT	Microtesla
USBL	Ultra Short Baseline
UXO	Unexploded Ordnance
VHF	Very High Frequency
ZoI	Zone of Influence

1. Introduction

1.1. Scope of this Report

The Eastern Green Link 3 (EGL 3) (hereinafter referred to as the 'Project') is being developed by Scottish Hydro Electric Transmission plc operating and known as Scottish and Southern Electricity Networks Transmission (SSEN Transmission) (the 'Applicant'). This report is part of the Applicant's Marine Licence Application (MLA) to the Marine Directorate – Licensing Operations Team (MD-LOT) for the construction and operation of the proposed EGL 3 grid reinforcement. For the purposes of necessary consents, the Project has been split into different 'Schemes' i.e. English Onshore Scheme, English Offshore Scheme, Scottish Onshore Scheme and the Scottish Offshore Scheme (with the latter hereafter referred to as the 'Proposed Development'), and this report is written with specific regard to the Proposed Development. As part of the MLA process in Scotland, MD-LOT is required to complete a Marine Protected Area (MPA) Assessment for the Proposed Development under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 (MCAA), due to the Proposed Development's interaction with a Marine Protected Area.

Although this report considers the Proposed Development, any Marine Conservation Zones (MCZs) or Highly Protected Marine Areas (HPMAs) in English waters which could be impacted by the Proposed Development must also be considered under the MCAA. MCZs, HPMAs and Nature Conservation Marine Protected Areas (NCMPAs) are collectively referred to as 'MPAs' in this report. This report aims to support the MPA Assessment process and provide the necessary information to MD-LOT to assist them in making an informed decision on the likely impact of the Proposed Development on MPAs and their designated features. This document encompasses the Stage 1 Initial Screening of the MPA Assessment process.

This report has been prepared, to accompany the Marine Environmental Appraisal (MEAp) to support the MLA. The report sets out the Applicant's approach to the MPA Assessment process, and records the findings, reasoning and conclusions in relation to their screening of the Proposed Development.

Where (and if) it is considered that the Proposed Development is capable of affecting (other than insignificantly) the protected features of an MPA or the ecological or geomorphological processes on which the protected features are dependent, the site will be 'screened in' and a Stage 2 Main Assessment must be carried out, in consideration of the conservation objectives of the MPA. Where the Proposed Development is not considered capable of affecting any of the protected features of an MPA due to a lack of pathway, a Stage 2 Main Assessment of the MPA and associated features is not required.

This Stage 1 Initial Screening report considers all phases of the Proposed Development: construction, operation (including repair and maintenance) and decommissioning. All assumptions made with respect to the project description are clearly outlined, and where engineering details are uncertain, maximum design parameters have been used to provide a worst-case assessment. The examination, analysis and evaluation of the relevant information that supported the Stage 1 Initial Screening process conducted and documented in this report followed the precautionary principle throughout. Stage 1 Initial Screening has been undertaken without the inclusion of mitigation measures.

The aim of the report is to seek agreement from MD-LOT and the statutory nature conservation bodies (SNCBs) such as NatureScot on the Stage 1 Initial Screening presented and the content of the MPA Assessment to be submitted with the MLA.

1.2. Overview of the Project

The Project comprises a 2-gigawatt (GW) High Voltage Direct Current (HVDC) system linking Aberdeenshire in Scotland and Lincolnshire in England. This MPA Assessment Stage 1 Initial Screening report is written with specific regard to the Proposed Development for which a single MLA will be made. The Proposed Development comprises:

- Approximately 145 km of subsea HVDC cable from the landfall at Sandford Bay to the boundary with adjacent English waters. The subsea cable system would consist of two bundled HVDC cables and a fibre optic cable (up to the first offshore joint) for control and monitoring purposes, as described further in **Chapter 3: Project Description**.

The location of the Proposed Development is illustrated by the Red Line Boundary (RLB) in **Chapter 3: Project Description, Figure 3-1 (Drawing reference C01494-EGL3-MEA-LOC-001).** The RLB is presently the anticipated maximum extent of seabed in which the construction and operation of the Proposed Development may take place. The RLB covers the entire area within which development could take place comprised of both temporary and permanent components of the Proposed Development. These include the proposed seabed preparation and maintenance works which would take place.

It is noted that laying and burial of the submarine cables within territorial waters (i.e., within 12 nautical miles (NM)) requires a Marine Licence under the Marine (Scotland) Act 2010. However, within the Scottish offshore region (between 12 and 200 NM), licensing falls under the MCAA and within offshore waters the installation of an international electricity cable is exempt from requiring a Marine

Licence under Section 81(2) of the MCAA. The placement of cable protection material e.g., concrete mattresses or rock would still qualify as a licensable activity in the Scottish offshore region and therefore would require a Marine Licence under MCAA.

1.3. Structure of the Report

This report is structured into the following sections to include information relating to the MPA process, relevant MPAs, and potential impacts.). Specifically, the structure of this report is as follows:

- Section 1: Introduction to the Report (this section);
- Section 2: Project Description (outlines the key aspects of the Proposed Development relevant to the MPA process);
- Section 3: Overview of the MPA Assessment Process (outlines key aspects of the MPA process and sets the legislative context);
- Section 4: Screening Approach;
- Section 5: Identification of Relevant MPAs;
- Section 6: Potential Impact Pathways;
- Section 7: Screening Assessment; and
- Section 8: Stage 1 Screening Conclusion.

1.4. Competent Experts

This report was prepared by the team at Collaborative Environmental Advisers (CEA) and quality checked and approved by a marine specialist who has a career spanning 20 years+ in development of marine infrastructure. This marine specialist also holds a BSc in Marine Biology and an MRes in Marine Technology.

2. Project Description

2.1. Proposed Development

A full description of the Proposed Development is provided in **Chapter 3: Project Description**. The Project comprises a 2 GW HDVC submarine cable that extends from the mean high water springs mark at Anderby Creek Landfall, Theddlethorpe, Lincolnshire, to Sandford Bay landfall, Peterhead, Aberdeenshire through English and Scottish territorial waters and the UK Exclusive Economic Zone (EEZ). This report is however focussed on the Proposed Development comprising HVDC submarine cable from Sandford Bay, Peterhead to the boundary with English adjacent waters. The location of the Proposed Development is illustrated by the Red Line Boundary (RLB) in **Chapter 3: Project Description**, **Figure 3-1 (Drawing reference C01494-EGL3-MEA-LOC-001).**

The construction programme for the Proposed Development is expected to take approximately 55 months, commencing in 2028 with pre-lay activities. Works at the landfall may commence in 2028 / 2029 with installation of the horizontal directional drilling (HDD) and ducts ahead of the main works. A summary of the key maximum design parameters for the Proposed Development are shown below in **Table 2-1**.

Table 2-1: Summary of the Proposed Development key maximum design parameters

Parameter	Maximum design parameter
RLB width	The surveyed corridor is 500 m wide but widens in certain sections to allow for future micro-routing around seabed features such as sand waves, challenging seabed conditions or sensitive habitats.
HDVC cable length	~ 145 km
HVDC cables configuration	Bi-pole (one cable per pole)
HVDC cables number	Two
HVDC cables transmission Capacity	2 GW
HVDC cables operating voltage	525 kV
HVDC cables outer diameter	150-190 mm
Fibre optic cable number	One
Fibre optic cable outer diameter	20-30 mm
Cable trench number	One

Parameter	Maximum design parameter
Cable trench maximum depth	3 m below non-mobile reference level
Cable trench maximum width	5 m
Cable trench disturbed area	20 m
Maximum width of cable protection	10 m
Indicative cable burial depth	2.5 m
Footprint of cable installation equipment	16 m
Indicative area of seabed disturbed by cable installation	2.32 km^2
Length of cable requiring boulder clearance using SCAR plough	50 km (estimated from length of boulder fields) in Scottish waters <32% of Scottish Section
Width of plough/cleared swathe	17 m swathe cleared
Total area of seabed disturbed by boulder plough	0.85 km^2
Depth of seabed disturbed by clearance plough	~10 cm (<2 m if trenching)
Length of cable requiring Pre-Lay Grapnel Run (PLGR)	145 km
Width of PLGR clearance corridor	30 m
Total area of seabed disturbed by PLGR	4.35 km^2
Maximum pre-sweeping clearance width	20 m
Length of cable requiring pre-sweeping	3.5 km
Total area of seabed disturbed by pre-sweeping	0.07 km^2
Maximum volume of sediment disturbed by pre-sweeping	1,000 m^3
Indicative Length of Cable requiring cable protection (excluding infrastructure crossings)	10 km
Maximum width of cable protection on seabed	10 m
Maximum height of cable protection berm	1.5 m
Maximum area of seabed covered by cable protection (excluding infrastructure crossings)	0.1 km^2
Total number of crossings required	Up to 7
Typical length of crossing	500 m (at some locations crossings may be combined due to proximity of infrastructure)
Maximum width of crossing	10 m
Maximum height of rock berm	2 m
Total area of seabed covered by cable crossings	0.035 km^2
Maximum area of seabed covered by cable protection (including infrastructure crossings)	0.135 km^2

2.1.1. Cable Configuration

The HVDC cables would each comprise two single core metallic conductors (one positive, one negative) and a fibre optic cable. The cable would be installed as a single bundle of two conductors and the fibre optic cable laid in a single trench as illustrated in **Figure 2-1**. As the cables approach the landfall the cables would be unbundled and each core passed through its own duct and there would be a spare duct providing flexibility for potential future repairs. Three ducts in total would be installed at the landfall.

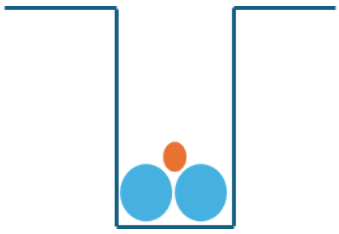


Figure 2-1: Indicative configuration of cables within the trenches

2.1.2. Pre-construction activities

Prior to the commencement of the HVDC cable installation, it is essential to ensure that the seabed is clear of obstructions that may hinder the construction works. Seabed preparation (PLGR, boulder clearance, pre-sweeping, infrastructure crossing preparation) is expected to involve clearance activities to ensure the seabed is clear of boulders, dropped object debris, and other obstacles.

Seabed surveys will be carried out prior to installation by the contractor to reconfirm existing geotechnical and geophysical information regarding seabed conditions, bathymetry, and other seabed features. Surveys may include the use of a multibeam echosounder, side-scan sonar, sub-bottom profiler or magnetometer. In addition, visual inspections may also be undertaken using a remotely operated vehicle or other visual inspection system. Pre-construction surveys may also include additional specialist studies, including geotechnical, benthic, and unexploded ordnance (UXO) investigations.

A UXO survey would be undertaken as part of the pre-construction surveys. The results of the survey will be used to identify potential UXO (pUXO). The Proposed Development would seek to avoid pUXO where possible through careful micro-routeing of the cables. If pUXO cannot be avoided, then further investigations would be undertaken to determine if the pUXO is UXO or ferrous debris, using a diver or remotely operated vehicle (ROV) equipped with magnetometer, dredge pump and sonar. If a target is confirmed as UXO, clearance activities may be undertaken. It is assumed that UXO clearance will be undertaken under a separate MLA under part 4 of the Marine (Scotland) Act 2010 and part 4 of the MCAA, subject to its own environmental assessments. Therefore, the consideration of UXO clearance is excluded from this MLA and MPA Stage 1 Initial Screening.

2.1.3. Construction activities

2.1.3.1. Cable installation

Following completion of the preparation activities, the cable would then be transported to the site ready for cable laying. The cable would either be laid directly on the seabed for later burial or would be directed into a burial tool for burial into the seabed. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m.

There are a range of burial tools and techniques that could be used to bury the subsea HVDC cable. The selection of the tool would be based on numerous factors including the seabed geology and mobility, burial depth to be achieved, the installation contractor selected, proximity to existing infrastructure and environmental sensitivities and mitigation defined during the assessment process. The following burial tools could be used:

- Cable plough;
- Jet trenching and/or vertical injector;
- Cutting; and
- Controlled flow excavation.

External cable protection may be required in various areas along the subsea HVDC cable. Areas that require protection would include infrastructure crossings and areas where depth of burial cannot be achieved. Options for providing external protection include:

- Rock placement;
- Concrete mattresses;
- Flow dissipation devices;
- Protective coverings, claddings or pipes;
- Rock, gravel/sand bags;
- Sand backfill; and
- Nature inclusive design.

2.1.3.2. Sandford Bay Landfall

There would be up to three high density polyethylene ducts installed exiting in the nearshore (between 0 m and 12 m LAT). Depending on the final design and depth of the ducts, there would be a 25 m separation between adjacent drill HDD exit points. The HDD entry point would be located onshore and directed out to sea reaching 25 m at its maximum depth. For each borehole, a pilot hole would be drilled and then widened to the full diameter required. The primary HDD activity that interacts with the offshore environment is where the HDD breaks through the sediment (or punches out) onto the seabed. The HDD works would broadly involve the following activities:

- Mobilisation and aligning the HDD rig;
- Pilot hole drilling;
- Forward reaming;
- Excavation of HDD pits (if required);
- Punch out;
- Installation of ducts;
- Demobilisation;
- Re-excavating the HDD pits (if required); and
- Pulling of cables.

2.1.3.3. Construction vessels

Table 2-2 provides an indication of the types of vessels to be used during construction based on experience on other projects. Vessels will typically transit in a linear manner along the Proposed Development. However, their port of origins are unknown at this stage and will not be known until an installation contractor has been appointed.

Table 2-2: Indicative vessel requirements for the Proposed Development

Construction activity	Indicative vessel requirements for the Proposed Development
Preconstruction survey	1 x survey vessel
UXO identification	1 x construction support vessels (CSVs)
Boulder clearance	1 x CSV
Sandwave pre-sweeping	1 x CSV
Crossing preparation	1 x CSV 1x rock placement vessel
PLGR	1x CSV
Sandford Bay landfall enabling works	1 x jack up barge / multicat 1 x tug 1 x crew transfer vessel 2 x small workboats
Cable lay and burial	1 x CLV 1 x CSV 2 x tug / anchor handlers 5 x guard vessels 1 x rock placement vessel

2.1.4. Operation and maintenance

The Proposed Development would be designed to minimise any maintenance requirements. Following installation, routine maintenance of the HVDC subsea cables is not anticipated, however, the following activities may be periodically required during the operational phase:

- inspection surveys, including geophysical surveys;
- cable repair (if required) (noting that emergency repairs requiring immediate action are exempt and therefore not included in this application); and
- reburial, remedial protection or maintenance and reinstatement of external cable protection features.

Geophysical surveys would be undertaken periodically to monitor cable burial and the status of external cable protection e.g., remedial or at infrastructure crossings. If results of the as-laid survey show that the Proposed Development is not at the required burial depth or has become exposed, remedial works could be undertaken. Additional surveys may be undertaken after storm events which exceeded the design conditions. Surveys would use the standard suite of geophysical techniques (i.e., multibeam echosounder, side-scan sonar, sub-bottom profiler, magnetometer etc). Nearshore and offshore survey vessels or an automated underwater vehicle would be used.

Should a fault be identified by the cable monitoring system, it would be necessary to access the relevant location of the fault and retrieve the cable to the surface for inspection. The damaged section would then be repaired or replaced. The most common reason for a repair of a subsea cable is damage caused by third parties, typically by a vessel anchor strike on a shallow or exposed cable segment.

A cable repair would typically be carried out by a single vessel. For a shallow water repair, in less than 10 m of water, an anchored barge would typically be used. In deeper water, a dynamic positioning cable vessel would be used. Vessels carrying out cable repair operations are restricted in their ability to manoeuvre and divers and/or ROV would be expected to be used with associated vessels.

2.1.5. Decommissioning

The minimum design life of the Proposed Development subsea cables is 40 years, although with repairs, some cable systems last upwards of 60 years. The Proposed Development will require a Licence or Lease from Crown Estate Scotland. An Initial Decommissioning Plan (IDP) will be written once the final route and construction methodology is chosen and it may be a condition of the Marine Licence for the Proposed Development (if granted) that the IDP should be approved by MD-LOT (and potentially other consultees) before construction can commence. This is a legal requirement necessary to secure the Crown Estate Scotland Lease or Licence. The IDP will form the basis of the Final Decommissioning Plan which would be developed in consultation with Crown Estate Scotland and in line with the following decommissioning principles:

- The measures and methods for any decommissioning would comply with any legal obligations which would apply to the decommissioning of the Proposed Development when it takes place;
- All sections of the cables within 12 NM would be removed except for any section or sections which are preferable to leave in situ having regard to the principles below:
    - that the measures and methods for any decommissioning are the best for, or minimise the risks to:
        - the safety of surface or subsurface navigation;
        - other uses of the sea;
        - the marine environment including living resources; and/or; and
        - health and safety.
    - The seabed would be restored, as reasonably as possible and to the extent reasonably practicable, to the condition that it was in before the cable was installed.

The IDP is periodically reviewed and updated in line with the applicable guidance and regulations at the time of writing.

The full environmental impact of works required to decommission the Proposed Development would be assessed at the time of decommissioning and a separate Marine Licence would be applied for in relating to any decommissioning works proposed. Removal of the subsea cable is a similar process to the installation of the cable, but in reverse. The environmental impact can therefore not be fully assessed until the environmental conditions at the time of decommissioning are established.

There are currently no specific plans to decommission the Proposed Development. It is expected that the transmission of electricity would continue for as long as there is a business case for doing so and that any decommissioning activity would occur decades into the future. It is anticipated that rather than being decommissioned, parts would be replaced to extend the operational life of the Proposed Development. A high-level assessment of the impact of cable removal is provided in this document to provide a holistic overview of potential impacts.

3. Overview of the MPA Assessment Process

3.1.1. Legislative context

Section 126 (6) of the of the MCAA and Section 83 (4) of the Marine (Scotland) Act 2010 requires that applicants seeking to undertake an activity must satisfy the competent authority that there is no significant risk of the proposed activity hindering the achievement of the conservation objectives stated for the NCMPA. Although this report considers the Proposed Development in Scottish waters, any English MCZs or HPMAs which could be impacted must also be considered under the MCAA. Nature Conservation Marine Protected Areas: Draft Management Handbook (Marine Scotland, 2013) and NatureScot, (2025) recommends a two staged sequential

assessment process for assessing the effects of a project on an NCMPA, with the outcome of each staging informing whether the assessment progresses to the next stage, as follows:

- **Stage 1 - Initial Screening**: The process of identifying whether section 126 of the MCAA and section 83 of the Marine (Scotland) Act 2010 should apply to the Proposed Development. Initial Screening identifies whether the proposed activity and/or development is capable of affecting (other than insignificantly) the protected features of the NCMPA. If the proposal is not screened out, the Stage 1 Initial Screening will progress to a Stage 2 Main Assessment.
- **Stage 2 - Main Assessment:** This stage considers whether there is a significant risk of proposed activity and/or development hindering the achievement of the conservation objectives stated for the NCMPA. The regulator can grant authorisation if it is satisfied that there will not be a significant risk. If the regulator cannot determine that there will be no significant risk of the activity hindering the achievement of the conservation objectives, authorisation can still be granted if the regulator is satisfied that:
    1. there is no alternative that would have a lower risk of hindering the conservation objectives of the NCMPA;
    2. the public benefit outweighs the environmental impact; and
    3. the applicant will arrange for measures of equivalent environmental benefit to offset the anticipated damage.

An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

The MPA Assessment is undertaken by the competent authority, which for the Proposed Development is MD-LOT, based on information provided by the Applicant, usually in the form of an MPA Assessment Report. In English Waters, an equivalent assessment will be provided as part of the Development Consent Order application to the Secretary of State under the Planning Act 2008 by National Grid Electricity Transmission. . Therefore, the required assessments will be provided for the whole Project.

4. Screening Approach

4.1. Approach

To determine whether Section 126 of the MCAA or Section 83 of the Marine (Scotland) Act 2010 applies to any MPAs, it is necessary to understand and assess whether the protected features:

- can come into contact with the licensable activity; and
- are sensitive to the proposed activities i.e., the activity is likely to have a significant adverse effect on the designated feature(s).

The following statements are guidance taken from The Nature Conservation Marine Protected Areas: Draft Management Handbook (Marine Scotland, 2013):

'*This initial screening stage should focus on what can reasonably be predicted as a consequence of the proposal and whether it is 'capable of affecting (other than insignificantly)' a protected feature of a NC MPA. This section sets out the approach that should be followed when considering applications for developments or activities. The same approach should also be followed when considering the functions carried out by public authorities*.'

'*The screening should use information that is currently available and consider aspects such as the scale, timing and duration of proposed activities/developments. These considerations should include proposals for developments or activities out with the boundary of a NC MPA*.'

'*Firstly, consideration of 'capable of affecting' should result in removing from further consideration all proposals / functions which are not in any way connected to the protected feature(s). A capability that is both remote (in terms of likelihood of occurrence) and hypothetical should not be the basis of a conclusion that further assessment is required. This can be determined by considering whether the activity will exert pressures which the protected feature(s) are sensitive to.*'

'*Secondly, if the conclusion is that there is 'capability of affecting', the focus should then be on considering whether the proposed development or activity will affect the protected features of a NC MPA, other than insignificantly. Consideration of the degree of pressure that could be exerted by the activity on a spatial basis should help to establish what level of effect might occur*.'

'*In circumstances where the conclusion is that the act or function is capable of affecting (other than insignificantly) the protected features of a NC MPA then the main assessment must be carried out considering the conservation objectives*.'

To identify relevant MPAs to include in this Initial Screening, the following approach has been adopted:

- Identify potential impact pathways and zones of influence (ZoI) (the spatial extent over which the impact may be experienced by receptors and therefore an effect may occur) between the Proposed Development and protected features using the source-pathway-receptor model;
- Define search areas for designated features based on the ZoI of potential impact pathways;
- Identify relevant MPAs within the search areas; and
- Assess whether, in the absence of mitigation measures, the identified potential impact pathway is capable of affecting (other than insignificantly) the protected feature or ecological or geomorphological process it is dependent on.

NCMPAs/MCZs are designated to conserve nationally important, rare, or threatened habitats and species and/or features of geological and geomorphological interest. HPMAs are designated for the protection and the recovery of marine ecosystems. Each of these features can be considered as receptors and can broadly be broken down into the following categories:

- Habitats;
- Benthic species;
- Geological interests;
- Geomorphological interests;
- Fish and shellfish;
- Birds; and
- Marine mammals.

4.2. Source-Pathway-Receptor Model

The potential for likely significant effects has been assessed using a source-pathway-receptor model. This approach identifies likely environmental effects resulting from the proposed construction, operation and maintenance and decommissioning of the Proposed Development. For instance, a project activity (source) may entail a predicted change in environmental conditions affecting either directly or indirectly (the pathway) a specific component of the baseline environment (the receptor / protected feature). If the receptor/protected feature is sensitive to the change it could result in either a positive or negative effect. **Figure 4-1** presents this model with a specific example to illustrate this concept.

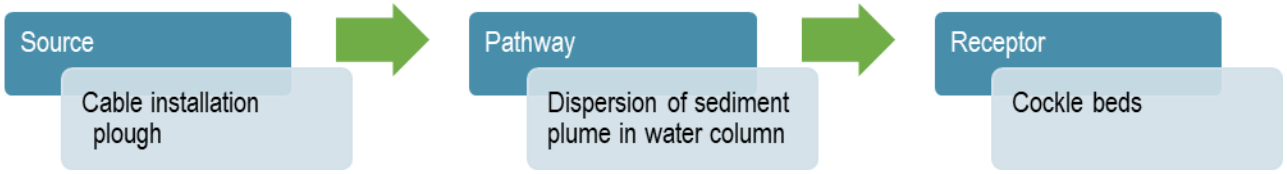


Figure 4-1: Source-Pathway-Receptor model example

4.3. Guidance

The Initial Screening has been undertaken in accordance with the following Guidance:

- Nature Conservation Marine Protected Areas: Draft Management Handbook (Marine Scotland, 2013);
- Development management and Nature Conservation Marine Protected Areas (NatureScot, 2025); and
- Marine Conservation Zones and Marine Licensing (Marine Management Organisation, 2013).

In relation to guidance issued by the Statutory Nature Conservation Bodies (SNCBs), this includes:

- Joint SNCB Guidance for assessing the significance of noise disturbance against Conservation Objectives of Harbour Porpoise Special Areas of Conservation (SAC) (Joint Nature Conservation Committee (JNCC), 2020);
- Joint SNCB Interim Displacement Advice Note (Marine Industry Group for Ornithology (MIG-Birds), 2022);
- Joint Interim Advice On The Treatment Of Displacement For Red-Throated Diver (MIG-Birds, 2022a); and
- High-level Conservation Advice for Public Authorities on Highly Protected Marine Areas (JNCC, 2022).

5. Identification of Relevant MPAs

5.1. Search Areas

The principles outlined above in **Section 4** have been used in this Initial Screening assessment to identify relevant MPAs. However, unlike NCMPAs/MCZs which list out individual protected features as part of each site's conservation objectives, HPMAs have one

overarching protected feature, 'the marine ecosystem of the area'. In order to assess whether the Proposed Development will undermine the conservation objectives of one of the three existing pilot HPMAs (Allonby Bay, Dolphin Head and the North East of Farnes Deep), key important habitats and species for which the HPMA was designated to protect are taken from supplementary information provided by Natural England (NE) and the JNCC (2022a). **Table 5-1** presents the search areas used for MPAs and the justification for the extent of the search areas from the RLB.

Table 5-1: Study Areas for Relevant MPAs

Interest Feature	Search Area	Justification
Habitats; Benthic Species; Geological interests; and Geomorphological Interests.	15 km from RLB	All direct impacts will be spatially limited and confined to the direct footprint of activities (e.g. seabed preparation, cable burial, external cable protection, remedial works and decommissioning). There is the potential for impacts from the suspension and deposition of finer sediments to occur outside of the immediate area of the activities. It has been predicted that 90% of sediments suspended during cable laying activities resettle within 1 km of the cable corridor (OSPAR, 2023). The search aarea for intertidal and subtidal benthic ecology includes the RLB plus an additional 15 km buffer on either side, representative of one tidal excursion. This search aarea incorporates the area within which there is potential for indirect impacts associated with the deposition of suspended sediments and is consistent with the conclusions reached in **Chapter 6: Marine Physical Processes**. The search aarea acts as a precautionary maximum zone of influence (ZoI).
Fish and Shellfish	40 km from RLB	Vessels using dynamic positioning systems will be utilised during the construction, operation, and decommissioning phases of the Proposed Development. Behavioural disturbance is observed in fish as a result of dynamic positioning vessels at a distance of up to 1,359 m (North Connect, 2017). Further to this, there is potential for underwater noise as a result of vessel activity and geophysical surveys to displace fish within the ZoI and impede migration (for migratory species). As such, a precautionary approach to the identification of relevant sites has been adopted which considers all MPAs within 40 km of the RLB. While this is considered overly cautious in terms of capturing the ZoI from impacts such as underwater noise (e.g., from geophysical surveys), it accounts for the potential movement of fish from nearby sites through the RLB. Since 40 km is typically used by CEA as a search area for migratory fish, it is considered to be suitable, (albeit highly precautionary) for non-migratory fish. There is considered to be no Source-Pathway-Receptor link which may have implications for the conservation objectives of MPAs beyond this range (e.g., ability of fish to reach these sites). For the purposes of the screening assessment, ocean quahog (*Arctica islandica*) are categorised as non-mobile benthic receptors as they are considered to have an extremely sedentary lifestyle and are not sensitive to under water noise, collision risk, visual disturbance, increased turbidity, smothering by sediment (light or heavy) or changes in prey (due to being suspension feeders) (Tyler-Walters and Sabatini, 2017). Consideration was given to shark species known for their large migratory ranges, which may potentially travel within the Proposed Development. For instance, basking shark (*Cetorhinus maximus*) have been recorded traveling over 9,000 km (Skomal *et al.,* 2009; Gore *et al.,* 2008). Species designated as features of MCZs/NCMPAs are basking shark, gulper shark (*Centrophorus granulosus*), and leafscale gulper shark (*Centrophorus squamosus*). However, these species are typically found off the west coast of Britain and Ireland (Wilson *et al.,* 2020; Barnes, 2008; Barnes 2008a) and are therefore unlikely to be present near the Proposed Development. As a result, there is considered to be no Source-Pathway-Receptor link, and these species are not considered further in the assessment.
Birds	Based on maximum foraging ranges ± 1 standard deviation	All direct impacts will be spatially limited and confined to the direct footprint of activities, however, there is the possibility that species from distant protected sites may be foraging within or passing through the RLB. Thaxter *et al*., (2012)

	(SD) for priority species as identified in **Table 5-2**	and Woodward *et al*., (2019) reported on representative foraging ranges ±1 SD for a range of species from a breeding colony to a foraging area. Whilst applying mean maximum foraging radius would encompass the majority of a population's home-range area, the overall size of the predicted foraging areas around the colony would potentially make it too large to be a useful management tool (Soanes *et al*., 2016). Similarly, the assumption that seabirds are uniformly distributed out to some threshold distance from their colonies, such as their putative maximum foraging range ±1 SD, is unrealistic (Wakefield *et al*., 2017). Therefore, given the scale and largely offshore nature of the Proposed Development, it was considered disproportionate to identify relevant protected sites on the basis of mean maximum foraging ranges ±1 SD of their protected designated features, as there is no evidence to support an impact pathway given the scale and nature of the Proposed Development. As such, a refined list of bird sites has been included. This is based on the SNCB Joint Interim Advice (MIG-Birds, 2022) which identifies that the priority species for assessment of displacement effects are typically diver and sea duck species, common guillemot (*Uria aalge*), razorbill (*Alca torda*), puffin (*Fratercula arctica*) and gannet (*Morus bassinus*). Gannet scores 2 (low sensitivity) under 'Disturbance Sensitivity' and 'Habitat Specialisation' scores from Bradbury *et al*., (2014) (expanded from Furness *et al*., 2013) but have had scores revised by Wade *et al*., (2016) based on empirical studies demonstrating they are sensitive to displacement and barrier effects from offshore wind farms (OWFs) (Krijgsveld *et al*., 2011, Vanermen *et al*., 2013). However, sensitivity to displacement from vessels remains low (score 2). Gannet therefore have been discounted from the Stage 1 Initial Screening. Bird species that are designated features of MCZs/NCMPAs are black guillemot (*Cepphus grille*), common eider (*Somateria mollissima)* and razorbill. Bird species for which HPMAs were designated to protect are taken from Annex H, prepared by NE and JNCC, (2022a) for Allonby Bay, Dolphin Head and the North East of Farnes Deep HPMAs. MIG-Birds, (2022) suggests that any species scoring 3 or more in either category 'Disturbance Susceptibility' or 'Habitat Specialisation' (as listed in **Table 5-2**) should be included in the assessment of disturbance or displacement effects. It is noted that this guidance relates specifically to OWF developments (in relation to the wind farm arrays). However, it is recognised that these species are also likely to be sensitive to vessel presence and noise, leading to disturbance and displacement. MPAs have been considered relevant if they have one or more of the species listed in **Table 5-2** as a designated feature which could potentially be present within the RLB based on their mean maximum foraging ranges ±1 SD. There is considered to be no Source-Pathway-Receptor link which may have implications for the conservation objectives of MPAs beyond this range as species typically won't travel further than their mean maximum foraging range ±1 SD. Important nesting/breeding sites are typically afforded protection through Special Protection Areas and RAMSAR sites, which are considered under a Habitats Regulations Appraisal (HRA) **in Appendix 5A: Habitats Regulation Appraisal screening and Appendix 5B Report to Inform Appropriate Assessment (RIAA).**
Marine Mammals		
Cetaceans (whales, dolphins and porpoises)	Species specific Management Unit (MU)	In the United Kingdom (UK) the only cetacean species afforded protection through the designation of an MCZ/NCMPA are minke whale (*Balaenoptera acutorostrata*) and Risso's dolphin (*Grampus griseus*). Cetaceans that are listed as important marine mammal species for HPMAs are minke whale, Risso's dolphin, harbour porpoise (*Phocoena phocoena*), short-beaked common dolphin (*Delphinus delphis)* and white-beaked dolphin (*Lagenorhynchus albirostris) (NE and JNCC, 2022a)..* Most cetaceans are wide-ranging, and individuals encountered within UK waters form part of a much larger biological population whose range extends into adjacent jurisdictions. As a result, MUs have been outlined for the species by the Inter-Agency Marine Mammal Working Group (IAMMWG, 2023) which

		comprises representatives from the UK SNCBs i.e., Natural England, NatureScot, Natural Resources Wales and the Department of Agriculture, Environment and Rural Affairs. The boundaries of an MU do not necessarily reflect the full range of a species but instead show areas within their territory where management of human activities is undertaken. These units were defined by considering several factors including the known population structure, movement and habitat use, as well as jurisdictional boundaries and divisions already used in the management of human activities. MUs are used to inform SNCB advice and are therefore the appropriate spatial scale for assessment of environmental impacts on species from marine development projects. The Proposed Development lies within the Celtic and Greater North Seas (CGNS) MU for minke whale, Risso's dolphin, white-beaked dolphin and short-beaked common dolphin. The Proposed Development also lies within the Greater North Sea (GNS) MU for harbour porpoise.
Grey seal	100 km from the RLB	It important to note that grey seal (*Halichoerus grypus*) and harbour seal (*Phoca vitulina*) are not protected features of any NCMPAs or MCZs, however, they are listed as important marine mammal species for the North East of Farnes Deep HPMA (NE and JNCC, 2022a). The ZoI for grey seal has been established based on information presented in Carter *et al*., (2022) and SCOS, (2022) which states that grey seal are known to go on foraging trips up to 100 km or more. The ZoI for harbour seal has been established based on evidence presented in JNCC, (2017) and OAP, (2022) which states that harbour seals are not known to make trips greater than 50 km from haul out sites.
Harbour seal	50 km from the RLB	

Table 5-2: Foraging ranges used to screen in relevant MPAs

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Mean-max Foraging ranges (km) ± Standard Error ^	Confidence of Data ^
Priority Seabird Species				
Common guillemot (*Uria aalge*)	3	3	55.5 ± 39.7	Highest
Razorbill (*Alca torda*)	3	3	73.8 ± 48.4	Good
Atlantic puffin (*Fratercula arctica*)	2	3	119.6 ± 131.2	Good
Divers, grebes and mergansers				
Black-throated diver (*Gavia arctica*)	5	4	No data	No data
Red-throated diver (*Gavia stellata*)	5	4	9.0	Low
Great northern diver (*Gavia immer*)	5	3	No data	No data
White-billed diver (*Gavia adamsii*)	5	4	No data	No data
European shag (*Gulosus aristotelis*)	3	3	13.2 ± 10.5	Highest
Great cormorant (*Phalacrocorax Carbo*)	4	3	25.6 ± 8.3	Moderate
Red-breasted merganser (*Mergus serrator)*	3	4	No data	No data

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Mean-max Foraging ranges (km) ± Standard Error ^	Confidence of Data ^
Goosander (*Mergus merganser*)	4	4	No data	No data
Great-crested grebe (*Podiceps cristatus*)	3	4	No data	No data
Slavonian grebe (*Podiceps auritus*)	3	4	No data	No data
Seaducks				
Common scoter (*Melanitta nigra*)	5	4	No data	Uncertain
Common goldeneye (*Bucephala clangula*)	4	4	No data	No data
Velvet scoter (*Melanitta fusca*)	5	3	No data	Moderate
Common eider (*Somateria mollissima*)	3	4	21.5	Poor
Greater scaup (*Aythya Marila*)	4	4	No data	No data
Long-tailed duck (*Clangula hyemalis*)	3	4	No data	Uncertain
Auks				
Black guillemot (*Cepphus grille*)	3	4	4.8 ± 4.3	Moderate
Terns and gulls				
Little tern (*Sterna albifrons*)	2	4	5.0	Moderate
Arctic tern (*Sterna paradisaea*)	2	3	25.7 ± 14.8	Good
Sabine's gull (*Xema sabini*)	2	3	No data	No data
Black tern (*Chlidonias niger*)	2	3	No data	No data
Roseate tern (*Sterna dougallii*)	2	3	12.6 ± 10.6	Moderate
Sandwich tern (*Thalasseus sandvicensis*)	2	3	34.3 ± 23.2	Moderate
Black-headed gull (*Chroicocephalus ridibundus*)	1	3	18.5	Uncertain

* MIG-Birds, (2022)
^ Woodward *et al.*, (2019,
Key to disturbance susceptibility and habitat specialisation scores:
1 is the lowest and 5 is the highest i.e a disturbance level of 5 suggests that species is highly sensitive to disturbance

Species Name	Disturbance Susceptibility *	Habitat Specialisation *	Mean-max Foraging ranges (km) ± Standard Error ^	Confidence of Data ^

Key to confidence of data score:

- Highest > 5 direct studies; graphs and standard deviation suggest relatively low variability between sites and hence higher confidence that estimates are likely to be representative for unsampled sites.
- Good > 5 direct studies; graphs and standard deviation show wider variability between sites, hence lower confidence that estimates will be representative for all sites.
- Moderate 2-5 direct studies
- Low Indirect measures or only 1 direct study
- Uncertain Survey-based estimates
- Poor Few survey estimates or speculative only

5.2. Relevant MPAs

A Geographical Information System (GIS) and the JNCC marine protected area mapper were used to identify relevant NCMPAs/MCZs. **Table 5-3** lists the designated sites selected for consideration for Initial Screening, with their relevant site descriptions and conservation objectives outlined in **Appendix Table 1**. Where a protected feature is outside the relevant search area as described in **Table 5-1** and **Table 5-2**, it has been greyed out in **Table 5-3** and has not been considered further in the Initial Screening assessment, as there is not considered to be a source-pathway-receptor. Note that Scottish Priority Marine Features (PMF) (habitats and species of conservation importance) as listed in NatureScot, (2020) are marked with '*' for NCMPAs in **Table 5-3.**

It is important to note that the Firth of Forth Banks Complex NCMPA is approximately 18.4km away from the RLB and has ocean quahog as a protected feature. However, for the purposes of the screening assessment, ocean quahog are categorised as non-mobile benthic receptors as they are considered to have an extremely sedentary lifestyle and are not sensitive to under water noise, collision risk, visual disturbance, increased turbidity, smothering by sediment (light or heavy) or changes in prey (due to being suspension feeders) (Tyler-Walters and Sabatini, 2017). Therefore, this site is outside of the search area for benthic receptors as outlined in **Table 5-1** and is not considered further in this report.

The three pilot HPMAs, (Allonby Bay, Dolphin Head and the North East of Farnes Deep) each have one overarching protected feature, 'the marine ecosystem of the area'. In order to identify whether the HPMAs should be 'screened in', key important habitats and species for which the HPMA was designated to protect are taken from supplementary information provided by NE and JNCC (2022a) and are listed in **Table 5-4,** with their relevant site descriptions and conservation objectives outlined in **Appendix Table 1**. Where an important feature is outside the relevant search area or is not a priority bird species as described in **Table 5-1** and **Table 5-2**, it has been greyed out in **Table 5-4** and has not been considered further in the Initial Screening assessment, as there is not considered to be a source-pathway-receptor.

The location of all relevant sites selected for consideration in the Initial Screening can be seen in **Figure 7-1 (Drawing reference C01494-EGL3-MEA-LOC-001).**

in **Section 7.1**.

Site name and ID	Country	Distance to the RLB (km)	Protected features
Southern Trench NCMPA (EU555703756) (NatureScot, 2025a)	Scotland	0.001	Geology: • Quaternary of Scotland: Moraines; • Quaternary of Scotland: Sub-glacial tunnel valleys; • Submarine Mass Movement: Slide scars; • Fronts- large-scale feature (marine); and • Shelf deeps- large-scale feature (marine). Habitats: • Burrowed mud* Species:

Site name and ID	Country	Distance to the RLB (km)	Protected features
			• Minke whale*
Turbot Bank NCMPA (EU555560489) (JNCC, 2018)	Scotland	19.3	Species: • Sandeels*
Sea of the Hebrides NCMPA (EU555703754) (NatureScot, 2025b)	Scotland	258.3	Geology: • Marine Geomorphology of the Scottish Shelf Seabed: Inner Hebrides Carbonate Production Area; and • Fronts- large-scale feature (marine). Species: • Minke whale*; and • Basking shark*.
North-east Lewis NCMPA (EU555703753) (NatureScot, 2025c)	Scotland	259.5	Geology: • Marine Geomorphology of the Scottish Shelf Seabed: Longitudinal bedform field; • Quaternary of Scotland: Glaciated channels/troughs; • Quaternary of Scotland: Landscape of areal glacial scour; and • Quaternary of Scotland: Megascale glacial lineations. Species: • Risso's dolphin*; and • Sandeels*.

Table 5-4: Relevant HPMAs selected for consideration in the Initial Screening

Site name and ID	Country	Distance to the RLB (km)	Key important habitat/species
North East of Farnes Deep HPMA (UKEHPMA003)	England	67.9	European Nature Information System (EUNIS) level 3 broad-scale habitats: • Sublittoral coarse sediment; • Sublittoral sand; • Sublittoral mud; and • Sublittoral mixed sediments. Important habitats: • Subtidal sands and gravels; and • Seapens and burrowing megafauna. Important demersal/benthic species: • Ocean quahog. Important bird species:

Site name and ID	Country	Distance to the RLB (km)	Key important habitat/species
			• Common guillemot • Razorbill • Atlantic puffin • Black-legged kittiwake (*Rissa tridactyla)* • Herring gull (*Larus argentatus*) • Northern fulmar (*Fulmarus glacialis*) • Northern gannet (*Morus bassanus*) • European storm petrel (*Hydrobates pelagicus)* • Great skua (*Stercorarius skua*) • Lesser black-backed gull (*Larus fuscus)* Important marine mammal species: • Harbour porpoise • Minke whale • White-beaked dolphin • Grey seal • Harbour seal Important fish species • Angler fish (*Lophiiformes*) • Haddock (*Melanogrammus aeglefinus*) • European pilchard (*Sardina pilchardus*) • Whiting (*Merlangius merlangus*) • European Smelt (*Osmerus eperlanus*)
Dolphin Head HPMA (UKEHPMA002)	England	690.1	EUNIS level 3 broad-scale habitats: • Atlantic and Mediterranean high energy circalittoral rock • Sublittoral coarse sediment • Sublittoral mixed sediment Important habitats: • Bedrock Reefs • *Sabellaria spinulosa* reefs • Stony Reefs • Subtidal sands and gravels Important bird species: • Atlantic puffin • Arctic tern • Black-headed gull • Black-legged kittiwake • Common guillemot • Common tern • Great skua • Lesser black-backed gull

Site name and ID	Country	Distance to the RLB (km)	Key important habitat/species
			• Little tern • Mediterranean gull (*Larus melanocephalus*) • Northern fulmar • Northern gannet • Razorbill • Sandwich tern Important marine mammal species: • Harbour porpoise • Short-beaked common dolphin • Risso's dolphin • Minke whale Important fish species • Atlantic cod (*Gadus morhua*) • Atlantic herring (*Clupea harengus*) • European plaice (*Pleuronectes platessa*) • Sole (*Solea solea*) • Thornback ray (*Raja clavate*) • Undulate ray (*Raja undulata*)
Allonby Bay HPMA (UKEHPMA001)	England	268.6	EUNIS level 3 broad-scale habitats: • High energy littoral rock • Moderate energy littoral rock • Low energy littoral rock • Features of littoral rock (rockpools / ephemeral algae) • Littoral sand and muddy sand Littoral mixed sediments littoral biogenic reefs • Features of littoral sediment (ephemeral algae) • High energy infralittoral rock • Moderate energy infralittoral rock • High energy circalittoral rock • Moderate energy circalittoral rock • Sublittoral coarse sediment • Sublittoral sand • Sublittoral mud • Sublittoral mixed sediments • Sublittoral biogenic reefs Important habitats: • Blue mussel (*Mytilus edulis*) beds • Estuarine rocky habitats • Honeycomb worm (*Sabellaria alveolata)* reefs • Peat and clay exposures

Site name and ID	Country	Distance to the RLB (km)	Key important habitat/species
			• Mudflats and sandflats not covered by seawater at low tide • Reefs • Sandbanks which are slightly covered by seawater at low tide • Sea pens and burrowing megafauna Important demersal/benthic species: • Ocean quahog. Important bird species: • Red throated diver • Common guillemot • Razorbill • Barnacled goose (*Branta leucopsis*) • Bar-tailed godwit (*Limosa lapponica*) • Curlew (*Numenius arquata*) • Northern gannet • Golden plover (*Pluvialis apricaria*) • Knot (*Calidris canutus*) • Lesser black-backed gull • Manx shearwater (*Puffinus puffinus*) • Oystercatcher (*Haematopus ostralegus*) • Pink-footed goose (*Anser brachyrhynchus*) • Pintail (*Anas acuta*) • Redshank (*Tringa totanus*) • Ringed plover (*Charadrius hiaticula*) Important marine mammal species: • Harbour porpoise Important fish species • Atlantic herring • Thornback ray • Bass (*Dicentrarchus labrax*) • Sole • Atlantic cod • European plaice • Common whelk (*Buccinium undatum*) Edible crab (*Cancer pagurus*) • Common lobster (*Homarus Gammarus*) • European eel (*Anguilla Anguilla*)

6. Potential Impact Pathways

6.1. Identifying Potential Impacts

Impacts have been established based on industry experience and consultation with relevant stakeholders. Where applicable the list of marine pressures established by the JNCC Marine Pressures-Activities Database v1.5., (JNCC, 2022b) OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) (OSPAR, 2011) pressures and NE's advice on operations (for relevant designated sites) and Marine Directorate's Feature Activity Sensitivity Tool (FeAST) (NatureScot, 2025d) have been used to establish impacts to be screened. The pressures considered relevant for the installation, operation and decommissioning of subsea cables are presented in **Table 6-1**. Note that impacts are given first in black text, while any corresponding JNCC pressures are provided underneath in grey in the first column of **Table 6-1**.

6.2. Defining a Zone of Influence

The ZoI for each of the impacts associated with the Proposed Development (Table 6-1) will be used during the screening assessment to determine whether there is likely to be a source-pathway-receptor between the Proposed Development activities and MPAs protected features. The ZoI is used to establish a refined search area for the screening process. The ZoI is defined as the spatial extent over which the pathway could affect the receptor, and has been established quantitatively where possible, or qualitatively based on evidence from analogous projects, post-construction monitoring data and literature reviews. Rationale for establishing the ZoI is provided in **Table 6-1**. Conservative estimates have been used when calculating the final ZoI for each impact to ensure that all potentially sensitive receptors are accounted for in the assessment process and that the 'worst-case scenario' is taken into consideration.

Table 6-1: Potential impact pathways between pressures and receptors (C = Construction, O&M = Operation & Maintenance, D = Decommissioning)

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
1. Temporary habitat loss / seabed disturbance Abrasion/disturbance of the substrate on the surface of the seabed Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	• HDD; • Anchoring; • Pre-sweeping; • PLGR; • Boulder clearance; • UXO Identification; • Cable lay and burial; • Cable repair; • Cable removal; and • Temporary seabed deposits	✓	✓	✓	The laying of cables will lead to seabed abrasion and disturbance of the substrate on the surface of the seabed (OSPAR, 2023). Ploughing, trenching, the placement of temporary seabed deposits, anchor placement and pre-sweeping of sandwaves will all result in abrasion and disturbance. Depending on the installation method used, the footprint of the cable installation machinery could be up to 16 m wide per trench. Where pre-sweeping of sandbanks is required, the footprint of activity could be up to 20 m wide per trench as presented in **Chapter 3: Project Description.** Beyond this direct footprint, low intensity physical disturbance may also occur due to anchor handling inside the anchor corridor which may be up to 0.5–1 km from the vessel. Most project activities from the Proposed Development that penetrate the seabed would present a temporary impact i.e., would only be undertaken once and the seabed will be able to recover after the activity. Some activities would occur in the same footprint and would be separated by a couple of months e.g., PLGR followed by trenching.	✓	✓	×	✓	×	✓	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					Abrasion and penetration could result in the localised loss or damage to habitats and benthic species within the direct footprint of this impact. There is also potential for this impact to affect demersal fish and shellfish by causing habitat loss or disrupting feeding habits. Geomorphological features could be permanently damaged by abrasion and penetration, particularly softer substrates such as chalk and clay beds. As such, this impact has been screened in for these receptors. This impact does not directly remove or disturb the habitats of birds and marine mammals. However, there may be an indirect effect on the availability of their prey species. Therefore, this impact is screened out for bird and marine mammal receptors and the indirect effects of changes in prey availability is considered under Impact 3.							
2. Permanent habitat loss Physical change (to another seabed or sediment type	• Deposit of external cable protection	✓	✓	✓	This impact relates to the permanent change of one marine habitat type to another marine habitat type, through the change in substratum, including artificial material (e.g. concrete). This involves the permanent loss of one marine habitat type but the creation of another.	✓	✓	×	✓	×	✓	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					Associated activities include the installation of infrastructure (e.g. surface laid cables) and the placement of cable and scour protection where soft sediment habitats are replaced by hard/coarse substratum habitats. Where external cable protection is required, the maximum width could be up to 10 m as presented in **Chapter 3 Project Description.** The materials used for external protection of cables such as concrete mattresses, rock placement, grout or rock bags, fronded concrete mattresses, etc. will result in a change of habitat type within the footprint of this activity. Permanent habitat loss is considered for all project phases of the Proposed Development as it is uncertain if external cable protection will be removed on decommissioning. The change of the seabed to another substrate will result in a permanent loss of habitat in locations where external cable protection is required – at cable crossings, in areas of insufficient burial or cable exposure. The placement of external protection may result in the mortality of benthic and epibenthic fauna and algae where directly disturbed. There is also the potential to impact demersal fish and shellfish populations due to direct habitat loss							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					and disturbance. Due to the permanent nature of this impact, it has the potential to impact geomorphological features. As such, this impact has been screened in for these receptors. This impact does not directly remove or disturb the habitats of birds and marine mammals. However, there may be an indirect effect on the availability of their prey species. Therefore, this impact is screened out for bird and marine mammal receptors and the indirect effects of changes in prey availability is considered under Impact 3.							
3. Changes in distribution of prey species	• HDD; • Anchoring; • Pre-sweeping; • PLGR; • Boulder clearance; • UXO Identification; • Cable lay and burial; • Cable repair;	✓	✓	✓	Changes in prey availability is a potential indirect impact which could arise during any phase of the Proposed Development life cycle. Activities that lead to temporary or permanent habitat loss (as outlined under Impact 1 and Impact 2) affect seabed habitats which could affect the availability of prey. Temporary or permanent habitat loss during the spawning season for species with a demersal life stage (such as sandeel and herring), could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species for other fish, birds and marine mammals. As such, this impact has been screened in for these	×	×	✓	×	✓	✓	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
	• Cable removal; • Temporary seabed deposits; and Deposit of external cable protection.				receptors. The indirect effects of local temperature changes and electromagnetic fields (EMF) (as described in Impacts 6 and 7) could also reduce or affect the distribution and availability of prey for bird and marine mammal receptors. There is no source-pathway-receptor between changes in distribution of prey species and habitats, benthic species, and geomorphological/ geological interests. Therefore, this impact has been screened out for those receptors.							
4. Temporary increase and deposition of suspended sediments Changes in suspended solids (water clarity) Smothering and siltation rate changes	• HDD; • Anchoring; • Pre-sweeping; • PLGR; • Boulder clearance; • Cable lay and burial; • Cable repair; • Cable removal; • Deposit of external	✓	✓	✓	This impact relates to changes in water clarity (or turbidity) due to changes in suspended sediment concentrations and smothering of seafloor habitats as a result of settled-out suspended sediments. During cable installation sediment re-suspension will occur followed by subsequent re-deposition on the seabed. The siltation rates will depend on the hydrological conditions and the sediment particle size distribution. A greater sediment dispersion distance means the sediment will be more thinly dispersed over a wider area, whilst a smaller sediment dispersion distance gives a high deposition depth over a smaller distance (OSPAR, 2023).	✓	✓	✓	×	×	✓	15 km from the RLB (dependent on sediment composition and tidal excursion locally)

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
	cable protection; and • Temporary seabed deposits.				Mean tidal excursions along the Proposed Development range from approximately 5 km to 11 km (ABPmer). This represents the maximum distance a particle could theoretically travel over the average tidal cycle. Though tidal ellipses determine the dispersal of sediment and the potential distance of travel, the range of excursion does not equate with the distance over which this impact may be exerted, rather, that is determined by a combination of factors including sediment particle size and mass and local hydrology. The findings of a separate study on the environmental impact of subsea trenching operation (Gooding *et al.,* 2012) suggested that the impacts on sediment disturbance vary depending on sediment particle size. Coarser sediments are likely to settle back in the very near-field (~ 100 m) with finer particles deposited further afield (1-2 km). The search area for intertidal and subtidal benthic ecology includes the RLB plus an additional 15 km buffer on either side, representative of one tidal excursion. This search area incorporates the area within which there is potential for indirect impacts associated with the deposition of suspended sediments and is consistent with the							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					conclusions reached in **Chapter 6: Marine Physical Processes**. The search area acts as a precautionary maximum zone of influence (ZoI). Increased sedimentation following construction, maintenance and decommissioning activities may impact benthic habitats by smothering them, reducing the availability of light and nutrients. This impact may also affect benthic species and shellfish which are often sessile or slow moving and unable to avoid the effects of increased sediment load. The deposition of suspended solids may also impact demersal fish and shellfish communities within the ZoI by decreasing levels of available light, impede foraging success and potentially affecting egg survival rates by decreasing intra-gravel flow velocities and oxygen concentrations (Pattison *et al.,* 2015). As such, these impacts have been screened in for these receptors. Indirectly this could lead to changes in prey availability (considered under Impact 3). Visually foraging birds particularly diving species, which depend on clear water to identify and catch potential prey can be affected by an increased turbidity by reducing							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					their foraging capability (Cook and Burton, 2010). As such, this impact has been screened in for birds. Marine mammals typically inhabit turbid environments and do not rely solely on vision for detecting prey and navigation through the water column (i.e., echolocation in cetaceans and sensitive vibrissae in seal). As a result, there is not considered to be a source-pathway-receptor, and this impact is screened out for marine mammals. There is no source-pathway-receptor between geomorphological/geological interests. Therefore, this impact has been screened out for those receptors.							
5. Water flow (tidal current) changes, including sediment transport considerations	• Deposit of external cable protection	✓	✓	✓	Structures placed in the marine environment immediately interact with the local current regime. The use of external cable protection which is elevated above the seabed can potentially result in localised changes in water flow resulting in turbulence (especially at peak flow) and the possible formation of scour pits around the structure. Though the impact of this is expected to be highly localised and negligible in magnitude there is a possibility that scour will result in localised degradation of soft	✓	✓	×	✓	×	✓	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					sediment habitats and the associated benthic communities and shellfish. Changes in water flow may impact demersal fish and shellfish communities within the ZoI affecting egg survival rates by decreasing intra-gravel flow velocities and oxygen concentrations (Pattison *et al.,* 2015). A change in water flow may also impact geomorphological features. As such, this pressure has been screened in for these receptors. It is also considered for all project phases of the Proposed Development as it is uncertain if external cable protection will be removed on decommissioning. As marine mammals and birds are highly mobile and are not restricted to the seabed, there is not considered to be a source-receptor pathway. This impact is screened out for marine mammals and birds.							
6. Temperature changes – local	• Operational cables	×	✓	×	During the operation of an HVDC cable heat losses occur because of the resistance in the cable/conductor. This can cause localised heating of the surrounding environment (i.e., sediment for buried cables, or water in the interstitial spaces of external cable protection). There are no specific regulatory limits applied to temperature changes in the seabed, although a 2°C change between seabed	×	×	×	×	×	×	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					surface and 0.2 m depth is used as a guideline in Germany (Primo Marine, 2019). Calculations have been undertaken for the Proposed Development cable systems (**Appendix 3C: Heat calculations)** to determine the heat profile under full load and at maximum operating temperature (the worst-case scenarios). Calculations assumed a burial depth of 2 m and a maximum operating temperature of the cables of 90 °C. Seabed surface temperatures will not change from the predicted ambient temperature of 12 °C. Sediment temperature at 0.5 m depth, immediately above the cables, is predicted to reach 20°C. It should be noted that the actual system is unlikely to reach these temperatures as the system would have to operate at full load continuously for an extended period (months/years) to meet these temperatures. The system will not be at full load for this long and therefore the temperature will fluctuate and be unlikely to reach these maximums. As the temperature changes will be localised to the immediate environment surrounding the cables and restricted to below 0.5 m and deeper (below the burrowing depth of most infauna) they will be within the fluctuations associated with natural temperature							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					fluctuations. There will be no warming of the water column. Therefore, there is not considered to be a source-pathway-receptor for any receptors, and this impact has been screened out. As such, there will be no indirect impacts from temperature increase on prey species, which is considered under Impact 3.							
7. Electromagnetic changes (EMF)	• Operational cables	×	✓	×	The burial and bundling of cables help to reduce the strength of EMF when compared to surface laid cables. An EMF study was undertaken by National Grid for the Proposed Development cable system (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) will attenuate to background levels within 0.520 m of the bundled cables when buried at 1 m below the seabed). The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.5 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Some species of mollusc and crustacean can detect electric and magnetic fields. As benthic	×	✓	×	×	✓	✓	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					invertebrates / shellfish are typically slow moving or sessile organisms that live on or within the seabed, they are exposed to the highest levels of EMF. However, the effects of EMF on invertebrates have not yet been well studied (Albert *et al.,* 2020). Therefore, this impact has been screened in for benthic species and shellfish receptors. Indirect impacts from EMF changes on these receptors (prey species) is considered under Impact 3. It is acknowledged that cetaceans use magnetic cues, such as the earth's geomagnetic field, to navigate. The mechanism for how this is achieved is still unknown (BOEMRE, 2011). This localised change in the magnetic field may temporarily affect sensitive species as they cross the cables or pass alongside their length and may temporarily reduce their navigational ability within the ZoI. Therefore, this impact has been screened in for marine mammal receptors. However, no evidence of magnetic sensitivity has been reported for seal (BOEMRE, 2011) therefore, there is not considered to be a source-receptor pathway, and seal are not assessed further for this impact. Some migratory fish species such as Atlantic salmon can use the earth's magnetic field for							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					navigation and movements over subsea cables may result in a temporary change swimming direction or avoidance behaviour possibly leading to a delay to migration (Gill and Bartlett, 2011; Gill *et al.,* 2012). Therefore, this impact has been screened in for fish receptors. Although some bird species may use the Earth's magnetic field for navigation during migration, this will not be impacted by EMF from subsea cables due to the range of impact being localised to the surrounding area of the cable underwater. There is not considered to be a source-pathway-receptor for birds, and they are not assessed further for this impact. Habitats and geomorphological features (for which there is no source-pathway-receptor) have been screened out.							
8. Introduction or spread of marine invasive non-native species (MINNS)	• Deposit of external cable protection; and • Presence of the Proposed	✓	✓	×	This impact refers to the direct or indirect introduction of non-native species, e.g., Chinese mitten crabs (*Eriocheir sinensis*), slipper limpets (*Crepidula fornicata*), Pacific oyster (*Crassostrea gigas*), and their subsequent spreading and out-competing of native species. Ballast water discharge, hull fouling and stepping stone effects from	×	×	×	×	×	×	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
	Development vessels.				offshore structures may facilitate the spread of such species. The introduction of invasive non-native species (MINNS) (e.g., through discharge of ballast water from the Proposed Development vessels) will be managed under the International Convention for the Control and Management of Ship's Ballast Water and Sediments. Vessel contractors will complete a biosecurity risk assessment prior to mobilisation. Best biosecurity practice for marine commercial operations will be followed by all vessels associated with the Proposed Development to minimise the risk of MINNS spread. All materials used for cable protection will be sufficiently sterilised prior to use and seabed deposits will be inert with no biologically active material. All materials used for remedial works will be procured from reputable sources. Nonetheless, there is potential for any external cable protection placed at cable crossings or during maintenance in areas of soft substrate to act as a stepping stone for MINNS that favour hard substrates. The placement of hard materials (such as rock protection) could introduce a new niche that increases connectivity with other natural or artificial hard							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					habitats within the dispersal range of benthic species. However, considering the implementation of the control measures required to ensure legal compliance, the introduction or spread of MINNS is not anticipated. Therefore, this impact has been screened out for benthic species. There is not considered to be a source-pathway-receptor for habitats, birds, marine mammals, fish and shellfish or geomorphological features and has been screened out for these receptors.							
9. Barriers to species movement	• HDD; • Anchoring; • Pre-sweeping; • PLGR; • Boulder clearance; • UXO Identification; • Cable lay and burial; • Cable repair; • Cable removal; and	✓	✓	✓	This impact pathway relates to the physical permanent obstruction of species movements and including local movements (within and between roosting, breeding, feeding areas) and regional/global migrations (e.g. birds and marine mammals). This includes movements across open waters from OWF, wave or tidal array devices, mariculture infrastructure or fixed fishing gears. The species affected are mostly birds, fish, and mammals (MarLIN, 2023). The Proposed Development is the construction and operation of subsea power cables. Cables will be buried there will be no permanent structures obstructing species movements within the water column. Even if cable protection is required, this will be placed on the	×	×	×	×	×	×	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
	• Temporary seabed deposits.				seabed and animals will be able to move over it. As such, no source-receptor has been identified for bird, fish & shellfish, or marine mammal receptors. Temporary underwater noise changes generated by survey equipment and vessel movement is the main barrier for these receptors and is considered in Impact 10. There is not considered to be a source-pathway-receptor for habitats, benthic species, and geomorphological features. Therefore, these receptors are screened out.							
10. Underwater noise changes	• Presence of the Proposed Development vessels; and • Geophysical surveys.	✓	✓	✓	Vessels and equipment for the Proposed Development will generate continuous underwater noise which may result in the temporary behavioural disturbance and displacement of marine mammals, and diving bird species such as seaducks. With respect to ornithological receptors, underwater noise directly influences water column feeders as these species are submerged for longer periods when diving in search for prey on the seabed (Natural England, 2024). Therefore, this impact has been screened in for this receptor. Behavioural disturbance is observed in fish because of vessels using dynamic positioning	×	×	✓	×	✓	✓	5 km (JNCC, 2020)

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					at a distance of up to 1,359 m (North Connect, 2017). Furthermore, fish species that have a swim bladder or other air bubble that is close to the ear can detect sound pressure as well as particle motion and are more likely to be affected by an increase in underwater noise than species without these structures (Popper *et al.,* 2014). This impact has been screened in for fish and shellfish. The onset of a temporary threshold shift (TTS) can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a permanent threshold shift (PTS) by moving away from the area. With respect to marine mammals, the Oslo and Paris Convention (OSPAR, 2023) considered that sound associated with the installation, removal or operation of submarine cables is less harmful compared to impulsive sound activities such as seismic surveys, military activities or construction work involving pile driving. It is unlikely that vessels and equipment used during the construction, operation and maintenance or decommissioning phase of the Proposed Development will result in a PTS or a TTS for							

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					most species of marine mammal however, this will be assessed for each species. TTS or a PTS is most likely to occur as a result of geophysical surveys. As an increase in underwater noise may result in behavioural disturbance/displacement, this impact has been screened in for marine mammals. A precautionary 5 km ZoI has been used. This is the effective deterrent range (EDR) for geophysical surveys as recommended by (JNCC, 2020) for very high frequency (VHF) cetaceans such as harbour porpoise. This has been used as a proxy for marine mammals, fish and shellfish and birds as it is deemed a worse case range. The effects from continuous underwater noise will be lower than this as detailed in **Appendix 10A: Underwater Noise Modelling Technical Report.** There is no source-pathway-receptor between noise and habitats, benthic species, and geomorphological/geological interests. Therefore, this impact has been screened out for those receptors.							
11. Visual / physical disturbance or displacement	• Presence of the Proposed Development	✓	✓	✓	Vessels, vehicles and people movement can create visual stimuli which can evoke a disturbance response in mobile species such as seabirds. The magnitude of the impact will depend on the nature and scale/intensity of the	×	×	✓	×	✓	✓	4 km (MIG-Birds, 2022)

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
Above water noise	vessels and equipment.				activity (e.g., location and timing of operation). Diving species such as seaducks are recognised as being highly sensitive to noise and visual disturbance, such as those caused by vessel traffic (Atterbury *et al.,* 2021). Once flushed, they may not rapidly resettle. Therefore, SNCBs recommend a 4 km displacement buffer for divers and seaducks (MIG-Birds 2022). The physical presence of the Proposed Development vessels and equipment during construction, maintenance and decommissioning have the potential to disturb marine mammals and fish. Therefore, birds, fish and shellfish and marine mammals are screened in for this impact. The 4 km displacement buffer has been used as a proxy for marine mammals and fish and shellfish as it is deemed a worse case range. There is no source-pathway-receptor between visual disturbance and habitats, benthic species, and geomorphological/geological interests. Therefore, this impact has been screened out for those receptors.							
12. Collision with project vessels	• Presence of the Proposed	✓	✓	✓	It is largely recognised that the key factors contributing to collision between marine mammals and vessels are the presence of both in the same area and vessel speed (see	×	×	×	×	✓	×	Within RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
	Development vessels and equipment.				(Schoeman *et al.,* 2020) for review). Injuries to marine mammals from vessel strikes are species-dependent but generally are more severe at higher impact speeds (Wang *et al.,* 2007). Given that the Proposed Development vessels will be travelling at speeds no greater than 5 knots, or travelling within established shipping lanes, and that birds and migratory fish are highly mobile and more manoeuvrable than marine mammals, no pathway for effect is considered. There is no source-pathway-receptor between vessel collision and habitats, benthic species, shellfish and geomorphological/geological interests. Therefore, this impact has been screened out for those receptors.							
13. Accidental spills Hydrocarbon & PAH contamination	• Presence of the Proposed Development vessels and equipment.	✓	✓	✓	During construction, accidental spillage may occur directly into the water column. Materials spilled may disperse as a plume on the water surface, within the water column or fall directly to the seabed. The primary chemicals of environmental concern in vessel oil and fuel are polycyclic aromatic hydrocarbons (PAHs). Deliberate discharges of oil or oil/water mixtures from ships are prohibited within the Northwest European Waters Special Area, established by the International Maritime	×	×	×	×	×	×	Within the RLB

Potential impact	Relevant activities	Phase			Pathway Description	Initial screening by receptor						Maximum ZoI
		C	O&M	D		Habitats	Benthic species	Bird species	Geomorphological/ geological features	Marine mammals	Fish and shellfish	
					Organization under MARPOL Annex I in 1999. This includes all waters around the UK and its approaches. However, accidental discharges still occur. The Proposed Development vessels will comply with the International Convention for the Prevention of Pollution from Ships (MARPOL) 73/78 which relate to pollution from oil from equipment, fuel tanks etc and release of sewage (black and grey waters). Compliance with International and National Regulations will be sufficient to minimise the risk to the environment and therefore, this impact has been screened out of the assessment for all receptors.							
14. In-combination effects	• All activities	✓	✓	✓	In-combination effects are likely to result where localised disturbance from more than one activity either occurring simultaneously resulting in a wider ZoI or consecutively within a restricted area resulting in an extension of the impact pathway. There is the possibility that the Proposed Development could overlap, temporally and spatially with other projects in the region or will occur within short succession of another project and as such all receptors have been screened in.	✓	✓	✓	✓	✓	✓	Within the ZoI of each impact, unless otherwise stated in **Section 6.3**.

6.3. Identifying In-Combination Impacts

The MMO guidelines state that for the competent authority to fully discharge its duties under section 69 (1) of the MCAA, in-combination and cumulative effects should be considered (MMO, 2013). Furthermore, the Nature Conservation Marine Protected Areas: Draft Management Handbook (Marine Scotland, 2013) states that '*Consideration of cumulative effects with other activities and functions should also be undertaken in line with EIA requirements*'. Existing plans/projects that are built and operational prior to the construction phase of the Proposed Development are typically classified as part of the baseline conditions and are not considered in by the in-combination assessment. However, if residual effects persist after construction such as habitat loss from infrastructure or external cable/crossing protection, these plans/projects are then included in the in-combination assessment. Plans/projects that are under construction (or are proposed to be) at the same time or subsequent immediately to when the Proposed Development is under construction will be considered in the in-combination assessment. As such, the following activities will be considered for the potential to contribute in-combination impacts for MPAs:

- OWFs
- Other power and telecommunication cables
- Disposal sites
- Aggregate extraction sites
- Munitions disposal sites
- Ministry of Defence (MoD) sensitive areas
- Oil and gas operations
- Carbon capture storage and natural gas storage sites
- Tidal energy
- Wave energy
- MLAs

Activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation, are sporadic or have continuous use of the region which are not necessarily licensable activities. However, they can exhibit pressure on designated sites. Whilst individual activities have not been identified, the pressure already exerted by these activities has been considered when assessing in-combination impacts.

To determine whether other plans/projects might interact with the licensable activities, common source-receptor pathways have been identified. The search area for other projects and plans that may contribute to in-combination effects from potential impacts to protected features of designated sites is taken from the ZoI outlined for various receptors in **Table 6-1**, unless no source-pathway-receptor exists. The ZoI serves as the search area from the designated site to identify other plans or projects that may fall within that distance. The exception to this is when considering underwater noise from OWF construction (including floating OWFs where pile-driven anchors may be used), which can propagate further than underwater noise from other types of plans/projects. In this case, the search area for underwater noise remains within the 5 km EDR, except for OWF construction, which follows the JNCC's recommended 26 km EDR for unmitigated piling (no noise abatement) (JNCC, 2020).

However, due to the distance of the relevant designated sites to the Proposed Development, only the Southern Trench NCMPA is within range for in-combination effects to directly impact the NCMPA. Other sites are out of range for direct impacts to occur. A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. However, given the distance to the remaining designated sites (the next closest site being 19.3 km away from the RLB), the Proposed Development will not act as a barrier to animals travelling within the remaining designated sites and will not affect the distribution or population of the species within these sites at any stage of the development. Therefore, it is concluded that there will be no detectable in-combination effects of any potential impacts from the Proposed Development and other plans/projects and the remaining designated sites.

Other plans/projects which may contribute to in-combination effects to the protected features of the Southern Trench NCMPA have been identified using GIS and the following publicly available data sources:

- The Crown Estate (TCE) Open Data Portal (TCE)
- Crown Estate Scotland Spatial Hub (CES)

There are no pipelines, tidal or wave energy projects within the maximum ZoI from the Southern Trench NCMPA and therefore will not be considered further. As the maximum ZoI for the potential impacts of the Southern Trench NCMPA is for underwater noise, OWF projects identified within 26 km and other plans/projects identified within 5 km of the Southern Trench NCMPA are listed in **Table 6-2**.

Table 6-2: Plans/Projects identified within the relevant search areas that may contribute to in-combination effects with the Southern Trench NCMPA

Plan/project name	Plan/project status	Distance to the Southern Trench NCMPA	Potential impact(s) associated with the plan/project
Cable projects (within 5 km of the Proposed Development)			
Cenos Floating Offshore Wind Farm – transmission infrastructure	Permitting – EIA Reports submitted	0km	• Temporary habitat loss / seabed disturbance; • Permanent habitat loss; • Water flow (tidal current) changes, including sediment transport considerations; • Temporary increase and deposition of suspended sediments; • Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; • Underwater noise changes; and • Collision with project vessels.
Eastern Green Link 2 Interconnector	Licence granted	1.96 km	• Underwater noise changes; • Temporary increase and deposition of suspended sediments; and • Visual / physical disturbance or displacement.
OWFs (within 26 km of the Proposed Development for monopiling, 15 km for pin piling (i.e.- floating OWF))			
Salamander Offshore Wind Farm	Licence granted	10.43 km	• Underwater noise changes.
Caledonia Offshore Wind Farm	In-planning	13.51 km	

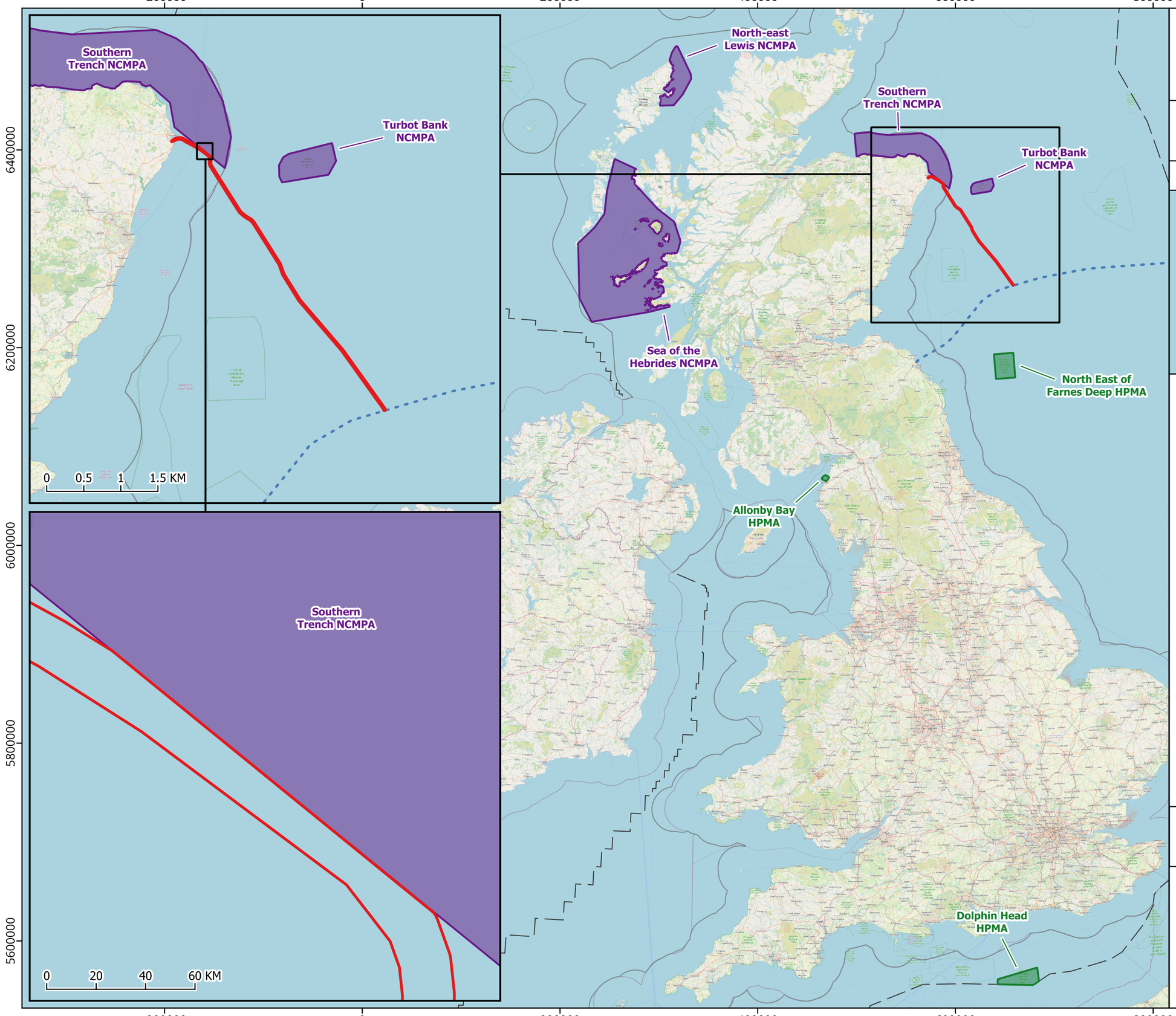
It is noted that the timeline of construction is currently unknown for the Broadshore OWF, which will be located approximately 25.25 km away from the Southern Trench NCMPA. The timing and commencement of pre-construction and construction activities is unknown until consent is awarded, and construction works could start up to seven years after the project is consented (Royal Haskoning DHV, 2024). The timeline of construction is also currently unknown for the Flora OWF which will be located approximately 9.90 km away

from the Southern Trench NCMPA. Due to a lack of information, the Broadshore OWF and Flora OWF cannot be assessed at this stage.

7. Screening Assessment

7.1. Overview

The schematic shown in **Figure 7-1 (Drawing reference C01494-EGL3-MEA-PROT-001-A)** illustrates the location of the RLB in relation to the relevant designated sites included in the assessment.



collaborative environmental advisers

Relevant Designated Sites

C01494-EGL3-MEA-PROT-001-A

Legend

- Red Line Boundary
- Highly Protected Marine Area (HPMA)
- Nature Conservation Marine Protected Area (NCMPA)
- Scottish Adjaceent Waters
- 12NM Limit
- EEZ

0 80 160 240 KM
0 40 80 120 NM
N

Date	17/06/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:3,750,000
Created	AN
Reviewed	JC
Authorised	NP

Document Path: X:\GIS\GIS_PROJECTS\C01494_EGL3&4\Project\QGS\EGL3\MEA\06_PROT\C01494_EGL3_MEA_PROT_001.qgz

7.2. Screening Assessment

The following seven sites are included in the assessment:

- Southern Trench NCMPA;
- Turbot Bank NCMPA;
- Sea of the Hebrides NCMPA;
- North-east Lewis NCMPA;
- North East of Farnes Deep HMPA;
- Dolphin Head HPMA; and
- Allonby Bay HPMA.

The assessment of these sites can be seen in **Table 7-1**, note that Scottish PMFs are marked with '*' in the first column for NCMPAs.

Table 7-1: Screening assessment for the Proposed Development

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
Southern Trench NCMPA **Distance from the Proposed Development to the NCMPA: 0.001 km**				
Geology: • Quaternary of Scotland: Moraines; • Quaternary of Scotland: Sub-glacial tunnel valleys; • Submarine Mass Movement: Slide scars; • Fronts- large-scale feature (marine); and • Shelf deeps- large-scale feature (marine). Habitats: • Burrowed mud*.	1. Temporary habitat loss / seabed disturbance	**No**- The Proposed Development does not cross the boundary for this NCMPA and is beyond the ZoI for the potential impact. Therefore, there is no source-pathway-receptor at any stage of the development.	**No**- There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	**Screened out**
	2. Permanent habitat loss	**No**- The Proposed Development does not cross the boundary for this NCMPA and is beyond the ZoI for the potential impact. Therefore, there is no source-pathway-receptor at any stage of the development.	**No**- There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	**Screened out**
	5. Water flow (tidal current) changes, including sediment transport considerations	**No**- The Proposed Development does not cross the boundary for this NCMPA and is beyond the ZoI for the potential impact. It has been considered that permanent structures, such as cable protection outside the NCMPA, could potentially impact water flow within the NCMPA. Where cable protection is not required, the seabed level will remain unchanged or similar to its pre-installation condition, eliminating the potential for this impact to occur. Where cable protection is required, the height of the structures on top of the seabed will result in a highly localised change of a small magnitude, immediately around the area where cable protection is applied. As this NCMPA is outside of the Proposed Development, there is no source-pathway- receptor at any stage of the development on the features of the NCMPA.	**No**- There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	**Screened out**
Habitats: • Burrowed mud*.	4. Temporary increase and deposition of suspended sediments	**No**- Burrowed mud is listed as a Scottish PMF and as an OSPAR threatened and declining habitat ('sea-pens and burrowing megafauna communities') (NatureScot, 2020; 2023). Seapens and burrowing megafauna are not thought to be sensitive to changes in suspended solids (water clarity), light smothering or heavy smothering (Hill	**No**- Although the Eastern Green Link 2 Interconnector and Cenos Floating Offshore Wind Farm – transmission infrastructure are within the 15 km ZoI for this impact, seapens and burrowing megafauna are not thought to be sensitive to changes in suspended solids (water clarity), light smothering or heavy smothering (Hill et al., 2023). Therefore,	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		et al., 2023). Therefore, there is no source-pathway-receptor at any stage of the development on this feature of the NCMPA.	there is no source-pathway-receptor at any stage of the Proposed Development or other plans/projects on this feature of the NCMPA.	
Species: • Minke whale*.	3. Changes in distribution of prey species	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for minke whale. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Furthermore, minke whale have a varied diet feeding on krill (and other animals of the plankton), and small fish such as sandeels, herring, sprat, haddock, saithe, whiting and small cod (NatureScot, 2023a). Having a varied diet makes minke whale less susceptible to changes in distribution of prey species. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No**- There is one other plan/project which could cause an in-combination for the impact of 'changes in distribution of prey species'. Cenos Floating Offshore Wind Farm – transmission infrastructure intersects the Southern Trench NCMPA for 19.2 km and is expected to begin construction in 2030. As a result, the project may temporally overlap with the Proposed Development. Cenos Offshore Wind Farm MPA Assessment (MLA reference number: 00011091) determined that the changes to prey distribution would not have the potential to hinder achievement (other than insignificantly) of the conservation objectives. A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	7. EMF	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the	**No-** There is one other plan/project which could cause an in-combination for the impact of 'EMF'. Cenos Floating Offshore	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		ZoI, mobile species such as minke whale may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. As minke whale are also predominantly pelagic cetaceans, it can be assumed that minke whale will also not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as minke whale have a large MU (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood and occurrence of any impact. In conclusion, the Proposed Development will not have a significant	Wind Farm – transmission infrastructure intersects the Southern Trench NCMPA for 19.2 km and is expected to begin construction in 2030. As a result, the project may temporally overlap with the Proposed Development. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that minke whale have large MUs (IAMMWG, 2023), minke whale have a low likelihood of being affected by EMF from cable systems. Therefore, it is concluded that there will be no detectable in-combination effect resulting from this impact. A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. It is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact at any stage of the development.	

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		effect on individuals from this site during any phase of development from this impact pathway.		
	10. Underwater noise changes	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). The Proposed Development will not involve any impulsive noise (UXO clearance will be the subject of a separate licence). Therefore, to calculate whether the underwater noise from the Proposed Development would be considered significant the 5 km EDR for geophysical surveys recommended by the JNCC, (2020) has been used as the ZoI. The NCMPA is within the ZoI. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. According to Southall *et al.* (2019) and NMFS, (2024), minke whale are categorised within the functional hearing group of low frequency (LF) cetacean. **Appendix 10A: Underwater Noise Modelling Technical Report** indicates that as LF cetaceans, the maximum potential impact range of a TTS on minke whale as a result of geophysical surveys using a multi beam echo sounder (MBES) is 10-287 m. Noise levels do not exceed the threshold for impacts for a PTS or a TTS from the Proposed Development vessels and equipment. After reviewing the impact thresholds, the JNCC's advised 5 km EDR used in this assessment would be highly precautionary. Using GIS, a 287 m buffer (the maximum distance for TTS to occur) was applied to the RLB, calculating that	**No-** There are four other plans/projects which could cause an in-combination underwater noise effect by displacing minke whale from within the NCMPA. Salamander OWF will be located approximately 10.42 km away from the Southern Trench NCMPA. It is due to begin offshore construction in 2028 and be operational by 2029 (ERM, 2024), therefore the project may temporally overlap with the Proposed Development. When using a 15 km EDR for pin piling, the Salamander OWF could displace minke whale from 64.91 km^2 of the site, which is equivalent to 2.56% of the NCMPA. However, The Southern Trench NCMPA is located within the CGNS MU for minke whale, which has an estimated abundance of 20,118 individuals (IAMMWG, 2023). The Southern Trench NCMPA is also within the most recent SCANS IV survey block NS-D which had a density estimate of 0.0381 individuals per km^2 (Gilles *et al.*, 2022). Therefore, 2.47 individuals could be displaced from the Southern Trench NCMPA by the Salamander OWF at any one time which is equivalent to 0.01% of the entire CGNS MU population and will not affect the favourable conservation status of the species. Caledonia OWF will be located approximately 13.51 km away from the Southern Trench NCMPA. Piling is anticipated between 2028-2032 (Ocean Winds, 2024) therefore, the project may temporally overlap with the Proposed Development. When using a 26 km EDR for piling, Caledonia OWF could disturb minke whale from 435 km^2 of the site, which is equivalent to 17% of the NCMPA. Therefore, 16.57 individuals could be displaced from the Southern Trench NCMPA by the Caledonia OWF at any one time which is equivalent to 0.08% of the entire CGNS MU population and will not affect the favourable conservation status of the species.	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		only 1.96 km^2 of the NCMPA could be impacted by underwater noise. As the site is 2,536 km^2, this is equal to 0.08% of the entire NCMPA and is considered insignificant. The Southern Trench NCMPA is located within the CGNS MU for minke whale, which has an estimated abundance of 20,118 individuals (IAMMWG, 2023). The Southern Trench NCMPA is also within the most recent SCANS IV survey block NS-D which had a density estimate of 0.0381 individuals per km^2 (Gilles *et al.*, 2022). Therefore, 0.07 individuals could be displaced from the Southern Trench NCMPA by the Proposed Development in total, which is equivalent to <0.001% of the entire CGNS MU population and will not affect the favourable conservation status of the species. Given the wide area available for foraging for minke whale in the NCMPA and the MU, and the fact that works will be temporary and transient, the Proposed Development activities will not have a significant effect on individuals from the site during any phase of development from this impact pathway. In addition, the licensable activities would not act as a barrier to movement to or from the site.	However, the Proposed Development alone will only impact 0.08% of the NCMPA and <0.001% of the entire CGNS MU population during geophysical surveys. Given the transient and temporary nature of the Proposed Development activities and the insignificant impact alone, it is concluded that there will be no detectable in-combination impact with the Salamander OWF or the Caledonia OWF. Cenos Floating Offshore Wind Farm – transmission infrastructure intersects the Southern Trench NCMPA for 19.2 km and is expected to begin construction in 2030. As a result, the project may temporally overlap with the Proposed Development. Cenos Offshore Wind Farm MPA Assessment (MLA reference number: 00011091) determined that the largest potential disturbance range as a result of geophysical and geotechnical surveys would be 1,340 m from vibro-coring. Therefore, Cenos could disturb minke whale from 65.87 km^2 of the NCMPA, which is equivalent to 2.75% of the NCMPA. This could displace 2.51 individuals from the Southern Trench NCMPA at any one time, which is equivalent to 0.01% of the entire CGNS MU population and will not affect the favourable conservation status of the species. It was also determined by the Cenos Offshore Wind Farm MPA Assessment that underwater noise would not have the potential to hinder the achievement (other than insignificantly) of the conservation objectives. In-Combination with each other, the Proposed Development and Cenos Floating Offshore Wind Farm – transmission infrastructure could impact 2.75% of the NCMPA and 0.01% of the entire CGNS MU population. In-combination with the Proposed Development, Salamander OWF, Caledonia OWF and Cenos Floating Offshore Wind Farm – transmission infrastructure could impact 22.21% of the NCMPA and 0.1% of the entire CGNS MU population. The Eastern Green Link 2 interconnector will be located approximately 1.96 km away from the Southern Trench	

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
			NCMPA. It is due to be operational by 2029 (Eastern Green Link 2) and therefore, the project may temporally overlap with the Proposed Development. However, as the maximum potential impact range of a TTS on minke whale as a result of geophysical surveys using a MBES is 410-287 m, Eastern Green Link 2 will not impact minke whale within the NCMPA and therefore, there is no potential for in-combination effects. No Marine Licences processed by Marine Scotland for UXO clearance were identified for Salamander OWF, Caledonia OWF, Cenos Floating Offshore Wind Farm – transmission infrastructureor Eastern Gren Link 2 Interconnector and therefore, there is no potential for in-combination effects from this activity. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, based on the available information at the time of writing this Stage 1 Initial Screening, the Proposed Development will only impact 0.08% of the NCMPA and <0.001% of the entire CGNS MU population alone during geophysical surveys and other vessel noise won't impact minke whale. Furthermore, considering the transient and temporary nature of the Proposed Development activities, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	11. Visual / physical disturbance or displacement	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). The NCMPA is within the ZoI (4 km EDR) for the Proposed Development, and due to the mobility of marine mammals, they may also enter the ZoI	**No-** Although the Eastern Green Link 2 Interconnector and Cenos Floating Offshore Wind Farm – transmission infrastructure is within the 4 km ZoI for this impact, cetaceans have evolved a sophisticated acoustic sensory	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		of the Proposed Development outside of the NCMPA. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the Proposed Development vessels has an effect. Furthermore, considering the transient nature of the construction, repair, and decommissioning activities, coupled with the fact that vessels will not remain in one area for extended periods, it is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	system which helps them to navigate, find prey, communicate with each other and avoid potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the vessels has an effect. Furthermore, considering the transient nature of the construction, repair, and decommissioning activities, for both periods both the Eastern Green Link 2 and the Proposed Development, coupled with the fact that vessels for either project will not remain in one area for extended periods, it is concluded that there will be no significant in-combination effect. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	12. Collision with project vessels	**No**- Minke whale are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as minke whale may travel within the ZoI. Given the distance to the site and the large extent of the MU for minke whale (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are	**No-** There is one other plan/project which could cause an in-combination for the impact of 'EMF'. Cenos Floating Offshore Wind Farm – transmission infrastructure intersects the Southern Trench NCMPA for 19.2 km and is expected to begin construction in 2030. As a result, the project may temporally overlap with the Proposed Development. Given that minke whale are likely to avoid vessels to prevent the onset of a TTS and a PTS and that construction vessels are typically slow moving, minke whale will be able to avoid	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		likely to avoid the Proposed Development vessels to prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, minke whale will be able to avoid collision with the Proposed Development vessels. The Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	vessels associated with Cenos Offshore Wind Farm – transmission infrastructure. Additionally, a high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
Turbot Bank NCMPA **Distance from the Proposed Development to the NCMPA: 19.3 km**				
Species: • Sandeels*.	1. Temporary habitat loss / seabed disturbance	**No**- The Proposed Development does not cross the boundary for this NCMPA and is beyond the ZoI for the potential impact. Therefore, there is no source-pathway-receptor at any stage of the development.	**No**- There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	**Screened out**
	2. Permanent habitat loss	**No**- The Proposed Development does not cross the boundary for this NCMPA and is beyond the ZoI for the potential impact. Therefore, there is no source-pathway-receptor at any stage of the development.	**No**- There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
	3. Changes in distribution of prey species	**No-** Sandeels are listed as a Scottish PMF (NatureScot, 2020). Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. However, sandeel primarily feed on plankton including small plankton eggs and larger copepods which are found in great abundance in Scottish seas (NatureScot, 2023b) and are found within the water column and not restricted to the seabed. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	4. Temporary increase and deposition of suspended sediments	**No**- Sandeels are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as fish may travel within the ZoI. However, given the distance to the Proposed Development (19.3 km), there will be sufficient alternatives areas of supporting habitat for sandeel available outside of the Proposed Development, including inside of the NCMPA. Furthermore, given the temporary and transient nature of the construction, repair and decommissioning activities, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. Given the distance to the NCMPA (19.3 km), the wider area available as supporting habitat in the North Sea and the fact that the Proposed Development on its own would not act as a barrier to species accessing the NCMPA, there will be no detectable contribution to an in-combination	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
			effect. Any significant impacts are more likely to arise from other plans/projects in isolation or in-combination with each other, rather than from a combined effect with the Proposed Development.	
	5. Water flow (tidal current) changes, including sediment transport considerations	**No**- Sandeels are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as fish may travel within the ZoI. Where cable protection is not required, the seabed level will remain unchanged or similar to its pre-installation condition, eliminating the potential for this impact to occur. Where cable protection is required, the height of the structures on top of the seabed will result in a highly localised change of a small magnitude, immediately around the area where cable protection is applied. As this change is highly localised, it will not impact the distribution or population of sandeel or act as a barrier to sandeel accessing the NCMPA.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of, or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. Given the distance to the NCMPA (19.3 km), the wider area available as supporting habitat in the North Sea and the fact that the Proposed Development on its own would not act as a barrier to species accessing the NCMPA, there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans/projects in isolation or in-combination with each other, rather than from a combined effect with the Proposed Development.	**Screened out**
	7. EMF	**No**- Sandeels are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as fish may travel within the ZoI. However, the burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development cable system (**Appendix 3A: EMF assessment)** It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Sensitivity to EMF is species dependent. Sandeel, are demersal, meaning they spend the majority of their time on or above the seabed, which could make them one of the more susceptible to the effects of EMF changes. However, the maximum EMF estimated to be generated by the cables (76.4µT) is not thought to be high enough to elicit any physiological or behavioural responses. In conclusion, the increased levels of EMF will be highly localised to the area immediately above the cables and will attenuate rapidly with distance. Therefore, the Proposed Development is not considered to have a significant effect on individuals from this site during any phase of development from this impact pathway.	on the site. However, the maximum EMF estimated to be generated by the cables (76.4µT) is not thought to be high enough to elicit any physiological or behavioural responses. Given the distance to the NCMPA (19.3 km), the wider area available as supporting habitat in the North Sea and the fact that the Proposed Development on its own would not act as a barrier to species accessing the NCMPA, there will be no detectable contribution to an in-combination effect. Any significant impacts are more likely to arise from other plans/projects in isolation or in-combination with each other, rather than from a combined effect with the Proposed Development.	
	10. Underwater noise changes	**No**- Sandeels are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as fish may travel within the ZoI. Popper *et al.,* (2014) categorised fish species into four groups, with groups 3 and 4 (where the swim bladder is involved in hearing, primarily pressure detection) being the most sensitive to noise and group 1 (fishes with no swim bladder or other gas chamber that are only sensitive to particle motion, not sound pressure) as being the least sensitive to noise. Sandeel are a group 1 species. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury by moving away from the area. There are no thresholds in relation to noise from high frequency sonar-based surveys (>10 kHz) (i.e. geophysical surveys). This is because the hearing range of fish species falls well below the frequency range of high frequency sonar systems (Popper *et al.,* 2014). Consequently, the effects of noise from geophysical surveys on fish has not been conducted as part of this assessment. Where insufficient data exist to determine a quantitative guideline value, the risk is of injury effects due to underwater noise on group 1 fish is categorised in relative terms as "high", "moderate" or "low" at three distances from the source: "near" (i.e., in the tens of metres), "intermediate" (i.e., in the hundreds of metres) or "far" (i.e., in the thousands of metres) in **Appendix 10A: Underwater Noise Modelling Technical Report**. For group 1 fish, the risk of mortality and potential injury and recoverable injury were identified as low for near, intermediate and low distances. Risk of a TTS was identified as being moderate at near distances and low at intermediate and low distances. Given the distance to the NCMPA (19.3 km), the wider area available as supporting habitat in the NCMPA and the North Sea as well as the temporary and transient nature of the construction, repair, and decommissioning activities, the Proposed Development is not considered to have a significant effect on individuals from this site during any phase of development from this impact pathway.	barrier to the site and will not affect the distribution or population of the species within the NCMPA at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	11. Visual / physical	**No**- Sandeels are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as fish may travel within the ZoI. De	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
	disturbance or displacement	Robertis and Handegard, (2013) reported that avoidance behaviour in fish can occur when the separation distance between the fish and the vessel reaches 250 m, suggesting that under water noise from the vessel triggers a response at this range rather than the visual presence of the vessel. As underwater noise propagates through the water column, it is likely that any disturbance/displacement will first occur through underwater noise. While visual disturbance or displacement could still occur at closer ranges, sandeels are more likely to avoid a TTS as outlined under the potential impact of underwater noise changes. Therefore, it is concluded that underwater noise from the Proposed Development vessels will be the primary cause of disturbance/displacement and sandeels are unlikely to be within range of the Proposed Development vessels for visual disturbance or displacement.. It is noted that repeated disturbance, or disturbance over an extended period of time can affect survival and productivity of individuals, however, given the temporary and transient nature of the construction, repair, and decommissioning activities, any fish that travel close enough to the Proposed Development vessels to experience disturbance/displacement are unlikely to encounter repeated disruptions. Therefore, the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
Sea of the Hebrides NCMPA **Distance from the Proposed Development to the NCMPA: 258.3 km**				
Species: • Minke whale*.	3. Changes in distribution of prey species	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for minke whale. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Furthermore, minke whale have a varied diet feeding on krill (and other animals of the plankton), and small fish such as sandeels, herring, sprat, haddock, saithe, whiting and small cod (NatureScot, 2023a). Having a varied diet makes minke whale less susceptible to changes in distribution of prey species. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	7. EMF	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as minke whale may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that minke whale have large MUs (IAMMWG, 2023), minke whale have a low likelihood of being affected by EMF from cable	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. As minke whale are also predominantly pelagic cetaceans, it can be assumed that minke whale will also not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as the site is 258.3 km away from the RLB, and that minke whale have a large MU (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood of occurrence of any impact. In conclusion, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	systems. It is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact. There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	
	10. Underwater noise changes	**No-** Minke whale are listed as a Scottish PMF (NatureScot, 2020). The Proposed Development will not involve any impulsive noise (UXO clearance will be the subject of a separate licence). Therefore, to calculate whether the underwater noise from the Proposed Development would be considered significant the 5 km EDR for geophysical surveys recommended by the JNCC, (2020) has been used as the ZoI. Although the NCMPA is beyond the ZoI, mobile species such as minke whale may travel within the ZoI.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. According to Southall *et al.* (2019) and NMFS, (2024), minke whale are categorised within the functional hearing group of LF cetacean. **Appendix 10A: Underwater Noise Modelling Technical Report** indicates that as LF cetaceans, the maximum potential impact range of a TTS on minke whale as a result of geophysical surveys using a MBES is 10-287 m. Noise levels do not exceed the threshold for impacts for a PTS or a TTS from the Proposed Development vessels and equipment. After reviewing the impact thresholds, the JNCC's advised 5 km EDR used in this assessment would be highly precautionary. Given the distance to the site, there would be no direct impacts on minke whale within the NCMPA. Indirect impacts have been considered including animals moving away from the site into the ZoI. However, given the wide area available for foraging for minke whale in the MU, and the fact that works will take place against a high level of shipping activity in the North Sea (with vessel density in some areas of 100+ hours / km^2 per month in 2023 (EMODNet, 2023), the Proposed Development activities will not have a significant effect on individuals from the site during any phase of development from this impact pathway. In addition, the licensable activities would not act as a barrier to movement to or from the site.	on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
	11. Visual / physical disturbance or displacement	**No**- Minke whale are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI (4 km EDR), mobile species such as minke whale may travel within the ZoI. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the Proposed Development vessels has an effect. Furthermore, given the distance to the site and the large extent of the MU for minke whale (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time. Therefore, any visual disturbance would be temporary and not repeated over an extended period of time. It is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	12. Collision with project vessels	**No**- Minke whale are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as minke whale may travel within the ZoI. Given the distance to the site and the large extent of the MU for minke whale (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are likely to avoid the Proposed Development vessels to	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, minke whale will be able to avoid collision with the Proposed Development vessels. The Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
North-east Lewis NCMPA **Distance from the Proposed Development to the NCMPA: 159.5 km**				
Species: • Risso's dolphin*.	3. Changes in distribution of prey species	**No-** Risso's dolphin are listed as a Scottish PMF (NatureScot, 2020). Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for Risso's dolphin. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Furthermore, most of the Risso's dolphin diet is made up of squid (NOAA, 2025), which does not have a benthic life stage. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	7. EMF	**No-** Risso's dolphin are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		ZoI, mobile species such as Risso's dolphin may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. As Risso's dolphin are also predominantly pelagic cetaceans, it can be assumed that Risso's dolphin will also not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as the site is 159.9 km away from the RLB, and that Risso's dolphin have a large MU (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood of occurrence of any impact. In conclusion, the	construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that Risso's dolphin have large MUs (IAMMWG, 2023), Risso's dolphin have a low likelihood of being affected by EMF from cable systems. It is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact. There is no pathway between the Proposed Development and other projects and plans to interact with the NCMPA at any stage of the development.	

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.		
	10. Underwater noise changes	**No**- Risso's dolphin are listed as a Scottish PMF (NatureScot, 2020). The Proposed Development will not involve any impulsive noise (UXO clearance will be the subject of a separate licence). Therefore, to calculate whether the underwater noise from the Proposed Development would be considered significant the 5 km EDR for geophysical surveys recommended by the JNCC, (2020) has been used as the ZoI. Although the NCMPA is beyond the ZoI (5 km EDR), mobile species such as Risso's dolphin may travel within the ZoI. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. According to Southall *et al.,* (2019) and NMFS, (2024), Risso's dolphin are categorised within the functional hearing group of high frequency (HF) cetacean. **Appendix 10A: Underwater Noise Modelling Technical Report** indicates that as HF cetaceans, the maximum potential impact range of a TTS on for Risso's dolphin as a result of geophysical surveys using a MBES is 290-300 m. Noise levels do not exceed the threshold for impacts for a PTS or a TTS from the Proposed Development vessels and equipment. After reviewing the impact thresholds, the JNCC's advised 5 km EDR used in this assessment would be highly precautionary.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		Given the distance to the site there would be no direct impacts on Risso's dolphin within the NCMPA. Indirect impacts have been considered including animals moving away from the site into the ZoI. However, given the wide area available for foraging for Risso's dolphin in the MU, and the fact that works will take place against a high level of shipping activity in the North Sea (with vessel density in some areas of 100+ hours / km^2 per month in 2023 (EMODNet, 2023)), the Proposed Development activities will not have a significant effect on individuals from the site during any phase of development from this impact pathway. In addition, the licensable activities would not act as a barrier to movement to or from the site.		
	11. Visual / physical disturbance or displacement	**No**- Risso's dolphin are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI (4 km EDR), mobile species such as Risso's dolphin may travel within the ZoI. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the Proposed Development vessels has an effect. Furthermore, given the distance to the site and the large extent of the MU for Risso's dolphin (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time. Therefore, any visual disturbance would be temporary and not repeated over an extended period of	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		time. It is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.		
	12. Collision with project vessels	**No**- Risso's dolphin are listed as a Scottish PMF (NatureScot, 2020). Although the NCMPA is beyond the ZoI, mobile species such as Risso's dolphin may travel within the ZoI. Given the distance to the site and the large extent of the MU for Risso's dolphin (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are likely to avoid the Proposed Development vessels to prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, Risso's dolphin will be able to avoid collision with the Proposed Development vessels. The Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the NCMPA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
North East of Farnes Deep HPMA **Distance from the Proposed Development to the HPMA: 67.9 km**				
Important bird species: • Common guillemot; • Razorbill; and • Atlantic puffin.	3. Changes in distribution of prey species	**No-** Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		significant impact on fish prey species for common guillemot, razorbill and Atlantic puffin. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	4. Temporary increase and deposition of suspended sediments	**No-** Although the HPMA is beyond the ZoI (within 15 km of the RLB), mobile species such common guillemot, razorbill and Atlantic puffin may travel within the ZoI. However, given that the mean max foraging range ±1 SD (as listed in **Table 5-2**) of common guillemot, razorbill and Atlantic puffin is 55.5 ± 39.7 km, 73.8 ± 48.4 km and 119.6 ± 131.2 km, respectively, there will be sufficient alternative foraging areas available outside of the Proposed Development. Furthermore, given the temporary and transient nature of the construction, repair and decommissioning activities, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	10. Underwater noise changes	**No-** Although the HPMA is beyond the ZoI (5 km EDR), mobile species such common guillemot, razorbill and Atlantic puffin may travel within the ZoI. Birds identified	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		as being sensitive to the Proposed Development activities are diving species/water column feeders that are submerged for longer periods of time when diving for prey. Birds may take evasive action, but a single disturbance event does not have an immediate effect on the survival or productivity of an individual bird. However, repeated disturbance, or disturbance over an extended period of time can affect survival and productivity. Given the transient nature of the construction, repair and decommissioning activities and that the Proposed Development vessels will be progressing in a linear manner away from the HPMA, repeated or extended disturbance of individual birds is unlikely. Common guillemot and razorbill have a low to moderate disturbance susceptibility score (where 1 is the lowest and 5 is the highest) of 3 (MIG-Birds, 2022) and as such, are identified as being moderately sensitive to disturbance. However, (Fliessbach *et al.,* 2019) calculated that the mean escape distance of common guillemot is 127 m and the mean escape distance for razorbill is 395 m, which is significantly less than the 5 km ZoI. Given that common guillemot and razorbill have large mean max foraging ranges ±1 SD (as listed in **Table 5-2**) of 55.5 ± 39.7 km and 73.8 ± 48.4 km, respectively, they will be able to avoid travelling within range of the escape distance without significantly reducing foraging opportunities. In the event that common guillemot or razorbill are disturbed/displaced by underwater noise from the Proposed Development, they will be able to return to forage in the area once vessels have moved on. Atlantic puffin have a low disturbance susceptibility score of 2 (MIG-Birds 2022) and are not identified as being sensitive to disturbance.	is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		Furthermore, considering the transient nature of the construction, repair, and decommissioning activities, coupled with the fact that vessels will not remain in one area for extended periods, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.		
	11. Visual / physical disturbance or displacement	**No-** Although the HPMA is beyond the ZoI (5 km EDR), mobile species such common guillemot, razorbill and Atlantic puffin may travel within the ZoI. Birds that are sensitive to noise disturbance are typically also sensitive to visual disturbance. Given that the 5 km EDR is recommended by JNCC, (2020) for geophysical surveys for VHF cetaceans such as harbour porpoise and that birds are less sensitive to underwater noise than marine mammals, they are more likely to be displaced by the visual presence of the Proposed Development vessels before being affected by underwater noise. Therefore, it is concluded that underwater noise from the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
Important marine mammal species: • Harbour porpoise; • Minke whale;	3. Changes in distribution of prey species	**No-** Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
• White-beaked dolphin; and • Grey seal.		have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for harbour porpoise, minke whale, white-beaked dolphin and grey seal. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	10. Underwater noise changes	**No**- Although the HPMA is beyond the ZoI (5 km EDR), mobile species such as harbour porpoise, minke whale, white-beaked dolphin and grey seal may travel within the ZoI. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. The worst-case scenario for underwater noise is for VHF cetaceans (such as harbour porpoise) which have the largest potential impact range for TTS and PTS from geophysical surveys, vessel and equipment noise. **Appendix 10A: Underwater Noise Modelling Technical Report** indicates that, the maximum potential impact range of a PTS on VHF cetaceans as a result of geophysical surveys using a MBES is 290-315 m. The potential impact range for a TTS is larger when using an ultra short baseline (USBL) at 635-1,285 m m. These distances are significantly reduced for HF and LF	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, minke whale, white-beaked dolphin and grey seal within the HPMA or species specific MU (for cetaceans) at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		cetaceans. When considering the Proposed Development vessels and equipment, underwater noise levels do not exceed the threshold for a PTS for VHF cetaceans and the maximum impact range for a TTS is between 30-108 m for the Proposed Development where a trailing suction hopper dredger or rock placement vessel is used. Survey vessels and construction support vessels can cause a TTS with a potential impact range of 11 m for the Proposed Development. Underwater noise levels from vessels and equipment do not exceed the threshold for a PTS or a TTS in HF or LF cetaceans. Phocid Carnivores in Water (PCW) include grey seal, which **Appendix 10A: Underwater Noise Modelling Technical Report** indicates have a potential impact range for a TTS from geophysical surveys using a MBES of 280-293 m and a range of 120-215 for a PTS. Underwater noise levels from vessels and equipment do not exceed the threshold for a PTS or a TTS in PCW. Given the large MUs for harbour porpoise, minke whale and white-beaked dolphin (IAMMWG, 2023) and the 100 km foraging range of grey seal (Carter *et al*., 2022; SCOS, 2022) compared to the potential impact distances for TTS and PTS, and the transient nature of the construction, repair and decommissioning activities, the Proposed Development is not considered to have a significant effect on individuals from this site during any phase of development from this impact pathway.		
	11. Visual / physical disturbance or displacement	**No-** Although the HPMA is beyond the ZoI (4 km EDR), mobile species such as harbour porpoise, minke whale, white-beaked dolphin and grey seal may travel within the ZoI. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the Proposed Development vessels has an effect. Seal are more sensitive to anthropogenic disturbance when hauled out. Wilson, (2013) presents a review of such studies, and concludes that as an overall generalisation, unless habituation has been established by frequent non-intrusive visits, a safe boat distance for grey seal (i.e., one at which there is a low risk of significant numbers of seal flushing) is about 200 m. As the HPMA is located approximately 55 km offshore, and the Proposed Development is located 67.9 km (north) away from the HPMA, vessels will not disturb seal haul out sites. In conclusion, given the distance to the site, the distance from grey seal haul out sites, the large extent of the MUs for harbour porpoise, minke whale and white-beaked dolphin (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time. Therefore, any visual disturbance would be temporary and not repeated over an extended period of time. It is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, minke whale, white-beaked dolphin and grey seal within the HPMA or species-specific MU (for cetaceans) at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	12. Collision with project vessels	**No**- Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise, minke whale, white-beaked dolphin and grey seal may travel within the ZoI. Given the distance to the site and the large extent of the MUs for cetaceans (IAMMWG, 2023) and the 100 km foraging distance of grey seal (Carter *et al*., 2022; SCOS, 2022) and the transient and temporary nature of	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are likely to avoid the Proposed Development vessels to prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, marine mammals will be able to avoid collision with the Proposed Development vessels. The Proposed Development will not have a significant effect on harbour porpoise, minke whale, white-beaked dolphin and grey seal from this site during any phase of development from this impact pathway.	acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not affect the distribution or population of harbour porpoise, minke whale, white-beaked dolphin and grey seal within the HPMA or species-specific MU (for cetaceans) at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
Important marine mammal species: • Harbour porpoise; • Minke whale; and • White-beaked dolphin.	7. EMF	**No-** Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise, minke whale and white-beaked dolphin may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that marine mammals have large MUs (IAMMWG, 2023), harbour porpoise, white-beaked dolphin and minke whale have a low likelihood of being affected by EMF from cable systems. It is considered that the Proposed Development will	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. As minke whale and white-beaked dolphin are also predominantly pelagic cetaceans, it can be assumed that these species will also not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as the site is 67.9 km away from the RLB, and that harbour porpoise, minke whale and white-beaked dolphin have large MUs (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood of occurrence of any impact. In conclusion, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, minke whale and white-beaked dolphin within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact. There is no pathway between the Proposed Development and other projects and plans to interact with the HPMA at any stage of the development.	
Dolphin Head HPMA **Distance from the Proposed Development to the HPMA: 690.1 km**				
Important marine mammal species: • Harbour porpoise; • Short-beaked common dolphin; • Risso's dolphin; and	3. Changes in distribution of prey species	**No-** Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale. The	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
• Minke whale.		permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	7. EMF	**No-** Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. As short-beaked common dolphin, Risso's dolphin and	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that marine mammals have large MUs (IAMMWG, 2023), harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale have a low likelihood of being affected by EMF from cable systems. It is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale within the HPMA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact. There is no pathway between the Proposed	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		minke whale are also predominantly pelagic cetaceans, it can be assumed that these species will also not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as the site is 690.1 km away from the RLB, and that harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale have large MUs (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood and occurrence of any impact. In conclusion, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	Development and other projects and plans to interact with the HPMA at any stage of the development.	
	10. Underwater noise changes	**No**- Although the HPMA is beyond the ZoI (5 km EDR), mobile species may such as harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale travel within the ZoI. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. The worst-case scenario for underwater noise is for VHF cetaceans (such as harbour porpoise) which have the largest potential impact range for TTS and PTS from geophysical surveys, vessel and equipment noise. **Appendix 10A: Underwater Noise Modelling Technical Report** indicates that, the maximum potential	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, short-beaked common dolphin, Risso's dolphin	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		impact range of a PTS on VHF cetaceans as a result of geophysical surveys using a MBES is 290-315m. The potential impact range for a TTS is larger when using an USBL at 635-1,285 m. These distances are significantly reduced for HF and LF cetaceans. When considering the Proposed Development vessels and equipment, where underwater noise levels do not exceed the threshold for a PTS for VHF cetaceans and the maximum impact range for a TTS is between 30-108 m for the Proposed Development where a trailing suction hopper dredger or rock placement vessel is used. Survey vessels and construction support vessels can cause a TTS with a potential impact range of 11 m for the Proposed Development. Underwater noise levels from vessels and equipment do not exceed the threshold for a PTS or a TTS in HF or LF cetaceans. Given the large MUs for harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale (IAMMWG, 2023) compared to the potential impact distances for TTS and PTS, the transient nature of the construction, repair and decommissioning activities, the Proposed Development is not considered to have a significant effect on individuals from this site during any phase of development from this impact pathway.	and minke whale within the HPMA or species specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	11. Visual / physical disturbance or displacement	**No**- Although the HPMA is beyond the ZoI (4 km EDR), mobile species such as harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale may travel within the ZoI. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		presence of the Proposed Development vessels has an effect. Furthermore, given the distance to the site and the large extent of the MUs for harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time. Therefore, any visual disturbance would be temporary and not repeated over an extended period of time. It is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	12. Collision with project vessels	**No**- Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale may travel within the ZoI. Given the distance to the site and the large extent of the MUs for marine mammals harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are likely to avoid the Proposed Development vessels to prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, marine mammals will be able to avoid collision with the Proposed Development	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not affect the distribution or population of harbour porpoise, short-beaked common dolphin, Risso's dolphin and minke whale within the HPMA or species-specific MU at any stage of the development. Therefore, it is concluded that there will be no	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		vessels. The Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	detectable contribution to an in-combination effect resulting from this impact.	
Allonby Bay HPMA **Distance from the Proposed Development to the HPMA: 268.6 km**				
Important marine mammal species: • Harbour porpoise.	3. Changes in distribution of prey species	**No-** Disturbance including habitat loss of the seabed during the spawning season for important fish prey species with a demersal life stage (i.e. sandeel and herring) could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species. **Chapter 8: Fish and Shellfish** concluded that the Proposed Development would not have a significant adverse effect on fish species and in turn will not have a significant impact on fish prey species for harbour porpoise. The permanent loss of habitat is extremely localised relative to the wider geographic areas available to prey species. No impact on stock recruitment is predicted. Therefore, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	**No**- A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to animals foraging within the site and will not affect the distribution or population of the species within the HPMA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	**Screened out**
	7. EMF	**No-** Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise may travel within the ZoI. The burial and bundling of cables help to reduce the strength of induced electrical fields when compared to surface laid cables. An EMF study was undertaken for the Proposed Development (**Appendix 3A: EMF assessment**). It calculates that EMF fields on the seabed immediately above the cables will reach 123.8 µT (or 76.4 µT without the Earth's magnetic field) but	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		and will attenuate to background levels within 0.520 m of the bundled cables. The cables will be buried within the sediment at a minimum depth of 1 m and a maximum depth of 2.25 m. Therefore, where cables are buried, there will be no changes in EMF above the seabed. However, if minimum burial depth cannot be achieved, there may be an increase in EMF above the seabed. Gill and Kimber, (2005) report that there have been no impacts to the migration of cetaceans over existing interconnector cables and Walker, (2001) notes that harbour porpoise migration across the Basslink interconnector has been observed unhindered despite several crossings of operating sub-sea HVDC cables. Therefore, it can be assumed harbour porpoise will not be significantly affected by HVDC cables. Given the rapid attenuation of the magnetic field, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field, cetaceans have a low likelihood of being affected by EMF. Furthermore, as the site is 268.6 km away from the RLB, and that harbour porpoise have a large MU (IAMMWG, 2023), it is unlikely that individuals will be in the vicinity of the Proposed Development for a sustained period of time, reducing the likelihood of occurrence of any impact. In conclusion, the Proposed Development will not have a significant effect on individuals from this site during any phase of development from this impact pathway.	on the site. However, given the insignificant effects of the Proposed Development alone, the lack of evidence of effects on cetaceans, and the predominantly pelagic existence resulting in separation with the change in field and that harbour porpoise have a large MU (IAMMWG, 2023), harbour porpoise have a low likelihood of being affected by EMF from cable systems. It is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact. There is no pathway between the Proposed Development and other projects and plans to interact with the HPMA at any stage of the development.	
	10. Underwater noise changes	**No**- Although the HPMA is beyond the ZoI (5 km EDR), mobile species may travel within the ZoI. The effects of noise disturbance may be physical, physiological and / or behavioural. Disturbance is frequently a behavioural response to noise and may lead to animals being displaced from an affected area. The onset of a TTS can be referred to as the fleeing response. This is therefore a	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		behavioural response, and animals exposed to these noise levels are likely to actively avoid injury as a result of a PTS by moving away from the area. The worst-case scenario for underwater noise is VHF cetaceans (such as harbour porpoise) which have the largest potential impact range for TTS and PTS from geophysical surveys, vessel and equipment noise. **Appendix 10A: Underwater Noise Technical Modelling Report** indicates that, the maximum potential impact range of a PTS on VHF cetaceans as a result of geophysical surveys using a MBES is 290-315m. The potential impact range for a TTS is larger when using an USBL at 635-1,285 m. These distances are significantly reduced for the Proposed Development vessels and equipment, where underwater noise levels do not exceed the threshold for impacts of a PTS and the maximum impact range for a TTS is between 30-108 m for the Proposed Development where a trailing suction hopper dredger or rock placement vessel is used. Survey vessels and construction support vessels can cause a TTS with a potential impact range of 11 m for the Proposed Development. Given the large MUs for harbour porpoise (IAMMWG, 2023) compared to the potential impact distances for TTS and PTS, the transient nature of the construction, repair and decommissioning activities, the Proposed Development is not considered to have a significant effect on individuals from this site during any phase of development from this impact pathway.	acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the distance to the site, the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	11. Visual / physical disturbance or displacement	**No**- Although the HPMA is beyond the ZoI (4 km EDR), mobile species such as harbour porpoise may travel within the ZoI. As light levels within the water column decrease rapidly with depth, cetaceans have evolved a sophisticated acoustic sensory system which helps them to navigate, find prey, communicate with each other and avoid	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		potential predators (Guan, 2023). Therefore, it is likely that any disturbance/displacement would primarily result from changes in underwater noise before the visual presence of the Proposed Development vessels has an effect. Furthermore, given the distance to the site and the large extent of the MU for harbour porpoise (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time. Therefore, any visual disturbance would be temporary and not repeated over an extended period of time. It is concluded that the Proposed Development will not have a significant impact on individuals from this site during any phase of development from this impact pathway.	fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not act as a barrier to the site and will not affect the distribution or population of the species within the HPMA or MU at any stage of the development. Therefore, it is concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	
	12. Collision with project vessels	**No**- Although the HPMA is beyond the ZoI, mobile species such as harbour porpoise may travel within the ZoI. Given the distance to the site and the large extent of the MU for harbour porpoise (IAMMWG, 2023) and the transient and temporary nature of the construction, repair and decommissioning activities, it is unlikely that individuals will be in the vicinity of the Proposed Development vessels for a sustained period of time, reducing the likelihood of collision. Individuals are likely to avoid the Proposed Development vessels to prevent the onset of a TTS and a PTS. Given that vessels involved in the Proposed Development are likely to be either stationary or travelling slowly (circa 5 knots) in predictable straight lines during construction, maintenance or decommissioning activities, harbour porpoise will be able to avoid collision with the Proposed Development vessels. The Proposed Development will	**No-** A high level of marine development is scheduled for the North Sea over the next ten years, particularly for the construction of offshore wind and other cable projects. There is the potential for more than one project to be under construction at the same time as the Proposed Development or occurring consecutively, extending the duration of or widening the spatial extent of impacts. It is also acknowledged that existing activities such as commercial fisheries, tourism and recreation, military practice areas and shipping and navigation can be sporadic or have a continuous use of the region and may already exert pressure on the site. However, given the transient and temporary nature of the Proposed Development activities and the insignificant effects of the Proposed Development alone, it is considered that the Proposed Development will not affect the distribution or population of the species within the HPMA or MU at any stage of the development. Therefore, it is	**Screened out**

Relevant protected feature	Potential impact	Connectivity between Proposed Development and the protected feature	Pathway for in-combination	Screening decision
		not have a significant effect on individuals from this site during any phase of development from this impact pathway.	concluded that there will be no detectable contribution to an in-combination effect resulting from this impact.	

8. Stage 1 Screening Conclusion

Having regard to the relevant legislation and the methodology followed, a Stage 1 Initial Screening was undertaken to ascertain whether or not the Proposed Development is capable of affecting (other than insignificantly) the protected features of any of the relevant MPAs identified **in Section 5.2**, alone and in-combination with other plans or projects.

The screening approach identified seven designated sites as relevant, either because they were in the direct ZoI of the Project, or they contained mobile species which could potentially travel into the ZoI of the Project.

A review of the Project Description identified 14 potential impact pathways during construction, operation and decommissioning, namely:

- Temporary habitat loss / seabed disturbance;
- Permanent habitat loss;
- Changes in distribution of prey species;
- Temporary increase and deposition of suspended sediments;
- Water flow (tidal current) changes, including sediment transport considerations;
- Temperature changes – local;
- EMF;
- Introduction or spread of MINNS;
- Barriers to species movement;
- Underwater noise changes;
- Visual / physical disturbance or displacement (above water noise);
- Collision with project vessels;
- Accidental spills; and
- In-combination effects.

The Initial Screening assessment, taking into consideration the conservation objectives for the designated sites and the protected features was undertaken for each relevant MPAs and is summarised in **Table 8-1**. The Initial Screening assessment reached the conclusion that the Proposed Development is not capable of affecting (other than insignificantly) the protected features of any of the relevant MPAs identified in **Section 5.2**. Therefore, Initial Screening concluded that Stage 2 Main Assessment is not required.

Table 8-1: Summary of Stage 1 Initial Screening

Designated site name	Protected feature	Potential impact	Initial Screening conclusion
Southern Trench NCMPA	Geology: • Quaternary of Scotland: Moraines; • Quaternary of Scotland: Sub-glacial tunnel valleys; • Submarine Mass Movement: Slide scars; • Fronts- large-scale feature (marine); and • Shelf deeps- large-scale feature (marine). Habitats:	• Temporary habitat loss / seabed disturbance; • Permanent habitat loss; and • Water flow (tidal current) changes, including sediment transport considerations.	**Screened out**

	• Burrowed mud.		
	Habitats: • Burrowed mud.	• Temporary increase and deposition of suspended sediments.	**Screened out**
	Species: • Minke whale.	• Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	**Screened out**
Turbot Bank NCMPA	Species: • Sandeels.	• Temporary habitat loss / seabed disturbance; • Permanent habitat loss; • Changes in distribution of prey species; • Temporary increase and deposition of suspended sediments; • Water flow (tidal current) changes, including sediment transport considerations; • EMF; • Underwater noise changes; and • Visual / physical disturbance or displacement.	**Screened out**
Sea of the Hebrides NCMPA	Species: • Minke whale.	• Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	**Screened out**
North-east Lewis NCMPA	Species: • Risso's dolphin.	• Changes in distribution of prey species;	**Screened out**

		• EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	
North East of Farnes Deep HPMA	Important bird species: • Common guillemot; • Razorbill; and • Atlantic puffin.	• Changes in distribution of prey species; • Temporary increase and deposition of suspended sediments; • Underwater noise changes; and • Visual / physical disturbance or displacement.	**Screened out**
	Important marine mammal species: • Harbour porpoise; • Minke whale; • White-beaked dolphin; and • Grey seal.	• Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	**Screened out**
Dolphin Head HPMA	Important marine mammal species: • Harbour porpoise; • Short-beaked common dolphin; • Risso's dolphin; and • Minke whale.	• Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	**Screened out**
Allonby Bay HPMA	Important marine mammal species: • Harbour porpoise.	• Changes in distribution of prey species; • EMF; • Underwater noise changes; • Visual / physical disturbance or displacement; and • Collision with project vessels.	**Screened out**

Appendix 1.

Relevant Site Descriptions and Conservation Objectives

The site descriptions and conservation objectives for all relevant MPAs are presented in **Appendix Table 1**.

Appendix Table 1: Relevant site description and conservation objectives

Designated site name	Site description	Conservation objectives
Southern Trench NCMPA NatureScot, 2024; NatureScot, 2020a)	The Southern Trench NCMPA is located off the north-east coast of Scotland and covers an area of 2,398 km^2. It is dominated by a deep geological trench which was formed by glacial movement and contains rock formations which are thought to be over 250 million years old. The trench is 58 km long, 9 km wide and 250 m deep. The trench area is an important nursery ground for juvenile fish, and the burrowed mud habitat supports a diverse assemblage of fauna, including seapens, tube anemones lobster and crabs. The NMCPA features a mixing zone of warm and cold waters known as a front that attracts shoals of herring, mackerel and cod. This attracts predators such as minke whale.	The Conservation Objectives of the Southern Trench MPA, are that the protected features: • So far as already in favourable condition, remain in such condition; and • So far as not already in favourable condition, be brought into such condition, and remain in such condition. "Favourable condition", with respect to a feature of geomorphological interest, means that: a. Its extent, component elements and integrity are maintained; b. Its structure and functioning are unimpaired; and c. Its surface remains sufficiently unobscured for the purposes of determining whether the criteria in paragraphs (a) and (b) are satisfied. For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured under paragraph (3)(c), any obscuring of that feature entirely by natural processes is to be disregarded. "Favourable condition", with respect to a marine habitat, means that a. Its extent is stable or increasing; and b. Its structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating. Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery from such deterioration. "Favourable condition", with respect to a large-scale feature, means that: a. The extent, distribution and structure of that feature is maintained; b. The function of the feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including, but not restricted to, feeding, spawning, courtship or use as nursery grounds; and c. The processes supporting the feature are maintained.

		For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded. "Favourable condition", with respect to a mobile species of marine fauna, means that: a. The species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds; b. The extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and c. The structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.
Turbot Bank NCMPA (JNCC, 2017a; JNCC,2028)	The Turbot Bank NCMPA is located off the east coast of Scotland covering an area of 251 km^2. The site ranges in depth from 60-80 m and lies within an area of sandy sediment and includes the shelf bank and mound feature known as 'Turbot Bank'. Turbot bank is important for sandeels particularly Raitt's sand eel (*Ammodytes marinus*). The sandeels within the site are an important component of the larger sandeel population in the North Sea and are important prey items for seabirds, other fish species and marine mammals. Conserving this site will help to maintain its potential to act as a source of sandeel larvae for surrounding areas.	The Conservation Objective for the Turbot Bank Nature Conservation Marine Protected Area is that the protected feature (Sandeels): • So far as already in favourable condition, remain in such condition; and • So far as not already in favourable condition, be brought into such condition, and remain in such condition. With respect to the Sandeels, this means that the quality and quantity of its habitat and the composition of its population are such that they ensure that the population is maintained in numbers which enable it to thrive. Any temporary reduction of numbers is to be disregarded if the population of Sandeels is thriving and sufficiently resilient to enable its recovery from such reduction. Any alteration to that feature brought about entirely by natural processes is to be disregarded.
Sea of the Hebrides NCMPA	The Sea of the Hebrides NCMPA is located off the north-west coast of Scotland covering area of 10,039 km^2. The NCMPA lies within the Inner Hebrides Carbonate Production Area, which is a key geodiversity area in Scottish waters, representing an internationally important example of a non-tropical shelf carbonate system. Cool, nutrient-rich water mixes with shallow warmer water within the NCMPA generating an area of high productivity known as a front. Fronts concentrate nutrients and plankton to create a feeding ground that attracts predators such as basking shark and minke whale.	The Conservation Objectives of the Sea of the Hebrides MPA, are that the protected features: • So far as already in favourable condition, remain in such condition; and • So far as not already in favourable condition, be brought into such condition, and remain in such condition. "Favourable condition", with respect to a feature of geomorphological interest, means that: a. Its extent, component elements and integrity are maintained; b. Its structure and functioning are unimpaired; and c. Its surface remains sufficiently unobscured for the purposes of determining whether the criteria in paragraphs (a) and (b) are satisfied.

		For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured under paragraph (3)(c), any obscuring of that feature entirely by natural processes is to be disregarded. "Favourable condition", with respect to a large-scale feature, means that: a. The extent, distribution and structure of that feature is maintained; b. The function of the feature is maintained so as to ensure that it continues to support its characteristic biological communities and their use of the site including, but not restricted to, feeding, spawning, courtship or use as nursery grounds; and c. The processes supporting the feature are maintained. For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded. "Favourable condition", with respect to a mobile species of marine fauna, means that: a. The species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds; b. The extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and c. The structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating.
North-east Lewis NCMPA (NatureScot, 2024a; NatureScot, 2020b)	The North-east Lewis NCMPA is located off the north-west coast of Scotland in the Minch strait, covering an area of 907 km^2 and is towards the most northerly extent of the Risso's dolphin range. Mothers with calves and groups of juveniles have been recorded within the NCMPA which suggests that this site is not only used for feeding but also for breeding, nursing and raising young. The NCMPA encompasses a former sandeel fishing ground that supports an important component of a larger, patchy sandeel population on the west coast. The well-flushed sandy seabed substrates preferred by the sandeels also form part of an internationally important assemblage of geodiversity interests present in this part of the Minch.	The Conservation Objectives of the North-east Lewis MPA, are that the protected features: • So far as already in favourable condition, remain in such condition; and • So far as not already in favourable condition, be brought into such condition, and remain in such condition. "Favourable condition", with respect to a feature of geomorphological interest, means that: a. Its extent, component elements and integrity are maintained; b. Its structure and functioning are unimpaired; and c. Its surface remains sufficiently unobscured for the purposes of determining whether the criteria in paragraphs (a) and (b) are satisfied. For the purpose of determining whether a feature of geomorphological interest is sufficiently unobscured under paragraph (3)(c), any obscuring of that feature entirely by natural processes is to be disregarded.

		"Favourable condition", with respect to a mobile species of marine fauna, means that: a. The species is conserved or, where relevant, recovered to include the continued access by the species to resources provided by the MPA for, but not restricted to, feeding, courtship, spawning or use as nursery grounds; b. The extent and distribution of any supporting features upon which the species is dependent is conserved or, where relevant, recovered; and c. The structure and function of any supporting feature, including any associated processes supporting the species within the MPA, is such as to ensure that the protected feature is in a condition which is healthy and not deteriorating For the purpose of determining whether a protected feature is in favourable condition any alteration to that feature brought about entirely by natural processes is to be disregarded.
North East of Farnes Deep HPMA (JNCC, 2023; JNCC, 2023a)	The North East of Farnes Deep HPMA was designated in June 2023 and overlaps entirely with the North East of Farnes Deep MCZ, however they remain as two distinct designations. HPMAs extend protection to the entire marine ecosystem (seabed, water column, processes and all species) within the site. The HPMA is located approximately 55 km offshore from the north Northumberland Coast, in the northern North Sea covering an area of 492 km^2. The seabed within the HPMA is a mix of highly mosaiced habitats, ranging from coarse sediments through to mixed sediments and mud. These are relatively stable habitats, which support a diverse range of marine flora and fauna such as anemones, worms, molluscs, echinoderms and fish species. These habitats also support birds and marine mammals, with at least seven nationally important seabird species and five marine mammal species recorded within the area. Large areas of muddy habitats cover 27 km^2 of the HPMA (equivalent to 5% of the site) and are thought to be important for the storage of carbon. At present, this is the only offshore HPMA with blue carbon habitats.	The conservation objective for the North East of Farnes Deep HPMA is to: a. Achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the North East of Farnes Deep Highly Protected Marine Area, to a natural state, and b. Prevent further degradation and damage to the protected feature, subject to natural change. Such that within the site: 1. The ecosystem is allowed to fully recover in the absence of damaging activities such that: a. The ecosystem structure consists of a diverse range of benthic and pelagic communities, habitats and species, including biotic and abiotic components of the ecosystem. These fulfil a variety of functional roles, including supporting key life cycle stages and/or behaviours of marine species; b. The physical, biological and chemical ecosystem processes and functions proceed unhindered, so that the site realises its full ecological potential to deliver goods and services, including habitats and species considered important to the long-term storage of carbon; and c. The ecosystem is resilient to change and stressors. 2. Any ecosystem changes brought about by the process of removing anthropogenic pressures should be considered in the context of a naturally recovering ecosystem. 3. The HPMA supports our understanding of how marine ecosystems change and recover in the absence of impacting activities. Note that this does not prevent human intervention to enable or facilitate recovery or the prevention of degradation or damage.

Dolphin Head HPMA (JNCC, 2023b; JNCC, 2023c)	The Dolphin Head HPMA was designated in June 2023 and covers an area of 466 km^2, with a depth range of 45-62 m. HPMAs extend protection to the entire marine ecosystem (seabed, water column, processes and all species) within the site. The HPMA is located in the eastern English Channel, approximately 55 km South of Selsey Bill, West Sussex. The seabed within the HPMA is a mix of high-energy circalittoral rock, sublittoral coarse sediment and sublittoral mixed sediments. Annex I Reefs are also present, which includes bedrock, stony and biogenic Ross-worm (*Sabellaria spinulosa*) reefs. These habitats support a range of benthic, demersal and mobile species such as sponges, tube worms, anemones, bivalves and fish.	The conservation objective for the Dolphin Head HPMA is to: a. Achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the Dolphin Head Highly Protected Marine Area, to a natural state; and b. Prevent further degradation and damage to the protected feature, subject to natural change. Such that within the site: 1. The ecosystem is allowed to fully recover in the absence of damaging activities such that: a. The ecosystem structure consists of a diverse range of benthic and pelagic communities, habitats and species, including biotic and abiotic components of the ecosystem. These fulfil a variety of functional roles, including supporting key life-cycle stages and/or behaviours of marine species; b. The physical, biological and chemical ecosystem processes and functions proceed unhindered, so that the site realises its full ecological potential to deliver goods and services, including habitats and species considered important to the long-term storage of carbon; and c. The ecosystem is resilient to change and stressors. 2. Any ecosystem changes brought about by the process of removing anthropogenic pressures should be considered in the context of a naturally recovering ecosystem. 3. The HPMA supports our understanding of how marine ecosystems change and recover in the absence of impacting activities. Note that this does not prevent human intervention to enable or facilitate recovery or the prevention of degradation or damage.
Allonby Bay HPMA (DEFRA, 2023; Natural England, 2024b)	The Allonby Bay HPMA was designated in June 2023 and covers an area of 27.6 km^2 of the outer Solway Firth, out to a maximum depth of 6.6 m. The site overlaps with the Allonby Bay MCZ (they remain as two distinct designations) and the Solway Firth SPA. A mix of rocky and sediment habitats are present within the HPMA These habitats provide food for a variety of shore birds and sea birds, marine mammals and fish species as well as nursery areas for fish. Additionally, one of the best examples of honeycomb worm reefs in the UK is found here. Furthermore, Intertidal sand, muddy sand and subtidal sands form 'blue carbon' habitats (for an area of 13 km^2 which is equivalent to 47% of the HPMA) which capture and store carbon.	The conservation objective of the Allonby Bay Highly Protected Marine Area is to: a. Achieve full recovery of the protected feature, including its structure and functions, its qualities and the composition of its characteristic biological communities present within the Allonby Bay Highly Protected Marine Area, to a natural state; and b. Prevent further degradation and damage to the protected feature, subject to natural change. Within the Allonby Bay Highly Protected Marine Area: 1. The ecosystem is allowed to fully recover in the absence of damaging activities such that: a. The ecosystem structure consists of a diverse range of benthic and pelagic communities, habitats and species, including biotic and abiotic components of the ecosystem. These fulfil a variety of functional roles, including supporting key life cycle stages and/or behaviours of marine species;

		b. The physical, biological and chemical ecosystem processes and functions proceed unhindered, so that the site realises its full ecological potential to deliver goods and services, including habitats and species considered important to the long-term storage of carbon, and habitats and species important for flood and erosion protection; and c. The ecosystem is resilient to change and stressors. 2. Any ecosystem changes brought about by the process of removing anthropogenic pressures should be considered in the context of a naturally recovering ecosystem. 3. The HPMA supports our understanding of how marine ecosystems change and recover in the absence of impacting activities. Note that this does not prevent human intervention to enable or facilitate recovery or the prevention of degradation or damage.

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