Eastern Green Link 3

Marine Environmental Appraisal

Chapter 10 - Marine Mammals and Marine Reptiles

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

Scottish & Southern Electricity Networks
TRANSMISSION

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Abbreviations/Glossary

ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas
EGL	Eastern Green Link
CEMP	Construction Environmental Management Plan
CODA	Cetaceans Offshore Distribution and Abundance in the European Atlantic
EDR	Effective Deterrence Range
EIA	Environmental Impact Assessment
EPS	European Protected Species
EU	European Union
GIS	Geographical Information Systems
HF	High Frequency
HRA	Habitats Regulations Appraisal
HVDC	High Voltage Direct Current
IAMMWG	Inter-Agency Marine Mammal Working Group
ICES	International Council for the Exploration of the Sea
ICUN	International Union for Conservation of Nature
JCDP	Joint Cetacean Data Programme
JNCC	Joint Nature Conservation Committee
MarLIN	Marine Life Information Network
MBES	Multi Beam Echo Sounder
MD-LOT	Marine Directorate – Licensing Operations Team
MEA	Marine Environmental Assessment
MEAp	Marine Environment Appraisal
MHWS	Mean High-Water Springs
MPA	Marine Protected Area
MU	Management Unit
NBN	National Biodiversity Network
NERC	Natural Environment and Rural Communities
NM	Nautical Mile
NMFS	National Marine Fisheries Service
NMPi	National Marine Plan Interactive tool
OBIS	Ocean Biodiversity Information Systems
OWF	Offshore Wind Farm
PCA	Phocid Carnivores in Air
PCW	Phocid Carnivores in Water
PMF	Priority Marine Feature
PTS	Permanent Threshold Shift
RLB	Red Line Boundary
SAC	Special Area of Conservation
SBP	Sub Bottom Profiling
SCANS	Small Cetacean Abundance in the European Atlantic and North Seas
SCOS	Special Committee on Seals

SEL	Sound Exposure Level
SMRU	Sea Mammal Research Unit
SMU	Seal Monitoring Unit
SNCB	Statutory Nature Conservation Bodies
SSC	Suspended Sediment Concentration
SSS	Side Scan Sonar
TTS	Temporary Threshold Shift
UK	United Kingdom
USBL	Ultra Short Baseline
UXO	Unexploded Ordnance
VHF	Very High Frequency
ZoI	Zone of Influence

10. Marine Mammals and Marine Reptiles

10.1. Introduction

This chapter of the Marine Environmental Appraisal (MEAp) describes the potential impacts arising from construction, operation and maintenance, and decommissioning of the Proposed Development on marine mammals. For the purposes of seeking the necessary consents, the Eastern Green Link (EGL) 3 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 herein after referred to as 'the Proposed Development'). Collectively all components of EGL 3 are referred to as "the Project".

In the context of this chapter marine mammals have been grouped into cetaceans (porpoise, dolphins, whales), pinnipeds (seals) and one category of semi-aquatic mammal Eurasian otter (*Lutra lutra*). It was identified in the MEA Non-Statutory Scoping Report (SSE & NGET, 2023) for the Proposed Development that marine reptiles (chelonians, e.g. marine turtles) are rarely present within the Red Line Boundary (RLB) and North Sea in general, with only two being recorded since 2011 (NBN Atlas, 2023), and as such have not been assessed in this Marine Environmental Assessment (MEA) and are not reported on in the MEAp.

A description of the works expected to be undertaken during construction, operation and maintenance, and decommissioning of the Proposed Development is provided in Chapter 3: Project Description. The Proposed Development, defined spatially by the RLB, includes approximately 145 kilometres (km) of subsea High Voltage Direct Current (HVDC) cables. The RLB extends from mean high water springs (MHWS) at the proposed landfall at Sandford Bay, Scotland, to the boundary with adjacent English waters and is nominally 700 metres (m) wide. This width is considered adequate to micro-route around a sensitive seabed feature or habitat, or to allow for the footprint of installation vessels and is the maximum extent of seabed in which construction and operation of the Proposed Development may take place. The RLB is shown in Figure 10-1 (Drawing reference C01494-EGL3-MEA-SPEC-002-B).

As set out in Chapter 1: Introduction, cable installation and some associated activities beyond 12 nautical miles (NM) are exempt from the requirement to obtain a Marine Licence under the Marine and Coastal Access Act 2009, as well as repair of the installed cable in inshore and offshore waters. This chapter presents an assessment of the effects of the Proposed Development from MHWS at the Sandford Bay landfall to the border with English adjacent waters. This is to provide a holistic view of the Proposed Development and any associated impacts. However, consent is not being sought for the exempt cable (either installation or repair) and only cable protection will be included in the Marine Licence beyond 12 NM.

Kilometre Points (KPs) are used throughout this chapter to provide context as to where within the Study Area a feature lies (see Section 10.1.1 for definition of Study Area). KP 436 is defined at the border with adjacent English waters, while KP 580 is defined at the proposed landfall in Sandford Bay, Peterhead.

Where appropriate, the chapter identifies proportionate measures to avoid, reduce or offset any predicted adverse effects. The potential for interaction between the Proposed Development and other plans and/or projects, which may result in significant cumulative effects to marine mammals, is assessed in Section 10.11

This chapter should be read in conjunction with:

- Chapter 3: Project Description.
- Chapter 8: Fish and Shellfish which identifies the potential impacts on fish and shellfish species many of which are prey species for marine mammals and marine reptiles.

This chapter is supported by the following appendices:

- Appendix 3A: Electric and Magnetic Field Assessment
- Appendix 5A: Habitats Regulations Appraisal (HRA) Stage 1 Screening
- Appendix 5B: Habitats Regulations Appraisal Stage 2 Report to Inform Appropriate Assessment
- Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening
- Appendix 7A: Scotland Environmental Baseline Report – EGL 3
- Appendix 10A: Underwater Noise Modelling Technical Report

10.1.1. Study Area

The Proposed Development will route from MHWS at Sandford Bay, Peterhead, to the border between Scottish and English adjacent waters. A Study Area has been defined to apply a boundary for the characterisation of the marine mammals likely to be present or with the potential to be present in proximity to the Proposed Development and with the potential for direct and indirect effects associated with the activities during construction, operation (including maintenance and repair) and decommissioning. The Study Area varies between receptor groups and is identified in Table 10-1 and takes into consideration the highly mobile and transient nature of marine mammal species (illustrated in Figure 10-1 (Drawing reference C01494-EGL3-MEA-SPEC-002-B)).

Table 10-1: Study Area

Receptor	Extent of Study Area	Justification
Cetaceans (porpoises, dolphins and whales)	Relevant cetacean MUs in line with the approach taken in Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening and Appendix 5A: HRA Stage 1 Screening and Appendix 5B HRA Stage 2 Report to Inform Appropriate Assessment for the Proposed Development 250 km from the RLB for transboundary European sites	The relevant cetacean MUs for species commonly occurring in the UK have been used to define the extent of the marine mammal Study Area and are outlined by species. The spatial scale of the MUs through which the Proposed Development passes is summarised below and illustrated in Figure 10-3 (Drawing reference C01494-EGL3-MEA-SPEC-003-C): • Greater North Sea and East Coast Scotland MUs for bottlenose dolphin (*Tursiops truncatus*) • North Sea MU for harbour porpoise (*Phocoena phocoena*) • Celtic and Greater North Seas MU for minke whale (*Balaenoptera acutorostrata*), Risso's dolphin (*Grampus griseus*), white-beaked dolphin (*Lagenorhynchus albirostris*) and common short-beaked dolphin (*Delphinus delphis*) Most cetaceans are wide ranging and individuals encountered within the UK form part of a much larger biological population whose range extends beyond the boundaries of the MUs. The boundaries of an MU, as outlined by Inter-Agency Marine Mammal Working Group (IAMMWG, 2023), do not necessarily reflect the full range of a species but instead shows 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 UK Statutory Nature Conservation Bodies (SNCB) advice and are therefore the appropriate spatial scale for assessment of environmental impacts on species from marine development projects. The MEA Non-Statutory Scoping Report (SSE & NGET, 2023) determined that the largest Zone of Influence (ZoI) from potential impacts on cetaceans relates to underwater noise changes. Drawing on the conclusions of Appendix 10A: Underwater Noise Modelling Technical Report, underwater noise changes would occur from UXO clearance (not included in this MEAp), geophysical survey, construction activities and vessel noise. The greatest disturbance range was identified as a distance of 3,367 m radius from underwater noise generated by survey and construction support vessels operating within the RLB. Vessel noise was scoped out from further assessment in the MEA Non-Statutory Scoping Report. Geophysical survey underwater noise effects has however been taken forward for assessment in the MEA. The greatest injury ranges identified to result from multibeam echo sounder (MBES) at a worst case range of 315 m using the Southall *et al. (*2019) thresholds (it should be noted that using the NMFS (2024) thresholds a slightly lower range of 290 m was calculated) for Very High Frequency (VHF) cetaceans. This range reflects the distance from source at which Permanent Threshold Shift (PTS) may occur. The spatial scale of MUs is therefore sufficient to encompass the ZoI. A 250 km buffer was used from the RLB to identify relevant transboundary European sites. Harbour porpoise are observed to have seasonal grounds in the UK which stretch longitudinally for approximately 250 km. Bottlenose dolphin, while wide ranging offshore, live across four groups coastally around the UK, one of which is located within the East Coast Scotland MU (Eunis *et al.*, 2018). Therefore, a Study Area of 250 km has been assessed to be an appropriate distance to screen transboundary sites; no transboundary sites were identified within 250 km of the RLB. Given that the maximum spatial scale of impacts is restricted to 5 km (JNCC, 2020) from the RLB, this is a precautionary and conservative approach.
Grey Seal (*Halichoerus gryphus*)	Seal Assessment Units: East Scotland	Animals are known to forage widely and go on trips up to 100 km or more between haulout sites (Carter *et al.*, 2022; SCOS, 2022, BEIS 2022). These long trips are outside of the breeding season.

Receptor	Extent of Study Area	Justification
	100 km radius from coastline	NatureScot telemetry data advises that a screening buffer of 20 km be used for the breeding season (NatureScot 2023). However, the Appendix 5A: HRA Stage 1 Screening Assessment outlines that grey seal are mobile receptors which may travel within range to be impacted by vessel or geophysical survey noise. With greater foraging ranges of up to an estimated 100 km from haulout sites on the coast, the search area has been established based on a 100 km radius from the coastline.
Harbour Seal (*Phoca vitulina*)	Seal Assessment Unit: East Scotland 50 km radius from coastline	Harbour seals are rarely observed to make trips greater than 50 km from haul out sites, however JNCC guidance states that a 50 km buffer is used for assessment purposes (JNCC, 2017a; OAP, 2022).
Eurasian otter (*Lutra lutra*)	Up to 80 m from MHWS and seaward 32 km along the coastline from proposed landfall	The Eurasian otter is a semi-aquatic mammal with a wide range of habitats such as rivers, streams, lakes and estuaries on the coast. Coastal otters generally have much smaller home ranges, as little as 4-5 km off the coastline, since there is a higher abundance of prey in inshore waters (NatureScot, 2023). Overall, it is suggested that an otter's foraging range is 80 m seaward from the coast (NPWS, 2015). In freshwater habitats, otters are largely (but not exclusively) nocturnal and occupy very large home ranges, around 32 km for males and 20 km for females (NatureScot, 2024a). Therefore, the Study Area for Eurasian otter is based off the largest home range of 32 km, along the coastline from the proposed landfall.

400000 500000 600000 700000

6500000 6400000 6300000 6200000

collaborative environmental advisers

Marine Mammal Study area

C01494-EGL3-MEA-SPEC-002-B

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Grey Seal (100km Buffer)
- Harbour Seal (50km Buffer)
- Otter (32km Buffer)

Marine Mammal Management Units

- Greater North Sea (Bottlenose Dolphin)
- North Sea (Harbour Porpoise)
- Celtic and Greater North Seas (Minke Whale, Common Short-Beaked Dolphin, White-Beaked Dolpin)
- Scottish Adjacent Waters
- 12NM Limit

0 30 60 90 KM

0 15 30 45 NM

N

Date	27/06/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:1,300,000
Created	JC
Reviewed	AN
Authorised	JDM

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10.2. Data Sources

The marine mammals (including semi-aquatic Eurasian otter) baseline characterisation has been determined based on a review of site-specific data, publicly available information and consultation with relevant organisations. This provides a robust, up-to-date characterisation of the marine mammals within the Study Area in accordance with the relevant guidance for this topic.

10.2.1. Site-Specific Survey Data

Extensive contemporary and historic information is available regarding the marine mammals of the North Sea. Following a detailed review to inform the scope of the data and assessment, while the Proposed Development transects or is in proximity to sites designated for the protection of cetaceans, offshore site-specific aerial surveys were not considered necessary due to the temporary and transient nature of construction, though data from the benthic survey has provided data for the assessments reported within the MEAp. For instance, seabed sampling included sediment sampling assessments for Particle Size Analysis (PSA). This PSA data has been used to inform a number of assessments including benthic and fish and shellfish. However, Appendix 7A: Scotland Environmental Baseline Report – EGL 3 (NextGeo, 2025) was commissioned to inform the assessment of supporting benthic habitats for sandeel and herring grounds surrounding the RLB. This has been used to inform a significance assessment regarding changes in prey availability (as a consequence of temporary and permanent habitat loss).

10.2.2. Publicly Available Data

A desk-based review of publicly available data sources (literature and Geographical Information Systems (GIS) mapping files) has been used to describe the baseline environment. In the absence of publicly available data, a precautionary approach has been taken based on experience of similar linear schemes and professional judgement, to inform the scope of the assessment. While it is recognised that there is limited data available on the behaviour and extent of some species, it is considered that the data available provides an appropriate evidence base for marine mammals and Eurasian otter within the Study Area and, where appropriate, inference has been applied (as defined in Section 10.4.1).

Table 10-2 lists the key data sources which have been used in the assessment.

Table 10-2: Data sources used to inform the baseline and assessment

Data Source	Description	Reference
Cetaceans		
Inter-Agency Marine Mammal Working Group	Updated abundance estimates for cetacean Management Units in UK waters. JNCC Report No. 734. Marine Mammal management units.	IAMMWG (2023)
Joint Cetacean Data Programme	Portal collating at-sea effort-related data collected via ship-based or aerial methods, under the Joint Cetacean Data Programme (JCDP).	JCDP (2025)
Joint Nature Conservation Committee (JNCC)	Southern North Sea MPA, Guidance for underwater noise against conservation objectives of harbour porpoise, Berwickshire and North Northumberland Coast, Harbour Porpoise.	Heinänen and Skov (2015)
	Cetacean species distribution maps. JNCC Atlas of Cetacean Distribution.	Reid *et al.* (2016)
Scottish Marine and Freshwater Science Reports	Provides a review of abundance estimates and distribution of marine mammals across the North Sea and Atlantic areas of Scottish waters. Marine mammal abundance.	Hague *et al.* (2020)
Seawatch	Sea Watch Foundation sightings data from 2024 to 2025.	Seawatch (2025)
Small Cetaceans in European Atlantic Waters and the North Sea (SCANS) III and IV Reports	Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys.	Hammond *et al.* (2021)
	Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys.	Gilles *et al.* (2023)

Data Source	Description	Reference
UK Cetacean Strandings Investigation Programme (CSIP, N.D.)	UK CSIP information on scientific publications and reporting to government.	CSIP (no date)
Distribution maps of cetacean and seabird populations in the North-East Atlantic	Harbour porpoise densities estimated along transects, used in Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B)	Waggit *et al.*, (2020)
North Atlantic killer whale Orcinus orca populations: a review of current knowledge and threats to conservation	Orca estimates of individuals and abundance in the North Atlantic	Jourdain *et al.*, (2019)
Pinnipeds		
marine.gov.scot	Updated seal usage maps (forage only): The estimated at-sea distribution of harbour and grey seals from UK and Ireland haulouts.	Carter *et al.* (2022)
National Marine Plan interactive (NMPi)	Marine Scotland Maps tool used to derive seal haulout sites in Scotland.	Marine Scotland (2018)
Special Committee on Seals	Seal populations data from the UK seals Monitoring Programme – Annual Report 2024.	(SCOS, 2024)
Cetaceans and Pinnipeds		
Marine.gov.scot (Marine Licence applications processed by the Marine Directorate)	Sightings data on harbour porpoise contained within the Seagreen Wind Energy Environmental Impact Assessment (EIA) Report, Volume I. Chapter 10 (September 2018). Sightings data on marine mammals contained within the Hywind Scotland Pilot Park Environmental Statement (April 2015). Sightings data on marine mammals contained within the Kincardine Offshore Windfarm Environmental Statement (March 2016). Available at https://marine.gov.scot/sites/default/files/00528221.pdf Sightings data on marine mammals contained within the Ossian Array EIA Scoping Report.(2023) Available at https://marine.gov.scot/sites/default/files/ossian_wind_-_array_eia_scoping_report_-_eor0811a.pdf Sightings data on marine mammals contained within the Berwick Bank Wind Farm Offshore Scoping Report (2021). Available at https://berwickbank-eia.com/offshore-scoping/berwickbank.pdf Sightings data on marine mammals contained with the Aberdeen European Offshore Wind Deployment Centre Environmental Statement, Chapter 12. (July 2011) Available at: https://marine.gov.scot/sites/default/files/chapter_12_marine_mammals.pdf Sightings data on marine mammals contained within the Moray West Offshore Wind Farm Offshore EIA Report, Chapter 9 (2018). Available at https://marine.gov.scot/sites/default/files/00538033.pdf	Seagreen (2018)) Hywind (2015) Kincardine (2016) Ossian (2023) Berwick (2021) AEOWDC (2011) Moray West (2018)
Marine Life Information Network	Species Information from the Marine Life Network.	Barnes, M.K.S. (2008a, b, c) and Oakley, J.A. (2008)
Marine Mammals ScotMER Receptor Group	Marine Mammals ScotMER Receptor Group outputs, evidence map.	Gov.scot
Marine Scotland	Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters.	Hague *et al.* (2020)

Data Source	Description	Reference
Eurasian otter		
National Biodiversity Network	Occurrence records for cetaceans, pinnipeds and Eurasian otter.	NBN (2023). National Biodiversity Network Gateway.

10.3. Consultation

10.3.1. Non-statutory scoping

In January 2024, a MEA Non-Statutory Scoping Report was submitted to the Scottish Government Marine Directorate – Licensing Operations Team (MD-LOT) as part of a pre-application consultation exercise for the Proposed Development. Responses from consultees were received on 15 July 2024. Responses which are relevant to this chapter were received from NatureScot.

The feedback received broadly confirmed that consultees were content with the proposed scope of the marine mammals and marine reptiles MEAp chapter as set out in the MEA Non-Statutory Scoping Report. Table 10-3 summarises the comments received, and the regard given to these in preparing this chapter.

The decommissioning phase has been scoped out of the assessment as described in the MEA Non-Statutory Scoping Report for marine mammals in Section 10.7.

Table 10-3: Summary of consultee responses on the MEA Non-Statutory Scoping Report

Consultee	Comments	Response
NatureScot	It should also be noted that the bottlenose dolphin feature of the Moray Firth Special Area of Conservation (SAC) should also be screened in, increasing evidence suggests that the range of the dolphins is expanding southwards with sightings of identified individuals seen off the Northumberland coast. We would also expect to see a Marine Mammal Mitigation Plan submitted for the preconstruction and construction periods of this project. We would recommend seeking an EPS licence for the preconstruction geophysical survey as well as for the construction works.	Bottlenose dolphin feature of the Moray Firth SAC has been screened in and assessed in Section 10.8. A European Protected Species (EPS) licence and Risk Assessment, including Marine Mammal Mitigation Plan (MMMP) was submitted for the cable survey campaign. The Applicant would include pre-construction and construction phase either by way of update to the current EPS Licence or in a new licence application prior to commencement of the pre-construction and construction phase. The licence numbers of the EPS and basking shark licences are EPS-00010874 and variation EPS-00011260 and BS-00010875, variation is BS-00011261.
	We broadly agree, with the data sources and assessment approach identified. We advise the following additional publications (and relevant data layers) to characterise fish spawning grounds: Langton R., Boulcott P., Wright P.J. (2021) A verified distribution model for the lesser sandeel *Ammodytes marinus*. Mar. Ecol. Prog. Ser. 667: 145-159. González-Irusta J.M. and Wright P.J., 2016. Spawning grounds of Atlantic cod (*Gadus morhua*) in the North Sea. ICES Journal of Marine Science, 73(2), pp.304-3152. González-Irusta J.M. and Wright P.J., 2017. Spawning grounds of whiting (*Merlangius merlangus*). Fisheries Research, 195, pp.141-1513. González-Irusta J.M. and Wright P.J., 2016. Spawning grounds of haddock (*Melanogrammus aeglefinus*) in the North Sea and West of Scotland. Fisheries Research, 183, pp.180-1914	Data sources that were supplied are included in the assessment provided in Chapter 8 Fish and Shellfish, which informed the assessment of the pressure pathway 'Change in distribution of prey species' in Section 10.8.1. The identification of fish spawning grounds is therefore not repeated within this chapter of the MEAp. Geophysical and benthic survey data has been used to inform the assessment of impacts on prey species and is included in Section 10.8.1.

Consultee	Comments	Response
	Grab samples taken during the geophysical survey should be used to identify potential sandeel habitat and herring spawning grounds.	
	It is worth noting here that the bottlenose dolphins associated with the Moray Firth SAC are transient in nature and inhabit the whole of the east coast of Scotland and their range is expanding southerly, this needs to be reflected in the Environmental Appraisal and HRA – see comments above about their need to be screened in.	The Moray Firth SAC and bottlenose dolphins are included in the Appendix 5A: Habitats Regulations Appraisal (HRA) Stage 1 Screening and assessed in Section 10.8 of this chapter.
	We broadly agree with the proposed mitigation and monitoring measures; however, we would like to see a Marine Mammal Mitigation plan, and Ornithological mitigation measures submitted for the pre-construction and construction periods of this project.	A MMMP will be submitted prior to construction for approval by MD-LOT as a likely condition of the Marine Licence. Mitigation in respect to the assessment of ornithology would be secured as described in Chapter 9: Intertidal and Offshore Ornithology.
	There is no clarity provided in terms of how cumulative effects will be assessed and with which other activities. We advise this needs to be considered further.	Cumulative effects are included in Section 10.11 of this chapter.

10.4. Baseline Characterisation

10.4.1. Overview

This section covers the marine and semi-aquatic mammal (cetacean, pinniped and Eurasian otter) baseline for the Study Area, with regard to presence, density and distribution across the area, in addition to identifying any sites for which cetaceans, pinnipeds or Eurasian otters may be a qualifying feature.

10.4.2. Designated Sites and Species

Marine mammals are protected by several international conventions, the obligations of which have been transposed into national and devolved legislation with regard to ensuring the protection of marine mammal populations is adequately considered when planning to undertake activities such as the Proposed Development.

Under the Convention on Migratory Species (CMS) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS) 1992 (renamed Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Sea in 2008 following extension of the agreement area), parties, including the UK, have committed to international cooperation in supporting the preservation of migrating cetaceans. The Habitats Directive (European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora), identifies a network of internationally important sites to be designated for their ecological status, including marine mammals.

The Habitats Directive is transposed into UK law under The Conservation of Offshore Marine Habitats and Species Regulations 2017 (COHMS) (offshore, beyond 12 NM from the coast), The Conservation (Natural Habitats, &c.) Regulations 1994 (inshore, <12 NM from the coast) (collectively referred to as the 'Habitats Regulations'), which instruments have been amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 respectively to make changes following the UK's exit from the EU. All cetaceans and Eurasian otter are European Protected Species (EPS) and are afforded protection under the Habitats Regulations, this protection applies irrespective of the presence of a designated site. It is an offence to deliberately kill, injure or disturb Eurasian otter and cetaceans under the Habitats Regulations.

Pinnipeds are primarily afforded protection by the Marine (Scotland) Act 2010, under which sites can be designated for their conservation (seal conservation areas). Haul-out sites are designated under the Protection of Seals (Designation of Haul-Out Sites) (Scotland) Amendment Order 2014 (as amended). It is an offence to intentionally or recklessly kill, injure or take a live seal or intentionally or recklessly harass a seal at a haul-out site.

Further protections and measures are afforded under additional regulations such as the Wildlife and Countryside Act 1981 and measures including The Scottish Marine Wildlife Watching Code, which fulfils NatureScot's duty under the Nature Conservation (Scotland) Act 2004 to present information on activities that have the potential to disturb wildlife, circumstances under which it is deemed acceptable to approach an animal and best practice to view and avoid disturbing animals. Several marine mammals are also

identified under the Scottish Biodiversity List as Priority Marine Features (PMF); those species are identified to be of conservation importance to Scotland's seas (SNH, 2016).

Within the Study Area there are several designated sites for which marine mammal species are a qualifying feature. These are outlined in Table 10-4 and illustrated in Figure 10-2 (Drawing reference C01494-EGL3-MEA-SPEC-001-B). There are no transboundary sites within 250 km of the RLB.

Table 10-4: Relevant designated sites

Site name and ID	Distance from the closest point on the RLB	Relevant /Qualifying features	Conservation objectives
Southern Trench MPA EU555703756	0.001 km	Minke whale	▪ Protection of an area containing persistently above average densities of minke whale where both juvenile and adult whales are regularly observed feeding (NatureScot, 2025). ▪ Preservation of a geologically unique shelf deeps feature on the Scottish continental shelf and its associated biological communities.
Moray Firth SAC UK0019808	92 km	Bottlenose dolphin	▪ Achieving Favourable Conservation Status for bottlenose dolphin and subtidal sandbanks under the Habitats Directive. ▪ Progress towards achieving Good Environmental Status particularly in relation to biological diversity, seafloor integrity and bottlenose dolphins. ▪ Making a significant contribution to the protection, enhancement and health of the marine area under the National Marine Plan. ▪ Restoring marine and coastal ecosystems and increasing the environmental status of our seas under the Scottish Biodiversity Strategy. ▪ Helping to adapt to climate change under The Scottish Climate Change Adaptation Programme.
Southern North Sea SAC UK0030395	133.1 km	Harbour porpoise	▪ Harbour porpoise is a viable component of the site ▪ There is no significant disturbance of the species ▪ The condition of supporting habitats and processes, and the availability of prey is maintained.

A number of species of conservation interest have been identified as likely or with the potential to be present within the Study Area. These are listed in Table 10-5, all the information in the table has been supplemented by NatureScot (2013), SNH (2016) and ASCOBANS (2018).

Table 10-5: Species within the Study Area

Protected Feature	Habitats Directive	IUCN Global Red list status	UK BAP Priority Species/Habitat	Wildlife and Countryside Act (Schedule 5)	OSPAR threatened and/or declining habitats and species	ASCOBANS	PMF	Presence within Study Area
Cetaceans								
Harbour porpoise	Annex II and IV	Lower risk - least concern	✓	✓	Regions II, III		Scottish territorial and offshore waters	Harbour porpoises are designated for the Southern North Sea SAC (133.1 km distant) and are widespread across the North Sea; they are

Protected Feature	Habitats Directive	IUCN Global Red list status	UK BAP Priority Species/Habitat	Wildlife and Countryside Act (Schedule 5)	OSPAR threatened and/or declining habitats and species	ASCOBANS	PMF	Presence within Study Area
								regularly sighted within the Study Area.
Short-beaked common dolphin	Annex IV	Lower risk - least concern	✓	✓			Scottish territorial and offshore waters	Short-beaked common dolphin is occasionally sighted within the Study Area.
White-beaked dolphin	Annex IV	Lower risk - least concern	✓	✓		✓	Scottish territorial and offshore waters	White-beaked dolphin is occasionally sighted within the Study Area.
Risso's dolphin	Annex IV	Lower risk - least concern	✓	✓		✓	Scottish territorial and offshore waters	Risso's dolphin is occasionally sighted within the Study Area.
Bottlenose dolphin	Annex II and IV	Lower risk - least concern	✓	✓		✓	Scottish territorial and offshore waters	Bottlenose dolphins are resident to the Moray Firth Special Area of Conservation (SAC) so there are occasional sightings within the Study Area.
Long-finned pilot whale	Annex IV	Lower risk – Least concern	✓	✓		✓	Scottish offshore waters	Long-finned pilot whale is occasionally sighted within the Study Area.
Minke whale	Annex IV	Lower risk - least concern	✓	✓			Scottish territorial and offshore waters	Minke whales are seasonally sighted within the Southern Trench Marine Protected Area (MPA) and are occasionally sighted within the Study Area
Orca	Annex IV	Data Deficient	✓	✓		✓	Scottish territorial and offshore waters	Orca is occasionally sighted within the Study Area.
Northern bottlenose whale	Annex IV	Lower risk - Least Concern	✓	✓		✓	Scottish offshore waters	Northern bottlenose whale is occasionally sighted within the Study Area.
Pinnipeds								
Harbour / common seal	Annex II and V	Lower risk - least concern	✓				Scottish territorial and offshore waters	Harbour seal is occasionally sighted within the Study Area.

Protected Feature	Habitats Directive	IUCN Global Red list status	UK BAP Priority Species/Habitat	Wildlife and Countryside Act (Schedule 5)	OSPAR threatened and/or declining habitats and species	ASCOBANS	PMF	Presence within Study Area
Grey seal	Annex II and V	Lower risk - least concern	✓				Scottish territorial and offshore waters	Grey seal is occasionally sighted within the Study Area.
Other mammals								
Eurasian otter	Annex II and IV	Near threatened – Largely depleted	✓				Scottish territorial waters	Otters are known to be present within the vicinity of the landfall.

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6000000

Southern Trench NCMPA
Moray Firth SAC
Sandford Bay
Southern North Sea SAC

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EGL 3 Red Line Boundary And Designated Sites

C01494-EGL3-MEA-SPEC-001-B

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Special Area of Conservation (SAC)
- Southern Trench Nature Conservation Marine Protected Area (NCMPA)
- Scottish Adjacent Waters
- 12NM Limit
- EEZ

0 40 80 120 KM
0 20 40 60 NM
N

Date	14/05/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:2,000,000
Created	JC
Reviewed	AN
Authorised	JDM

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10.4.3. Cetaceans

Several large-scale surveys to monitor cetacean population size have been carried out in UK Waters by Small Cetacean Abundance in the European Atlantic and North Seas (SCANS) and Cetaceans Offshore Distribution and Abundance in the European Atlantic (CODA). Surveys were carried out in 1994, 2005, 2016 and 2022 by SCANS and in 2007 for CODA. The Proposed Development passes through Block NS-D (formerly R) of the SCANS IV survey areas (Gilles *et al.*, 2023) illustrated by Figure 10-3 (Drawing reference C01494-EGL3-MEA-SPEC-003-C).

There are twenty-eight recorded cetacean species in UK waters but only eleven of these are considered regular visitors (DECC, 2016). Most of these species have wide ranges, uninhibited by country boundaries. To assist in the monitoring and management of cetaceans, Management Units (MUs) have been developed for seven commonly occurring species in North Atlantic and Northwest European waters by the Inter-Agency Marine Mammal Working Group (IAMMWG) following advice from the Sea Mammals Research Unit (SMRU) and International Council for the Exploration of the Sea (ICES) (IAMMWG, 2023). The MUs relevant to the Proposed Development can be seen in Figure 10-1 (Drawing reference C01494-EGL3-MEA-SPEC-002-B).

As of 2024, coastal bottlenose dolphin and minke whale received a Good Environmental Status (GES) in the Greater North Sea MU. However other species of cetacean were recorded as having an uncertain Environmental Status (Defra, 2022).

Analysis of MUs and SCANS IV data has been used to indicate the likely presence of marine mammals in the Study Area, but it is recognised that this does not constitute a definitive list of species present, given the mobile and wide-ranging nature of marine mammals.

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SCANS III

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SCANS IV

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CS-K

NS-E

NS-F

NS-G

NS-D

NS-C

CS-E

CS-D

NS-B

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SCANS III And SCANS IV Survey Blocks

C01494-EGL3-MEA-SPEC-003-C

Legend

- Red Line Boundary
- Sandford Bay Landfall
- SCANS-III Survey Block
- SCANS-IV Survey Block
- Scottish Adjacent Waters
- 12NM Limit
- EEZ

0 100 200 KM

0 50 100 NM

N

Date	26/06/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:2,700,000
Created	JC
Reviewed	AN
Authorised	JDM

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10.4.3.1. Harbour porpoise

Harbour porpoise, with a maximum size of approximately 2 m (Russel, 2006), are the smallest and most abundant cetacean species in UK waters (Reid *et al.* 2003). Favouring water depths of less than 200 m (Marine Directorate, 2021), harbour porpoise are widely distributed across the Greater North Sea ecoregion. An adaptation of harbour porpoises' small size in colder waters is that they must eat up to 10% of their bodyweight every day (Kastelein *et al.*, 1997; Lockyer *et al.*, 2003; Wisniewska *et al.*, 2016). This speeds up their metabolism allowing their small bodies to be moving constantly. Prey species for harbour porpoise include sandeel (*Ammodytidae spp.*), herring (*Clupea harengus*), cod (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), whiting (*Merlangius merlangus*), gobies (*Gobiidae spp.*), squid (*Alloteuthis subulate*), sprat (*Sprattus sprattus*), octopus (*Octopus vulgaris*) and crustaceans (*Crustacea spp.*) (Mahouz *et al.*, 2017; Santos *et al.*, 2004, SNH 2016). Harbour porpoise distribute themselves based on prey availability, as well as for the purpose of breeding and calving (Robinson *et al.*, 2007; Learmonth *et al.*, 2014).

Typically observed in groups of 1 to 3 animals, and shy in nature, harbour porpoise tend not to interact with vessels (Seawatch Foundation, 2012). However, seasonal congregations of larger groups of harbour porpoise have been reported within the year (February to March and August to October). This is thought to be associated with longer distance migrations or prey concentrations. In the summer months harbour porpoise, across the continental shelf, are recorded with the greatest densities in the offshore waters of the central and southern North Sea (Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B); Marine Directorate, 2021). In the winter, harbour porpoise tend to be concentrated in the southern North Sea and English Channel, with low densities recorded further north and a tendency for these numbers to be closer to shore (Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B); Marine Directorate, 2021). Seasonal movements depend on the maturity of their calves and their mating season; calving season for harbour porpoise is from May to July (Robinson *et al.*, 2007; Learmonth *et al.*, 2014).

Harbour porpoise populations are divided into units around the UK and the area in which the Proposed Development is located is the North Sea MU (IAMMWG, 2022). Harbour porpoise act as one continuous population in the North Sea. Estimation of abundance of harbour porpoise is calculated as 346,601 individuals (95% confidence interval (CI): 289,498 – 419,967) (IAMMWG, 2023).

The SCANS-III survey in July 2016 calculated an abundance of 38,646 individuals (95% CI: 20,584 – 66,524) and a density estimate of 0.599 individuals per km^2 for survey block R (Hammond *et al.*, 2021). SCANS-IV surveys calculated an abundance of 38,577 individuals (95% CI: 18,087 – 76,361) and a density estimate of 0.598 per km^2 for survey block NS-D (Gilles *et al.*, 2023). Additionally, sightings data for harbour porpoise have been collected from 1980 to 2018 by Waggit *et al.*, (2020) as seen in Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B). A number of site specific surveys have been carried out in proximity to the Proposed Development to establish the baseline environment for construction projects; sightings data from these surveys are presented in Table 10-6 and Table 10-7.

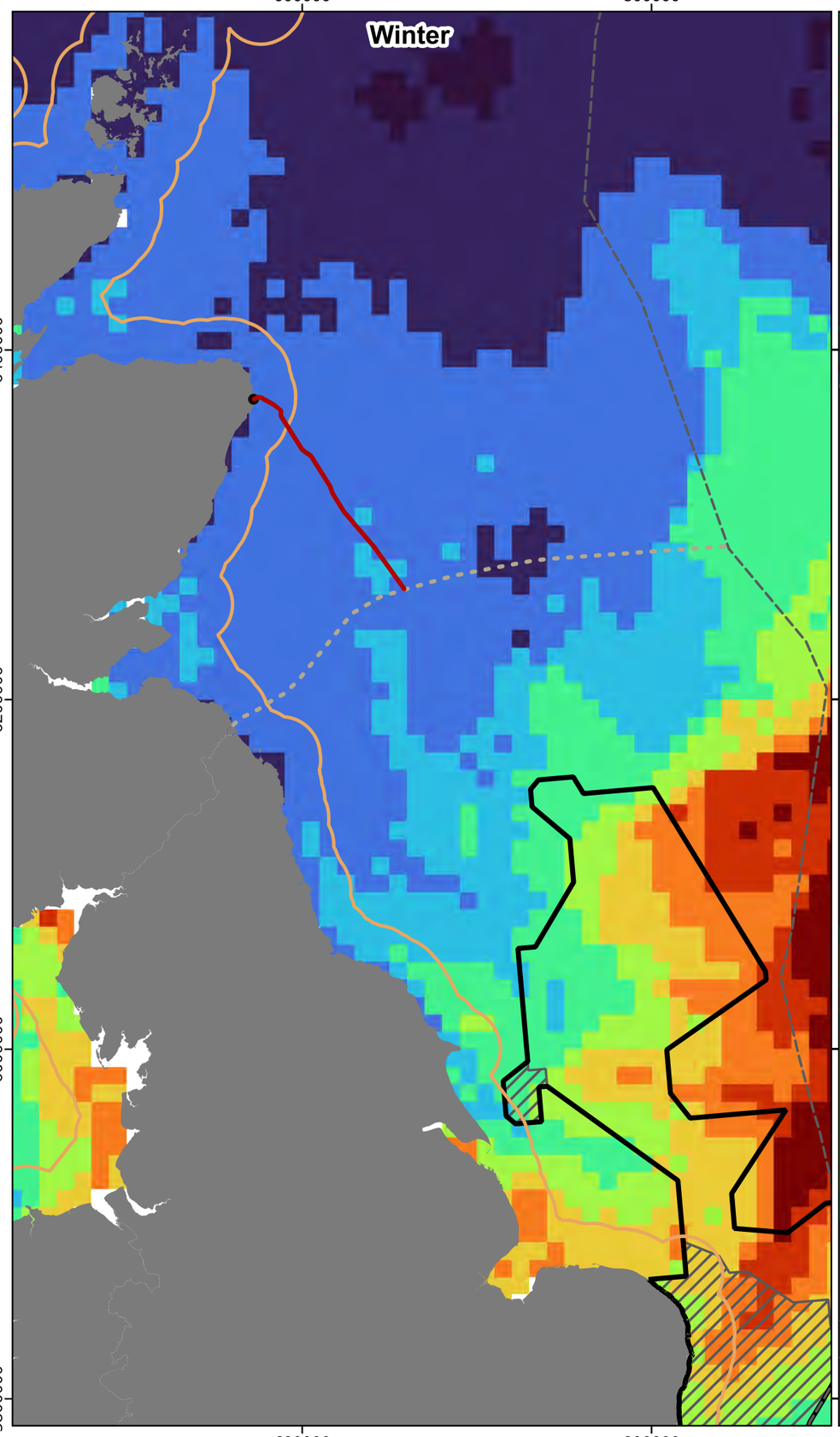
Table 10-6: Species and sightings data of harbour porpoise (Hammond et al., 2021; Gilles et al., 2023)

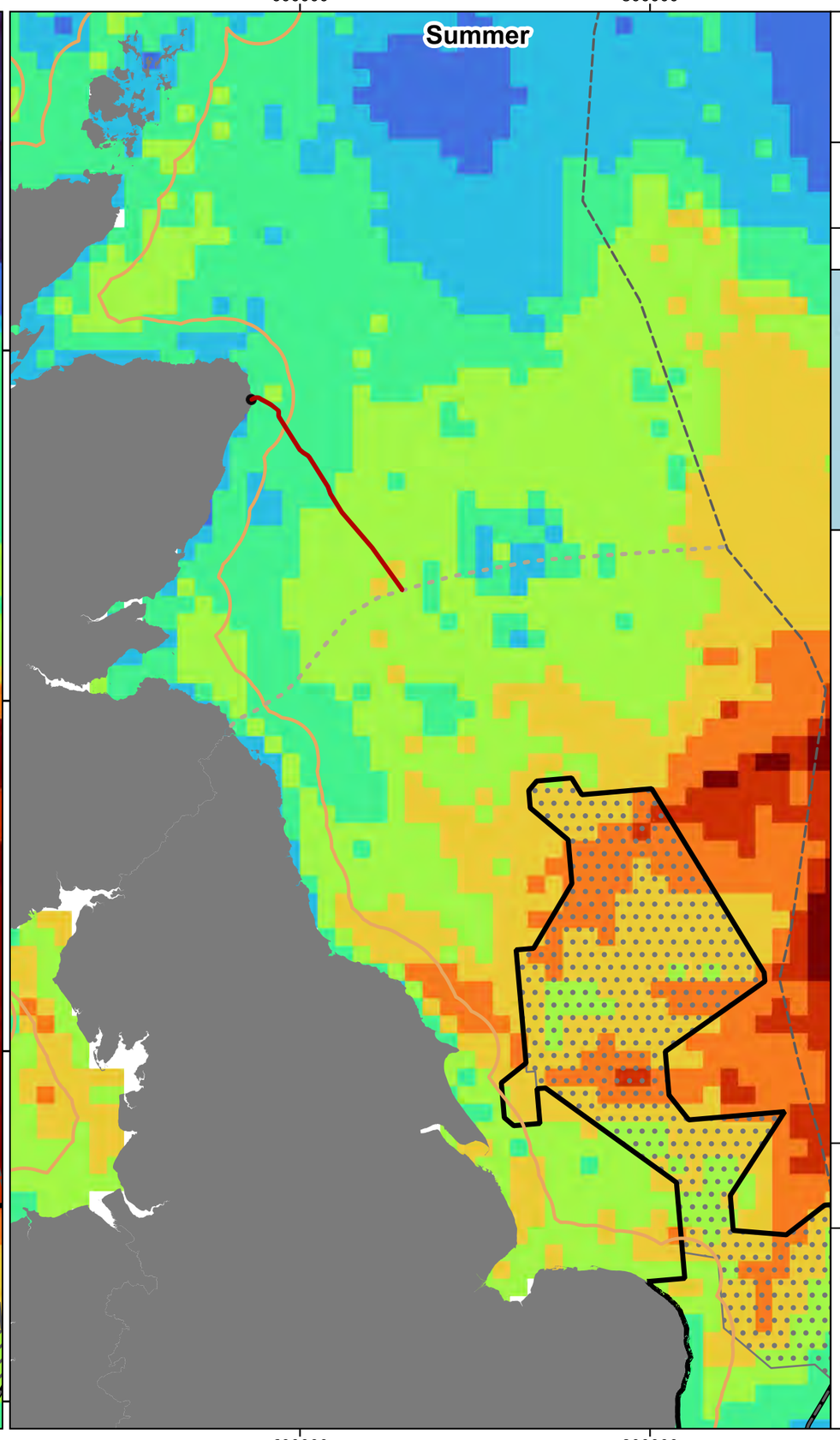
Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022)	SCANS IV Estimation of Density (Gilles *et al.* 2023)	SCANS IV Estimation of Abundance
Harbour porpoise	North Sea	All year	29 sightings with a max group size of 8	25 sightings	Block NS-D (formerly R) 0.598 individuals per km^2	Block NS-D (formerly R) 38,577 individuals

*Table 10-7: Offshore wind farm (OWF) site specific survey data of harbour porpoise sightings**

OWF Data	Kincardine 2010-2011	Seagreen 2010 and 2011	Aberdeen EOWDC 2005 to 2008	Hywind 2013-2014	Ossian 2021-2022*	Berwick Bank 2010-2011
Observations of Harbour Porpoise	89 sightings in 17 months	95 animals in 2 days (2 km buffer)	420 sightings in a year of surveys	229 sightings and a maximum group size of 6	852 sightings	-

* Located within 15km of the RLB (search area as per Chapter 13: Other Marine Users and Activities)





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Harbour Porpoise Density in Summer and Winter

C01494-EGL3-MEA-SPEC-004-B

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Southern North Sea Special Area of Conservation (SAC)
- Harbour Porpoise Seasonal Area (Southern North Sea SAC)
- WinterArea (Southern North Sea SAC)

Harbour Porpoise Density (Animals/km2)

- <= 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.7
- 0.7 - 0.8
- > 0.8
- Scottish Adjacent Waters
- 12NM Limit
- EEZ

0 30 60 90 KM

0 20 40 60 NM

N

Date	14/05/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:3,000,000
Created	JC
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Authorised	JDM

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There are no designated sites within the RLB for which harbour porpoise is a qualifying feature. However, it is a qualifying feature of a site located within the Study Area (North Sea MU), the Southern North Sea Special Area for Conservation (SAC) which is located in English waters.

Southern North Sea SAC (English waters, 133.1 km south of the RLB)

Designated for harbour porpoise, the Southern North Sea SAC is an area of great importance to harbour porpoise populations in the UK. This site stretches from the central North Sea (north of Dogger Bank) to the Straits of Dover in the south, covering an area of 36,951 km^2 (JNCC, 2019). Water depths can reach up to 75 m within the SAC however the majority of the site has water depths shallower than 40 m. It is estimated the Southern North Sea SAC supports 17.5% of the UK North Sea MU population of harbour porpoise (JNCC, 2023a). SCANS II survey information has been used to calculate an abundance of approximately 18,500 individuals within the site (95% CI, 11,864 - 28,889) in 2005 (JNCC, 2017a). Seasonal migration within the northern part of the Southern North Sea SAC is noted and is thought to be linked to variation in prey distribution (Gilles *et al.*, 2016; Gilles *et al.*, 2009). Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B) shows that the northern part of the Southern North Sea SAC is important for harbour porpoise during the summer with densities during August of 0.6-0.7 animals per km^2, but less so in the winter, as during January densities reduce to 0.4-0.5 animals per km^2. Seasonal migration is not noted in the southern part of the Southern North Sea SAC as this area is important to harbour porpoise all year round, with consistently high densities recorded the throughout the year (Cucknell *et al.*, 2017; JNCC website, latest updated 2023; Figure 10-4 (Drawing reference C01494-EGL3-MEA-SPEC-004-B), above).

10.4.3.2. Short-beaked common dolphin

The short-beaked common dolphin is easily identified at sea by the hourglass pattern on their lower flank. They can grow up to 2.4m in length and commonly breach and bow ride with vessels. Short-beaked common dolphins travel in groups of between 6 and 10, though some larger schools have been sighted (Oakley, J.A. 2008). Short-beaked common dolphins are opportunistic feeders and tend to feed on pelagic fish in the North Sea, such as whiting, mackerel (*Trachurus trachurus*), sandeel, sprat and squid (Seawatch Foundation, 2012; Kessler, 2021; SNH 2016). They often work co-operatively in groups to herd their prey (Seawatch Foundation 2012). Their seasonal movements onto the continental shelf in summer (July to October) are driven by prey availability and higher sea surface temperatures (Seawatch Foundation, 2020).

Around the UK, common dolphin are largely distributed off the west coast with occasional North Sea sightings during summer months (June to September) (Reid *et al.*, 2003). There was only one sighting of this species (max group size of 9, as defined by Seawatch Foundation) within the Study Area, with no other sightings recorded during SCANS IV or OWF site surveys, as shown in Table 10-8.

Table 10-8: Short- beaked common dolphin sightings data

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022)	OWF Observations	Estimation of Density ^
Short-beaked common dolphin	Celtic and Greater North Sea	Summer	1 sighting with a max group size of 9	-	-	-

There are no designated sites within the Study Area for which short-beaked common dolphin are a qualifying feature.

10.4.3.3. White beaked dolphin

The white-beaked dolphin has a short, often white, beak. They can grow up to 3.2 m in length and they display vertical or side breaches with vessels as well as bow-riding. White-beaked dolphin tend to feed on small pelagic fish such as herring and haddock, as well as crustaceans, squid and octopus (SNH, 2016). They are often observed feeding in groups applying co-operative techniques to herd their prey and also in proximity to other small cetaceans e.g. Atlantic white sided dolphin, minke whales, humpback whales (*Megaptera novaeanglitae*), bottlenose dolphins and Risso's dolphins (Seawatch Foundation, 2020).

Frequently recorded in the European continental shelf and in the central and northern North Sea, an estimated 80% of the European population of white-beaked dolphins are located in the waters off Scotland and north-east England (UKBAP, 2008; Canning *et al.*, 2008). They have been recorded in UK waters year-round, with an increase in sightings in the summer months when animals move further inshore (Evans 1992; Northridge *et al.*, 1995; Weir *et al.*, 2007; Canning *et al.*, 2008).

The proposition that white-beak dolphin move seasonally is supported by OWF data (as outlined in Table 10-9 and Table 10-10). This movement into inshore coastal waters during summer is believed to be related to calving, with calves also being observed in peak sightings between June and August (Atkins 2016; AEOWDC 2011). The summer months may have an increase in sensitivity to disturbance, due to the presence of calves.

The SCANS III estimation of abundance for white-beaked dolphin in survey block R was 15,694 individuals (95% CI: 3,022 – 33,340) and a density estimate of 0.243 animals per km^2. In the more recent SCANS (IV) estimation of abundance for white-beaked dolphin in survey block NS-D was 5,149 individuals (95% CI: 961 – 10,586) and a density estimate of 0.0799 animals per km^2. In offshore wind aerial surveys in the area (Ossian Array, 2023) white-beaked dolphin were the second most recorded cetacean, and are therefore considered likely to occur within the Study Area (Table 10-9 and Table 10-10).

Table 10-9: White-beaked dolphin sightings data (Hammond et al., 2017; Giles et al., 2023)

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022†)	SCANS IV Estimation of Density ^	SCANS IV Estimation of Abundance
White-beaked dolphin	Celtic and Greater North Sea	Summer	1 sighting with a max group of 12	-	Block NS-D (formerly R) - 0.0799 individuals per km^2	Block NS-D (formerly R) – 5,149 individuals

*Table 10-10: Surrounding OWF sightings for white-beaked dolphin**

OWF Data	Kincardine SMRU 2010-2011	Seagreen 2017	Aberdeen EOWDC 2005 to 2008	Hywind 2013-2014	Ossian 2021-2022*	Berwick Bank 2010-2011
Observations of white-beak dolphin	117 individual sightings	Recorded on two of the five surveys, density estimate is 0.042 individuals per km^2	420 sightings in a year of surveys	229 sightings and a maximum group size of 6	852 sightings	Constant sightings from May 2010 to November 2011

* Located within 15km of the RLB (search area as per Chapter 13: Other Marine Users and Activities)

10.4.3.4. Bottlenose dolphin

The bottlenose dolphin is a large dolphin species of up to 3.8 m in length and characterised by their short beak, rounded had and central recurved dorsal fin (Seawatch Foundation 2020b). They display forward to sideways breaches, somersaults and tail slaps, and frequently bow ride (Seawatch Foundation 2020b). Bottlenose dolphins frequently mix with other species: group sizes can be between 2 to 25 animals, though much larger groups are common in deep water. Bottlenose dolphin feed on hake (*Merluccius merluccius*), octopus and a variety of marine fish including salmon (*Salmo salar*), mullet (*Mugil cephalus*), sandeels, bass (*Dicentrarchus labrax*) and eels (*Anguilliformes*) (SNH, 2016) and are considered to be selectively opportunistic feeders (Seawatch Foundation, 2020c). Bottlenose dolphin employ highly diverse feeding techniques, often working in pods to herd fish shoals from opposite sides (Taylor & Saayman, 1972).

Sightings of bottlenose dolphin peak between July and October, though they are present all year round in the Study Area (as shown in Figure 10-5 (Drawing reference C01494-EGL3-MEA-SPEC-005-A)), including the Moray Firth population (Reid *et al.*, 2003). The overall trend in bottlenose dolphins' conservation status in UK waters is unknown; although the population size appears to be stable there are too few datapoints to conclude on population trends (JNCC 2019b).

The SCANS III abundance for bottlenose dolphin in survey block R was 1,924 individuals (95% CI: 0 – 5,048), with a density estimate of 0.030 per km^2 (Hammond *et al.* 2017). The SCANS IV surveys found no sightings in the NS-D survey block (Gilles *et al.* 2023). Bottlenose dolphins are observed off the coast of northeast Scotland all year, though most sightings occur in the summer months. Sightings of this species are common as shown in Table 10-11 and Table 10-12, so are considered likely to occur in the Study Area.

Table 10-11: Bottlenose dolphin sightings data (Hammond et al., 2017; Giles et al., 2023)

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022†)	SCANS III Estimation of Density ^	SCANS III Estimation of abundance
Bottlenose dolphin *(Tursiops truncatus)*	Celtic and Greater North Sea	All year	43 sightings with a max group size of 30	1146 sightings	Block R 0.0419 individuals per km^2	Block R 924 individuals

Table 10-12: Surrounding OWF sightings for Bottlenose dolphin

OWF Data	Kincardine SMRU 2010-2011	Seagreen 2017	Aberdeen EOWDC 2005 to 2008	Hywind Photo ID Counts 2013-2014	Ossian 2021-2022*	Berwick Bank 2010-2011
Observations of Bottlenose dolphin	-	98 individuals in the Moray Firth	200 individuals	195 individuals	-	-

*Located within 15km of the RLB (search area as per Chapter 13: Other Marine Users and Activities)

There are no designated sites within the Proposed Development for which bottlenose dolphin are a qualifying feature. However, it is a qualifying feature of a site located within the Study Area, the Moray Firth SAC.

Moray Firth SAC

The Moray Firth SAC is approximately 92.5 km to the northwest of the RLB, located within the Moray Firth. The Moray Firth SAC is designated for the resident bottlenose dolphin population; they are common all year round but peak between July and October (Hague, Sinclair, & Sparling, 2020). Within the Moray Firth bottlenose dolphins are found close to the shore (within 3 km) and in shallow water (<20 m) (NatureScot, 2024). Though they are resident to this designated site, they are just as common in the surrounding waters of Aberdeenshire and the North Sea. Quick *et al.*, (2014) demonstrated that individuals from the Moray Firth are known to range up and down the coast, but there is a variability in the timings and location of this. It is suggested that animals move between the Moray Firth and Firth of Tay seasonally, migrating to the Moray Firth in early summer and then from the Moray Firth to the Firth of Tay in late summer (Arso Civil *et al.*, 2021). Instead of this movement being driven by seasonal changes in prey, it is observed that movements are related to social connections, with bottlenose dolphins following a potential mate rather than driven by the need to feed (Wilson *et al.*, 2004; Arso Civil *et al.*, 2019). The Moray Firth SAC is within the relevant MU for bottlenose dolphin.

The bottlenose dolphin feature of the Moray Firth SAC has been screened in and assessed in Section 10.8 as requested by NatureScot in their response to the MEA Non-Statutory Scoping Report.

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Winter

Summer

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Bottlenose Dolphin Density in Summer and Winter

C01494-EGL3-MEA-SPEC-005-A

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Moray Firth Special Area of Conservation (SAC)

Bottlenose Dolphin Density (Animals per km²)

- 0.0000
- 0.0025
- 0.0050
- 0.0075
- 0.0100
- 0.0250
- Scottish Adjacent Waters
- 12NM Limit
- EEZ

0 30 60 90 KM

0 20 40 60 NM

N

Date	14/05/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:3,000,000
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Authorised	JDM

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10.4.3.5. Minke whale

The minke whale is the most widely and frequently observed of all baleen whale species in UK waters. Minke whale are widely observed in Scottish waters (Seawatch Foundation, 2012). They are typically one of the smaller baleen whales, averaging at 8.5m in length. While they are often solitary, they have been observed in small groups of 2 – 3 (Seawatch Foundation, 2012), with the exception of dense foraging areas where up to 15 individuals can be spotted (NatureScot, 2023). They are curious by nature and are known to breach and spy-hop alongside vessels (Kinze, 2002). Minke whales have a varied diet, feeding on small schooling fish such as sandeel and mackerel as well as invertebrates (SNH, 2016; NatureScot, 2023).

The majority of UK sightings occur in Scotland, mainly in waters over the continental shelf in water depths of <200 m, but minke whale are also often sighted close to shore (NatureScot 2023). Presence is predominantly in offshore waters in the early summer (May to June) and then movement is recorded to inshore waters and is considered to be linked to abundance of prey (sandeel as well as other fish species) (NatureScot, 2023). The Moray Firth also acts as an important feeding ground for a significant number of juvenile minke whales(NatureScot, 2023).

Minke whale are a part of the Celtic and Greater North Sea MU (IAMMWG, 2022). This MU has an estimated abundance of 20,118 individuals (95% CI: 14,061 – 28,786) in the entire MU. The SCANS III estimate of abundance for survey block R was 2,498 individuals (95% CI: 604 – 6,791) and the density estimate is 0.039 every km^2 (Hammond *et al.*, 2021). The SCANS IV abundance for survey block NS-D was 2,702 (95% CI: 547 – 7,357); the density estimate is 0.0381 every km^2 (Gilles *et al.* 2023).

They are considered seasonal visitors to Scotland despite their year-round densities, with higher densities in the summer as shown in Figure 10-6 (Drawing reference C01494-EGL3-MEA-SPEC-006-B). The Ossian floating OWF array site specific surveys recorded peak sightings in June and July. Similarly, minke whale were only observed in the summer months of site-specific aerial surveys for Berwick Bank Offshore Wind Farm and Firth of Forth Round 3 Zone (Sparling, 2012; SSER, 2022). Minke whales are considered more likely to be encountered in the summer months within the Study Area; throughout the year very few sightings are recorded, as shown in Table 10-13 and Table 10-14.

Table 10-13: Minke whale sightings data ((Hammond et al., 2017; Giles et al., 2023)

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022†)	SCANSIII Estimation of Density ^	SCANS III Estimation of abundance
Minke whale	Celtic and Greater North Sea	Summer	17 sightings max group number of 6	3 sightings	3 sightings in 17 months ** 13 sightings in 2x 2-day surveys #	Block NS-D (formerly R) - 0.0419 individuals per km^2

Table 10-14: Surrounding OWF sightings data for Minke whale

OWF Data	Kincardine SMRU 2007-2008	Seagreen 2017	Aberdeen EOWDC	Hywind Photo ID Counts 2013-2014	Ossian 2021-2022 only June and July	Berwick Bank 2010-2011
Observations of Minke Whale	12 Individuals	62 individuals	-	195 individuals	16 individuals	Density of 0.04 whale per km^2

There is a designated site within the area of the Proposed Development for which minke whale are a qualifying feature: the Southern Trench Nature Conservation Marine Protection Area (NCMPA).

Southern Trench NCMPA

The Southern Trench NCMPA is located approximately 0.001 km from the RLB. This site lies off the coast of Aberdeenshire and into the Moray Firth. The Southern Trench NCMPA contains a 250 m deep trench which is of geological interest and was also designated for the protection of minke whale, and provides valuable feeding grounds for juveniles. The trench is composed of soft sands, ideal for sandeel spawning, and the depth of the trench creates a highly productive mixing zone of upper warm waters and low cold waters. This attracts other fish species like herring, mackerel and cod to the area. Above average densities of minke whale (Paxton *et al.*, 2014) and their juveniles will flock to this site in the summer to feed and build sufficient energy for the winter migration to breeding grounds.

600000 800000

Winter

Summer

6400000

6200000

6000000

5800000

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Minke Whale Density in Summer and Winter

C01494-EGL3-MEA-SPEC-006-B

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Southern Trench Nature Conservation Marine Protected Area (NCMPA)

Minke Whale Density (Animals per km²)

- 0.0000
- 0.0025
- 0.0050
- 0.0075
- 0.0100
- 0.0250
- 0.0500
- Scottish Adjacent Waters
- 12NM Limit
- EEZ

0 30 60 90 KM

0 20 40 60 NM

N

Date	14/05/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:3,000,000
Created	JC
Reviewed	AN
Authorised	JDM

Document Path: X:\GIS\GIS_PROJECTS\C01494_EGL3&4\Project\QGS\EGL3\MEA\08_SPEC\C01494-EGL3-MEA-SPEC-006.qgz

10.4.3.6. Humpback whale

Humpback whales undertake seasonal migrations between high latitude summer feeding grounds and tropical coasting waters in winter for breeding (Fleming and Jackson, 2011). Over the past 20 years the number of humpback whales recorded in UK waters has increased (Snell *et al.*, 2023). An increase in the occurrence of humpback whales in the Firth of Forth in winter has been suggested to be related to a migratory stopover during the southbound migration (O'Neil *et al.*, 2019). Humpback whales recorded in Scottish and Irish waters have been recorded migrating to breeding grounds off Cape Verde (Berrow *et al.*, 2021). There is no MU for humpback whales in UK waters, with no individuals recorded during the SCANS III survey. There are no designated sites for humpback whales within the Proposed Development. The few sightings have been recorded in Table 10-15.

Table 10-15: Humpback whale sightings data

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024-Sept 2025)	NBN Atlas – Sightings (2018-2022†)	OWF Observations	Estimation of Density ^
Humpback whale	N/A	-	2 sightings, max group size of 1	1 sighting	-	-

10.4.3.7. Long-finned pilot whale (*Globicephala melas*)

The long-finned pilot whale is identified by their bulbous head, low and hooked dorsal fin approximately one-third along the back, a long and slender tail stock behind the dorsal fin and often dark grey to black in colour (Seawatch Foundation, 2020d). They can grow up to 6.7 m in length. They are an offshore species and can dive up to 600m depth but usually are situated around 60 m depth (Barnes, M.K.S., 2008). They are not considered common in Scottish waters, though they have been sighted along the east coast of Scotland to the east of the Moray Firth (Reid *et al.*, 2003; NMPi, 2014). Long-finned pilot whale tend to feed on squid but also a variety of fish such as mackerel (SNH, 2016). There is no MU for long-finned pilot whales in UK waters, with no individuals recorded during the SCANS III survey. There are no designated sites for long-fined pilot whale within the Study Area, and there have been no recent sightings recorded in the area as shown in Table 10-16.

Table 10-16: Long-finned pilot whale sightings data

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024-May 2025)	NBN Atlas – Sightings (2018-2022†)	OWF Observations	Estimation of Density ^
Long-finned pilot whale	N/A	-	-	-	-	-

10.4.3.8. Orca (*Orcinus orca*)

Orcas are widely distributed in coastal and oceanic waters of the North Atlantic and occur throughout the year in British waters (Jourdain *et al.*, 2019). Most sightings across the UK are in Scottish waters. The majority of orca sighted in Scotland are in the Northern Isles community of orcas off the coast of Shetland, Orkney and the north Scottish mainland as well as further offshore (Jourdain *et al.*, 2019). Here orcas are present year-round but with an increase in sightings in coastal areas during summer months (Jourdain *et al.*, 2019). Evidence shows movements of at least some individuals from the Northern Isles to Icelandic summer-spawning grounds (Foote *et al.*, 2010). During winter an increase in sightings offshore in the northern North Sea is associated with mackerel fisheries (Luque *et al.*, 2006). Orca feed on a variety of species including seal (*Pinnipedia*), otter (*Lutra, lutra*), eider ducks (*Somateria mollissima*), squid and some marine fish (SNH, 2016).

There is no MU for orca in UK waters and no abundance or density estimates were calculated for orca through the SCANS III survey. Estimates of abundance for North Atlantic orca is 15,014 individuals (CV 0.42, CI 6,637 - 33,964) (Jourdain *et al.*, 2019). To date 187 distinctive individuals have been photo catalogued off the coast of Scotland (Scullion *et al.*, 2021); these sightings are categorised into nine groups of orca. It should be noted that this survey was conducted across all Scottish waters. There have been nine sightings of orca recorded on the recent sightings of Grampian on Seawatch Foundation portal, as seen in Table 10-17. The few sightings have been recorded in Table 10-17. There are no designated sites for orca within the Proposed Development.

Table 10-17: Orca sightings data

Species	Relevant MU	Seasonality	Seawatch Foundation Sightings (Aug 2024- May 2025)	NBN Atlas – Sightings (2018-2022†)	OWF Observations	Estimation of Density ^
Orca	N/A	-	9 sightings with a max group size of 8	-	-	-

10.4.3.9. Northern bottlenose whale (*Hyperoodon ampullatus*)

The Northern bottlenose whale is recognised by a bulbous head and relatively short, dolphin like beak (Seawatch Foundation, 2012b). The lower jaw has a single pair of teeth, and this whale has a distinctive beak and steep bulbous forehead. It is a member of the beaked whale family with a very short dorsal fin far back on its body (Seawatch Foundation, 2012). They can grow up to 10 m in length, and adults are often covered in scars from aggressive male behaviour (Barnes, 2008). Northern bottlenose whale are an offshore species and can dive up to 1,000 m (Barnes, 2008). They are very rare in the North Sea, favouring deep waters. The UK continental shelf does not represent their preferred habitat (Seawatch Foundation, 2012). Northern bottlenose whale usually travel in groups of 1 to 4 animals, and it is suggested they feed at the seafloor on squids, herring, deep sea fish and shrimps (Seawatch Foundation, 2012). There is no MU or SCANS data for northern bottlenose whales in UK waters. There are no designated sites for northern bottlenose whales within the Proposed Development.

10.4.4. Pinnipeds

Scotland hosts 85% of the UK's harbour seals and 80% of grey seals (SCOS, 2022). The UK achieved its aim of Good Environmental Status (GES) for grey seal in the Greater North Sea in 2018 (Defra, 2022). Grey seal numbers are stable or increasing throughout Scotland, whilst harbour seal have experienced catastrophic declines in the last two decades (Russel *et al.*, 2022). Populations have been increasing in harbour seal recently, however harbour seal are yet to achieve GES (Defra, 2022).

10.4.4.1. Grey seal

The grey seal is the larger of the two seal species in Scotland. They spend most of their time in open water, only coming to the shore to haul out and moult, rest and pup. Grey seals predominantly feed on sandeels, which burrow in sandy sediments (McConnel *et al.*, 1999). They would also feed on a variety of other marine fish as well as octopus, cuttlefish and squid (SNH, 2016). Approximately 38% of the world's grey seal population breed in UK waters, with 88% of colonies in Scotland (SCOS, 2021). SCOS defines six Seal Monitoring Units (SMU) in Scottish waters, of which the Proposed Development falls within the East Scotland SMU (Morris *et al.* 2021). Grey seals breed in the autumn in colonies on rocky shores, beaches, caves and occasionally on sandbanks, as well as on small largely uninhabited islands. Pupping usually occurs in the autumn (SCOS, 2021). Females would remain onshore and suckle a pup for 17 to 23 days during this time (Bowen *et al.*, 2006).

The estimated population size of grey seals in Scotland was 54,974 (SCOS 2024). The main breeding and haul out sites in the region surrounding the Proposed Development for grey seal are in the Firth of Forth (approximately 135 km west from the RLB) and a site at the River Ythan Mouth (approximately 22.7 km west from the RLB).

The grey seal population of the Newburgh haul out site in the Ythan River Mouth (see Figure 10-7 (Drawing reference C01494-EGL3-MEA-SPEC-007-C)) has increased rapidly in the last decade, with the number of individuals recorded increasing from almost 0 seals in 1998 to around 2000 hauled out in 2019 (River Ythan, 2020). The seals haul out to rest and breed particularly on the north bank at the river mouth and have access to prime hunting grounds for salmon and sea trout (Marine Scotland, 2016). While seals are present here all year round, during November and December, the seals have pups (NatureScot, 2023)

Further south, there are multiple haul out sites in use within the Firth of Forth. The closest designated site to the Proposed Development for grey seal is the Isle of May SAC which lies within the Firth of Forth and is located approximately 122 km west of the Proposed Development. This population supports 2.9% of the annual grey seal pup production in Scotland and southeast England (Carter *et al.*, 2022).

The most recent UK wide grey seal count is presented in SCOS (2024) which combines data collected between 2016 and 2023. Although the true value of pup production likely sits between the low and high level, ground comparisons indicate that the high level is likely nearer the truth. This produced a total population estimate for the UK of 169,500 (95% CI: 143,500 – 198,200) seals. The East Scotland pup production was 7,413 from 2019-2023 (SCOS, 2024).

Sightings of grey seal occur most commonly in the central and northern North Sea and generally inshore (DECC, 2016). The average seal density at sea in relation to the RLB can be seen in Figure 10-7 (Drawing reference C01494-EGL3-MEA-SPEC-007-C). The highest average seal density for grey seal is >=0.03% per 25 km^2 which is around the Firth of Tay, Eden estuary and River Ythan,

where seal haul out sites are known to be in use (Carter and Russell, 2020). Within 100 km from the RLB, the average at sea density ranges from 0.0025 - 0.005 per 25 km^2 to 0.0125 - 0.015 per km^2 (Carter and Russell, 2020; Carter *et al.*, 2022; Carter *et al.*, 2025). Other sightings data can be seen in Table 10-18 and Table 10-19.

Table 10-18: Sightings of grey seal

Species	Density Estimate (Carter and Russell, 2020)	Seawatch Foundation Sightings S Grampian and SE Scotland (Aug 2024 – May 2025)	NBN Atlas – Sighting 2020 – 2023
Grey seal	0 – 0.04% per 25 km^2 within 100 km of the Proposed Submarine Cable Corridor	1 sighting with a max group of 1	111 sightings

*Table 10-19: OWF sighting data for grey seal**

OWF Data	Kincardine SMRU 2007-2008	Seagreen 2017 visual boat surveys	Aberdeen EOWDC	Hywind ESAS surveys	Ossian 2021-2022 only June and July	Berwick Bank 2016-2019
Observations of Grey seal	9 sighting in 17 months	45 in early summer and 15 animals in late summer	-	38 individuals	26 individuals	Less than 20 - individuals

*Located within 15km of the RLB (search area as per Chapter 13: Other Marine User and Activities)

600000

700000

6400000

6300000

collaborative environmental advisers

Grey Seal Population Density

C01494-EGL3-MEA-SPEC-007-C

Legend

- Red Line Boundary
- Sandford Bay Landfall
- Ythan River Haul Out Site

Grey Seal Density Distribution (Mean), Carter 2020

- 0 - 0.0025
- 0.0025 - 0.005
- 0.005 - 0.0075
- 0.0075 - 0.01
- 0.01 - 0.0125
- 0.0125 - 0.015
- 0.015 - 0.0175
- 0.0175 - 0.02
- 0.02 - 0.03
- >=0.03
- Scottish Adjacent Waters
- 12NM Limit

0 10 20 30 KM

0 5 10 15 NM

N

Date	26/06/2025
Coordinate System	WGS 84 / UTM zone 30N
Projection	Universal Transverse Mercator (UTM)
Unit	meters
Scale at A3	1:700,000
Created	JC
Reviewed	AN
Authorised	JDM

10.4.4.2. Harbour seal

Harbour seals come ashore in sheltered waters, often on sandbanks and in estuaries, but also in rocky areas (SCOS, 2021), hauling out to rest, moult and breed (Thompson *et al.*, 1996) before dispersing from these sites to forage at sea (Thompson *et al.*, 1994; Bailey *et al.*, 2014). In June and July female seals haul out to give birth (SCOS, 2021). Females lactate and care for pups for 21 days before weaning (Thompson & Wheeler, 2008), during which time the female continues to forage at sea, returning regularly to the pup and therefore limiting at sea distribution (Thompson *et al.*, 1994; Bailey *et al.*, 2014). Harbour seals feed on a wide variety of prey including sandeels, gadoids, herring, sprat, flatfish (*Pleuronectoidei*), octopus and squid, with diet varying seasonally and between regions (SCOS, 2021). The diet of seals off the east coast of Scotland is dominated by sandeels particularly during winter and spring.

Harbour seals are listed globally as least concern on the IUCN Red List, with an unknown population trend (European Mammal Assessment Team, 2007a). Approximately 79% of the population of UK harbour seal are found in Scotland; they are widespread throughout the east coast of Scotland. Harbour seals are present in UK waters year-round, and pups are born during the summer in June and July, in which they spend their time ashore with their pups (Hammond *et al.*, 2003; SCOS 2010). Harbour seal tend to feed on a variety of marine fish (including sandeel), octopus and squid (SNH, 2016).

Harbour seal are most frequently sighted in the central and southern North Sea inshore region. There are no designated sites for harbour seal within 50 km of the RLB, and there is limited density of harbour seal within this area. The highest density of seals is just south of Peterhead at approximately 0.006% per 25 km^2 (Carter and Russel, 2020).

For harbour seal, the main haul out site is within the Firth of Tay and Eden Estuary SAC, which supports a nationally important breeding colony of the east coast population. They typically utilise the sandbanks within the designated site; around 600 adults rest, pup and moult here, representing 2% of the UK population (JNCC, 2015).

The Firth of Tay and Eden Estuary SAC has experienced a steep reduction in harbour seal population over the past two decades. The decline of harbour seal population across the UK is complex and is linked to competition with and predation by grey seals (Carter *et al.*, 2022). The decline could also be linked to phocine distemper virus (PDV) and climate change. This site is 114.2 km west of the RLB and therefore is unlikely to be directly disturbed by the Proposed Development, and is unlikely to interact with it as harbour seals tend not to forage further than 50 km from their chosen haul out site.

The most recent UK wide harbour seal count presented in SCOS (2024) combines data collected between 2016 and 2023. This produced a total population estimate for the UK of 40,525 (CI 33,157 – CI 54,033) seals. For the seal monitoring unit of east Scotland, 276 seals were counted. The most recent sightings of harbour seal are shown in Table 10-20 and Table 10-21.

Table 10-20: Harbour seal sightings data

Species	Density Estimate (Carter and Russell, 2020)	Seawatch Foundation Sightings (March – Aug 2023*)	NBN Atlas – Sighting 2020 – 2023
Harbour (Common) seal	0.006% per 25 km^2 within 50 km of the Proposed	-	2 sightings since 2011

*Table 10-21: OWF sightings data for harbour seal**

OWF Data	Kincardine SMRU 2007-2008	Seagreen 2017	Aberdeen EOWDC	Hywind ESAS surveys	Ossian 2021-2022 only June and July	Berwick Bank 2016-2019
Observations of Harbour Seal	1 sighting in 17 months	-	-	4 sightings	-	79 sightings

* Located within 15km of the RLB (search area as per Chapter 13: Other Marine Users and Activities)

10.4.5. Eurasian otter

Eurasian otter are semi-aquatic mammals that forage for food mostly in fresh water sources like rivers or lakes. They are classified as Near Threatened on the IUCN Red List (The Wildlife Trust, 2025). The population was lost from most of England and Wales between the 1950s and 1970s due to pesticide pollution of waterways but survived in Scotland due to its clean bodies of water in the north and west (NatureScot,2024). The Scottish population is now estimated to be around 8000 otters (NatureScot, 2024a). Cleaner waters and legal protection has allowed otter populations to return to lochs and rivers as well as the coast.

Otters feed on fish such as trout, salmon and eels in freshwater. They are largely nocturnal and occupy very large home ranges (around 32 km for males and 20 km for females). Coastal dwelling otters are different however, only travelling 4-5 km from home to forage,

and are more active during the day due to more productive inshore waters. Otters mate year-round, though must pups are born between May and August, and would maintain numerous couches and holts. Couches is an above ground resting place, often on an island or hidden in reed beds. A holt is an underground resting place, among rock falls, in caves or excavated tunnels in root systems.

The NBN Trust Atlas is an online tool combining all sources of information about UK species and habitats. The NBN Atlas Allows users to interrogate species records. The Atlas provides sightings records for otter using an online interactive map facility. A 32 km circle was drawn centred on the proposed landfall by Peterhead. In total there has been 16 sightings of otter in this area between 2020 and 2025, shown in Figure 10-8.

Figure 10-8: Occurrence records of the Eurasian shown on the NBN Atlas (NBN, 2023) interactive map near the proposed Landfall, 32 km buffer around the landfall

10.5. Potential Pressure Identification and Zone of Influence

10.5.1. Spatial Scope

The Study Area for marine mammals and Eurasian otters adopts a conservative approach to include the RLB and extend beyond this point. The extent of the Study Area, as outlined in Figure 10-8 and Table 10-4, varies between receptor groups defined in Section 10.4.

10.5.2. Temporal Scope

The temporal scope of the assessment of marine mammals and Eurasian otters is consistent with the period over which the Proposed Development would be carried out. It assumes construction of the Proposed Development would commence at the earliest in 2028 with the latest possible completion by 2033. Within this window, construction (including pre-lay activity) is expected to take 55 months. Operation would commence in 2033 with periodical maintenance required during the operational phase. It is assumed that maintenance and repair activities could take place at any time during the life span of the Proposed Development.

The Proposed Development is expected to have a life span of more than 40 years. If decommissioning requires cessation of operation and removal of infrastructure at this point in time, then activities and effects associated with the decommissioning phase are expected to be of a similar level to those during the construction phase works albeit with a lesser duration of two years. Acknowledging the complexities of completing a detailed assessment for decommissioning works up to 40 years in the future, based on the information available, the Applicant has concluded that impacts from decommissioning would be no greater than those during the construction phase. Furthermore, should decommissioning take place, it is expected that an assessment in accordance with the legislation and

guidance at the time of decommissioning would be undertaken and a separate Marine Licence would be sought for decommissioning activities.

10.5.3. Identification of Pressure-Receptor Pathways

Table 10-22 provides a summary of the receptors scoped into the assessment and the potential impacts assessed. The scoping 'in' of these impacts is based on the potential impacts identified within the marine mammals chapter of the MEA Non-Statutory Scoping Report. This took a precautionary approach whereby some impacts were scoped 'in' to the assessment if a strong evidence base to scope the impact 'out' was lacking. Wider consultation then concluded the impacts to be scoped in/out, such as the bottlenose dolphin feature of the Moray Firth SAC which has been scoped back 'in' to the assessment.

Table 10-22: Justification for the zone of influence assigned to potential impacts scoped in for marine mammal assessment

Potential impact	Project Activity	Project Stage	Receptor	Zone of Influence	Justification
Changes in distribution of prey species	Pre-sweeping of sand waves. Cable burial and trenching. Deposit of external cable protection.	Construction Operation (including repair and maintenance).	Cetaceans and pinnipeds	Within the RLB	Changes in prey availability is a potential indirect impact which could arise during any phase of the project life cycle. Activities that lead to temporary or permanent habitat loss (such as seabed preparation, cable burial, deposition of cable protection) affect seabed habitats which could affect the availability of prey. Disturbance of the seabed during the spawning season for species with a demersal life stage (such as sandeel and Atlantic herring) and temporary or permanent habitat loss for such a species could have a direct impact on the spawning biomass for a specific year group, leading to a shortage of prey species marine mammals. Other impacts on fish species such as changes in underwater noise, electromagnetic field (EMF), and thermal changes could also affect the distribution and availability of prey.
Underwater noise changes	Geophysical surveys	Construction, Operation (including repair and maintenance), Decommissioning	Cetaceans and pinnipeds	5 km (JNCC 2020)	For geophysical survey a 5 km ZoI has been adopted based on the recommendations of JNCC (2020). This is a conservative Effective Deterrent Range (EDR) for harbour porpoise (JNCC, 2020). This has been used as a proxy for marine mammals as it is deemed a worse case range because harbour porpoise, with Very High Frequency (VHF) hearing, are regarded as the most sensitive to underwater noise in UK waters (Defra, 2025). The range at which there are effects from continuous underwater noise would be likely be lower than this (JNCC, 2020). Additionally, Appendix 10A: Underwater Noise Modelling Technical Report concluded that disturbance from underwater noise generated by survey and construction support vessels would reach a maximum of a 3.4 km radius from the source. The 5 km ZoI is therefore a precautionary distance. It should be noted that underwater noise changes resulting from project vessels and equipment (including cable trenching) were scoped out in the MEA Non-Statutory Scoping Report. As such, only underwater noise changes associated with geophysical surveys have been assessed.

10.5.4. Guidance

The marine mammals assessment has been undertaken in accordance with relevant guidance and has been compiled in accordance with professional standards. The guidance and standards which relate to this assessment are:

- Priority Marine Features (PMFs), as described in NatureScot Commissioned Report 388; Strategy
- Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0) (NFMS 2024);
- Marine Mammal Noise Exposure Criteria: Assessing the Severity of Marine Mammal Behavioural Responses to Human Noise (Southall *et al.*, 2021);
- Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects (Southall *et al.*, 2019);
- Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations (Southall *et al.*, 2007);
- Review and Recommendations on Assessment of Noise Disturbance for Marine Mammals (Sinclair *et al*., 2023);
- Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts (NOAA, 2018);
- Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise in Special Areas of Conservation (SACs) (JNCC, 2020);
- JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017b);
- Environmental Impact Assessment Handbook (NatureScot, 2018);
- The Protection of Marine EPS From Injury and Disturbance: Draft Guidance for the Marine Area in England and Wales and the UK Offshore Marine Area (JNCC, Natural England, & Countryside Council for Wales, 2010);
- The Protection of Marine EPS from Injury and Disturbance for the Marine Area in Scottish Inshore Waters (Scottish Government (SG) and Scottish Natural Heritage (NatureScot, 2020);
- The Scottish Marine Wildlife Watching Code (NatureScot, The Scottish Marine Wildlife Watching Code - Part 1, 2017a); and
- The Guide to Best Practice for Watching Marine Wildlife to reduce the disturbance of important marine species (NatureScot, 2017b)

10.6. Key Parameters for Assessment

10.6.1. Realistic Worst-Case Design Scenario

The assessment has followed the Rochdale Envelope approach as outlined in Chapter 3: Project Description. The assessment of effects has been based on the description of the Proposed Development and parameters outlined in Chapter 3: Project Description. Where there is uncertainty regarding a particular design parameter, the realistic worst-case design parameters are provided in Table 10-23 with regards to marine mammals along with the reasons why these parameters are considered worst-case. The assessment for marine mammals has been undertaken on this basis. Effects of greater adverse significance are not likely to arise should any other development scenario (e.g., different infrastructure layout within the RLB) to that assessed here, be taken forward in the final design plan, provided the development scenario is within the Rochdale Envelope parameters set out.

It should be noted that Unexploded Ordnance (UXO) clearance is not covered under the Marine Licence sought. In the event that clearance is identified as necessary, a separate Marine Licence would be sought and assessment would be carried out in support of that Marine Licence application. As such UXO clearance has not been assessed in this MEA and MEAp.

Table 10-23: Worst-case assumptions

Impact Pathway	Construction	Operation	Decommissioning	Most sensitive location or scenario
Change in distribution of prey species	Chapter 6: Marine Physical Processes concluded that the coarse sediment would settle within the RLB and fine sediment plumes can travel up to 13.6 km and would cause light surface smothering of <1 mm.		Scoped out	Prey habitat
Underwater noise changes	For the geophysical surveys, the greatest injury ranges results from the multibeam echo sounder (MBES), with Southall *et al.*, (2019) permanent threshold shift (PTS) range for very high frequency (VHF) cetaceans of 315 m, and National Marine Fisheries Service (NMFS) injury range of 290 m.		Scoped out	Injury or disturbance

Impact Pathway	Construction	Operation	Decommissioning	Most sensitive location or scenario
	It should be noted that underwater noise changes resulting from project vessels and equipment (including cable trenching) were scoped out in the MEA Non-Statutory Scoping Report. As such, only underwater noise changes associated with geophysical surveys have been assessed.			

10.7. Embedded Mitigation Measures

As set out in Chapter 4: Marine Environmental Appraisal Scope and Methodology, embedded mitigation forms part of the design for which consent is sought and can be characterised as 'design measures' or 'control and management measures'. This embedded mitigation would be implemented as part of the Proposed Development and secured by way of a condition in the Marine Licence as relevant.

Several management plans would be provided to discharge Marine Licence conditions prior to the start of construction. These would include a Construction Environmental Management Plan (CEMP), Marine Pollution Contingency Plan (MPCP), Marine Mammal Mitigation Plan (MMMP) and a Fisheries Management and Mitigation Plan (FMMP). These documents would outline measures to be implemented to comply with legislation, such as Prevention of Pollution at Sea (MARPOL) and Safety of Life at Sea (SOLAS), and the mitigation commitments proposed within the MEAp (Embedded Mitigation Measure OMT08). An Outline CEMP is provided as Appendix 3B: Outline Construction Environmental Management Plan (CEMP). In addition, design measures identified through the MEA process have been applied to avoid or reduce potential significant effects as far as possible.

Table 10-24 outlines the embedded mitigation measures that would be implemented for the Proposed Development that have been considered by the marine mammal assessment.

Embedded mitigation that was proposed at scoping to justify why a potential impact pathway was not significant has also been included in Table 10-24, along with the impact pathway that it was addressing (i.e. collision with vessels).

Table 10-24: Embedded mitigation measures utilised for marine mammals

Impact Pathway	Receptor	Embedded Mitigation Measures
Underwater noise causing injury and disturbance effects	Cetaceans and Pinnipeds	MM01 - Sub-bottom profiling shall comply with JNCC guidelines for minimising the risk of injury and disturbance to marine mammals (JNCC, 2017b)
EMF potentially disrupting migration patterns, foraging behaviour and social interactions.	Cetaceans and Pinnipeds	OMT06 - HDVC poles will be bundled to minimise the effects of EMF for electrosensitive receptors.
Collisions with Proposed Development vessels and equipment	Cetaceans and Pinnipeds	MM02 - All vessels (exceeding 20 m) shall not exceed 14 knots during construction operations within the RLB to protect marine mammals from ship strikes.
	Cetaceans and Pinnipeds	OO04 - All vessels used during the course of the Licensed Activity will adhere to the Scottish Marine Wildlife Watching Code.

10.8. Significance Assessment

The generic project-wide approach to the assessment methodology is set out in Chapter 4: Marine Environmental Appraisal Scope and Methodology. The criteria for characterising the value and sensitivity and magnitude for marine mammals are outlined in Table 10-25 and Table 10-26, respectively. The significance of an effect, either adverse or beneficial, has been determined using a combination of the magnitude of the impact and the sensitivity of the receptor based on a matrix approach (Table 10-27) which is used throughout all topic areas to ensure a consistent approach within the assessment. The ecological impact assessment uses available evidence, professional judgement and knowledge of marine mammals and behaviour to determine the level of impact.

The assessment of sensitivity has been made with consideration of the vulnerability of the receptor to an impact and its ability to recover and adapt. Vulnerability can differ between different groups and species of marine mammal and would also vary depending on the impact pathway. For example, marine mammal sensitivity to underwater noise changes differs between species depending on their functional hearing group whereas sensitivity to a change in distribution of prey species is subject to the variety in diet, foraging range and frequency at which the species need to feed.

It should be noted though, that species identified as present within the Study Area which are protected by international and national legislation, are of very high importance. However, if baseline studies and species characteristics show that the species is only rarely or occasionally present in the Study Area, or if it is not sensitive to the impact pathway, professional judgement may justify lowering its sensitivity category. Where such assessments have been made, justification has been provided.

The assessment of magnitude has been made with consideration of the extent of the area impacted, the duration and frequency of the impact and the scale of the change i.e., whether it has an effect at an individual or population level. When determining the magnitude of impacts the life history and ecology of the receptors is important. Factors such as seasonality of presence or whether specific areas are required for a certain life stage which the species may be unwilling or unable to move away from are considered.

The significance of an effect, either adverse or beneficial, has been determined using a combination of the magnitude of the impact and the sensitivity of the receptor. A matrix approach is used throughout all topic areas to ensure a consistent approach within the assessment. This is described further in Chapter 4: Marine Environmental Appraisal Scope and Methodology and is replicated for ease in Table 10-27.

Table 10-25: Criteria for characterising the sensitivity of receptors

Sensitivity	Definition
High	Receptor is of very high or high importance and rarity, international or national scale. Receptor has low tolerance to change i.e. recovery will take longer than 10 years following the cessation of activity or will not occur. The receptor is a protected feature of an internationally designated site (e.g., SAC, SPA) and the licensable activity is taking place during a sensitive season.
Medium	Receptor is of medium importance and rarity, regional scale. Receptor has intermediate tolerance to change i.e., recovery to pre-impact conditions is possible between 5 and 10 years. The receptor is a protected feature of a nationally designated site (e.g., NCMPA, SSSI).
Low	Receptor is of low importance and rarity, local scale. Receptor has high tolerance to change with recovery to pre-impact conditions between 1 and 5 years. Common and widespread habitats/species of no specific conservation value.
Negligible	Receptor is common or widespread. The receptor is tolerant to change with no effect on its character. Recovery expected to be relatively rapid, i.e., less than approximately six months following cessation of activity. Artificial, highly modified, and/or degraded benthic habitats/species of low/no conservation interest.

Table 10-26: Criteria for characterising the magnitude of an impact

Magnitude	Definition
High	Impacts last >15 years on a regional or population/habitat level or are a major alteration to key elements/features of the baseline condition such that post-impact baseline character will be fundamentally changed. Natural recruitment will not return the population/habitat to the baseline condition.
Medium	Impacts are of medium term (7-15 years) duration on a local level (wider than project footprint) or alter an element of the baseline conditions such as that post-impact the damage to the baseline is above that experienced under natural conditions but with no permanent effect on integrity.
Low	Impacts are temporary (<1 year) or short term (1-7 years) in duration on a site specific level. Impacts limited to discrete areas within the Project footprint. Negligible contribution to cumulative effects.
Negligible	Very little or no detectable change from baseline conditions, for any length of time. Disturbance is within the range of natural variability or is a highly localised impact that the alteration to the key characteristics and

Magnitude	Definition
	features of the particular receptor does not affect ecological function. Negligible contribution to cumulative effects.

Table 10-27: Significance matrix

		Sensitivity			
		High	Medium	Low	Negligible
Adverse magnitude	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible
Beneficial magnitude	Negligible	Minor	Minor	Negligible	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Medium	Major	Moderate	Minor	Negligible
	High	Major	Major	Moderate	Minor

10.8.1. Change in Distribution of Prey Species

This assessment focuses on the changes in the distribution of prey species. This could occur as an indirect result of permanent habitat loss from the deposit of external cable protection during construction and on a smaller scale if there were to be maintenance works. However, other impacts on prey species such as underwater noise, temporary increase and disposition of suspended sediments and sediment heat change could also combine with temporary and permanent habitat loss to lead to a change in prey availability.

The decommissioning phase has been scoped out of the assessment as described in the MEA Non-Statutory Scoping Report for marine mammals.

10.8.1.1. Marine mammals

Marine mammals feed on a variety of prey species and some can travel great distances to forage. The cetacean species common to the Proposed Development are harbour porpoise with occasional sightings of dolphin (short-beaked common, white-beaked and bottlenose dolphins) and rare sightings recorded for whale (minke, humpback, orca, bottlenose and long-finned pilot whales). Cetaceans are opportunistic hunters, feeding on a variety of fish (haddock, hake, cod, herring, whiting, sandeel, mackerel, salmon and flatfish), cephalopod species (squid and octopi), and crustaceans (shrimp and crabs) but herring, mackerel and sandeel are often preferred prey.

Activities that lead to temporary or permanent habitat loss affect seabed habitat, could, in turn affect the availability and distribution of prey. Significant or widespread disturbance of the seabed 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 marine mammals in subsequent years.

If fish species are avoiding an area, then marine mammals may be required to travel greater distances to locate prey, with an associated energetic cost. If a seal's prey that is closest to their haul-out site is disturbed or reduced, it may be necessary to travel greater distances from haul-out site, thereby increasing the amount of time the animals are at sea and in turn, their time away from pups during pupping season. This could have the potential to impact pup survival. Harbour porpoises, as identified in Section 10.4.3.1, require to feed regularly to sustain their energy and are therefore highly dependent on year-round proximity to reliable food sources (JNCC, 2019). Minke whale, while their diet is varied, identify certain areas as of importance for feeding, such as the Moray Firth SAC. As identified in Section 10.4.3.5, this is where a high number of juveniles feed. The maintenance of supporting habitats and processes to ensure the provision of prey species for marine mammals is therefore a key consideration in maintaining the favourable conservation status of the individual species and features of designated sites and in achieving GES.

With regard to fish and shellfish prey species, Chapter 8: Fish and Shellfish considered a number of impact pathways during construction on marine species including herring, sandeel and shellfish. The impact pathways considered as part of the MEA include:

- Temporary habitat loss (Section 8.8.1)
- Permanent habitat loss (Section 8.8.2)
- Temporary increase and deposition of suspended sediments (Section 8.8.3)

- Electromagnetic changes and barriers to species movement (Section 8.8.4)
- Temperature increase (Section 8.8.5)

Herring, sandeel and shellfish were identified as having a value and sensitivity of medium for all impact pathways assessed due to their specific habitat requirements and/or low mobility, making them vulnerable to seabed disturbance. The magnitude of the impacts was assessed as low based on the highly localised, temporary nature of the construction works. The assessment concluded that the significance of all effects on fish and shellfish receptors was assessed as Minor and Not Significant.

In the absence of any environmentally significant impact on prey species, sensitivity and magnitude are assessed as Negligible, it can be concluded that there would be No Significant effect on marine mammals. Appendix 5A: Habitats Regulation Appraisal (HRA) Stage 1 Screening has completed assessment for LSE on the Moray Firth SAC and Southern North Sea SAC and concluded no LSE. Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening has completed an assessment for the Southern Trench MPA and concluded that the Proposed Development is not capable of affecting (other than insignificantly) the protected features of the MPA. Marine mammals which are a feature of a designated site are considered below.

10.8.1.2. Minke whale feature of the Southern Trench MPA

Minke whale feed in the Southern Trench MPA and it is identified as an important feeding ground for juveniles. Significant disturbance or disruption to their preferred feeding grounds has the potential to limit the development of juvenile minke whale; in the summertime they use the SAC to feed and build up strength to migrate and breed in the winter (NatureScot, 2025). The conservation objectives for the site are that any protected features remain in favourable condition.

Given that there would be no proposed works within the MPA, the magnitude of effect has been assessed as low, since the majority of the Southern Trench MPA would be undisturbed by cable laying (with operations on the edge of the MPA). It has been reported that minke whales have a reduced reproductive success rate when there has been a reduction in foraging (Christiansen *et al.*, 2013), so there is a potential for the changes in available prey to affect the minke whale during the breeding season. Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening concluded that the change in prey is extremely localised relative to the wider geographic areas available to prey species. Furthermore, minke whale have a varied diet feeding on krill and small fish such as sandeel, herring, sprat, whiting and small cod (NatureScot, 2023a). This varied diet makes minke whale less susceptible to changes in prey. Therefore the sensitivity of minke whale to changes in distribution of prey species has been assessed as medium.

In the absence of any environmentally significant impact on prey species (as concluded in the assessment of fish and shellfish receptors), it can be concluded that there would be no Significant effect on minke whale. Overall, the significance of the effect of changes in distribution of prey species has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at Favourable Conservation Status (FCS).

10.8.1.3. Bottlenose dolphin feature of the Moray Firth SAC

Bottlenose dolphin have a reduced sensitivity to changes in the distribution of prey species in comparison to many other marine mammal species since their diet varies geographically unlike minke whale, and they do not need to feed as frequently as harbour porpoise. Bottlenose dolphin can travel southwards to the Firth of Tay, if prey is unavailable in the Moray Firth. Given the Moray Firth SAC is 92.5km from the RLB, it is unlikely to become unfavourable to bottlenose dolphin, as the supporting habitats and availability of prey for bottlenose dolphin would be maintained and undisturbed. The sensitivity of bottlenose dolphin to changes in prey has been assessed as low. The duration of this is limited and therefore magnitude has been assessed as negligible.

As such, in the absence of any environmentally significant impact on prey species and considering the bottlenose dolphins' adaptability in terms of range of forage and prey, it can be concluded that there would be no significant effect on bottlenose dolphin. Overall, the significance has been assessed as Negligible and Not Significant for bottlenose dolphins and therefore not detrimental to the maintenance of the population of the species at Favourable Conservation Status (FCS).

10.8.1.4. Harbour porpoise feature of the Southern North Sea SAC

For harbour porpoise, a change in prey availability affects their ability to forage constantly (Wisniewska *et al.*, 2016) which is needed to sustain their energy levels as their small size limits the stored energy they can carry. A short-term reduction in available habitat is unlikely to significantly damage harbour porpoise, however this is context specific as described by Southall *et al.* (2021): strong disturbance in short bursts can cause harbour porpoise to become isolated and starve. Given the distance from the Southern North Sea SAC of 133.1 km, there is no risk of the Proposed Development's activities interacting with their regular feeding grounds within the Southern North Sea SAC. The sensitivity of harbour porpoise to changes in prey has been assessed as low. The duration of this is limited and therefore magnitude has been assessed as negligible.

As such, in the absence of any environmentally significant impact on prey species (as concluded in the assessment of fish and shellfish receptors), it can be concluded that there would be no discernible effect on harbour porpoise. Overall, the significance has been assessed as Negligible and Not Significant and therefore not detrimental to the maintenance of the population of the species at Favourable Conservation Status (FCS).

10.8.2. Underwater Noise Changes - Geophysical Survey

Cetaceans use underwater acoustics as an important aid in navigation, communication and hunting. Pinnipeds are not known to rely on hearing to forage and communicate as strongly as cetaceans do. It is generally accepted that exposure at close range to high noise levels can cause permanent or temporary hearing damage, while in extreme circumstances and at very close range gross physical trauma is possible. This is known as a temporary threshold shift (TTS) and a permanent transitory shift (PTS) (NMFS, 2023). At wider ranges, the introduction of any additional noise could potentially cause short term behavioural changes, for example the ability of a species to communicate and to determine the presence of predators, food, underwater features and obstructions. This is known as behavioural disturbance (NMFS, 2023). Changes in behaviour, though short term, can have long term consequences. The animal would likely move a distance from the zone of disturbance until the activity passes, which inhibits the regular foraging, breeding and migratory patterns of the species (Hemery *et al.*, 2024).

Sound is readily transmitted into the underwater environment and there is a potential for the noise emissions from the Proposed Development to affect marine mammals. The environmental assessment therefore considers the potential for injury (lethal/physical and auditory) and behavioural disturbance (Southall *et al.,* 2019; NFMS, 2024).

Noise can be categorised into impulsive and continuous (non-impulsive) sound:

- Impulsive noises are typically transient, brief (less than one second), broadband, and consist of high peak sound pressure with rapid rise time and rapid decay (ANSI, 1986 and 2005; NOISH 1998). This category includes noise sources such as seismic surveys and underwater explosions.
- Continuous (non-impulsive) can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent and typically do not have a high peak sound pressure with rapid rise/decay time that impulsive noises do (ANSI, 1995); NIOSH, 1998). This category includes noise sources such as continuous running machinery, sonar and vessels, as well as tonal pulsed activities such as MBES. Underwater noise propagation modelling has been undertaken for the Proposed Development to inform the marine environmental appraisal.
- Appendix 10A: Underwater Noise Modelling Technical Report provides a summary of acoustic concepts and terminology, acoustic assessment criteria, estimated source noise levels and provides the approach taken and results of the underwater noise propagation modelling. The report uses sound propagation models to calculate the impact ranges to marine mammals from each phase of the Proposed Development for:
- Geophysical surveys using non-impulsive sonar-based sound sources;
- Clearance of Unexploded Ordnance (UXO) as an impulsive sound source; and
- Vessels and other non-impulsive sound sources.
- The impact of vessel and associated equipment was scoped out in the MEA Non-Statutory Scoping Report. Additionally, as referenced in Section 10.6.1, UXO clearance if required would be subject to a separate Marine Licence and environmental assessment. As such, this assessment focuses geophysical surveys in terms of changes in underwater noise which could occur as a result of construction operations and on a smaller scale if there were to be maintenance works.

Marine mammals are not equally sensitive to noise at all frequencies and have different hearing sensitivity thresholds. The underwater noise propagation modelling calculates the received noise level at different distances from the source. To determine the potential consequences of these received levels on any marine mammals, it is necessary to relate the levels to known or estimated potential impact thresholds and, on balance, the directivity of the noise source. The auditory injury thresholds proposed by Southall *et al.*, 2019 and NMFS, 2024 are the latest peer reviewed criteria and have been used in this assessment. These are PTS and Temporary Threshold Shifts (TTS) which are a combination of unweighted peak pressure and marine mammal hearing weighted Sound Exposure Level (SEL) and are described and explained in Appendix 10A: Underwater Noise Modelling Technical Report. The approach separates marine mammals into groups based on their functional hearing i.e. the frequency characteristics (bandwidth and noise level) within which acoustic signals can be perceived and therefore are assumed to have auditory effects. The groups for thresholds in Appendix 10A: Underwater Noise Modelling Technical Report relevant to this assessment are:

- Low Frequency (LF) cetaceans: marine mammal species such as baleen whales (e.g. minke whale).
- High Frequency (HF) cetaceans: marine mammal species such as dolphins (e.g., bottlenose dolphin and white-beaked dolphin).
- Very High Frequency (VHF) cetaceans: marine mammal species such as true porpoises, river dolphins and pygmy/dwarf sperm whales and some oceanic dolphins, generally with auditory centre frequencies above 100 kHz) (e.g., harbour porpoise).
- Phocid Carnivores in Water (PCW): true seals (e.g., harbour seal and grey seal); hearing in air is considered separately in the group Phocid Carnivores in Air (PCA).

There is no regulatory or industry guidance with regard to the assessment of behaviour disturbance in marine mammals (Sinclair *et al*. 2023). This reflects both a lack of empirical data and the high variability in behaviour responses, which are often unrelated to the sound level received (Gonez *et al., 2016* and Southall *et al*., 2021 cited in NGET and SSEN-T, 2022). As such, to establish an approach for defining behavioural disturbance and criteria against which assessment can be made, a review of recent environmental impact assessments for activities in Scottish waters has been carried out.

In the West of Orkney Wind Farm: Pre-Construction and Construction Marine Mammal Underwater Noise Impact Assessment (Sinclair *et al.* 2022), disturbance is described as the likely impact of anthropogenic noise on the behaviour of marine mammals. For underwater noise, this is likely to manifest in a behavioural response to flee and avoid the area in which noise is being generated (Sinclair *et al.* 2023), i.e., displacement of marine mammals from an area in which they would have otherwise been present. This could also include behaviours such as a change in speed, direction, dive profile, modification of vocal behaviours or changes in respiratory rate, as outlined in Ossian Array Environmental Impact Assessment Marine Mammal Methodology Note (RPS, 2024).

Appendix 10A: Underwater Noise Modelling Technical Report, adopts the NMFS (2024) guidance which sets a harassment threshold of Level B, 120 dB re 1µPA (rms), for continuous noise sources such as the proposed geophysical survey methods. This is also observed in RPS (2024) which cites NMFS (2018) for the establishment of a harassment threshold also of Level B (but for impulsive noise in this instance), a threshold of 160 dB re 1µPA (rms). However, there is little empirical data concerning these thresholds, as highlighted in Darias-Ohara *et al.* (2025), which specifically concerns Antarctic marine mammal species, but the underpinning principle of the lack of data behind current thresholds adopted is considered relevant. Highlighting the generic approach both with regard to sound categories and species groups and arguing a more suitable approach (citing Tougaard *et al.*) might be to identify a threshold based on frequency weighted sound levels according to the hearing curve of the species, as proxies for the perceived loudness of the sound to the marine mammal (Darias-Ohara *et al.*, 2025).

In the absence of robust empirical data concerning response thresholds or a common approach, as outlined in the Appendix 10A: Underwater Noise Modelling Technical Report (and JNCC *et al.* (2020)), EDR with a range of 5 km has been adopted in this assessment. The EDR is used to define the area within which interaction between the marine surveys and marine mammals may occur.

For both auditory injury and behavioural disturbance, features of designed sites are also assessed with regard to potential for a negative impact on the FCS of the site.

During pre-construction, several types of sonar-like survey equipment would be used e.g., multi-beam echosounder (MBES), side scan sonar (SSS), sub-bottom profiler (SBP) and USBL (ultra short baseline). These are classed as non-impulsive noise because they generally comprise a single (or multiple discrete) frequency as opposed to a broadband signal with high kurtosis, high peak pressures or rapid rise times, as detailed in Appendix 10A: Underwater Noise Modelling Technical Report. The equipment can typically work at a range of signal frequencies, depending on the distance to the bottom and the required resolution. The signal is highly directional and acts as a beam, with the energy narrowly concentrated within a few degrees of the direction in which it is aimed. This effectively means that there is only the potential for injury if a marine mammal is directly within the main beam of the sound source. Once the animal moves outside of the main beam there would be little potential for injury.

It is best practice to follow the JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from geophysical surveys (JNCC, 2017b). Adherence to the guidelines mentioned in Table 10-24 constitutes best practice and would, in most cases, reduce the risk of deliberate injury to marine mammals to negligible levels.

The JNCC (JNCC, 2017b) guidelines state that MBES surveys in shallow waters (<200 m) use higher frequencies that typically fall outside the hearing frequencies of cetaceans and that the sounds produced are likely to attenuate more quickly than the lower frequencies used in deeper waters. JNCC do not, therefore, advise that mitigation is required for MBES surveys in shallow waters. SSS equipment is similar, and mitigation is not required for these surveys. Since the RLB is deeper than 200m at several points, MBES, SBP and USBL have been included in the assessment. It should be noted that new draft guidance was issued for consultation by JNCC in February 2025 (JNCC 2025). The draft 2025 guidelines do not differ from the 2017 guidance on this point.

10.8.2.1. Injury

Cetaceans and Pinnipeds

VHF cetaceans such as porpoises, dolphins and toothed whales (Southall *et al.,* 2019) are the most sensitive to underwater noise from anthropogenic sources. This functional hearing category has therefore been assessed as having a sensitivity of high. This assessment is based on the potential impact ranges predicted for the VHF cetaceans, as representative of worst case. Appendix 10A: Underwater Noise Modelling Technical Report, Table 6-1 indicates:

- SBP: PTS in hearing could be experienced within 195 m; TTS could be experienced within 620 m of source.
- MBES: PTS for VHF cetaceans could be experienced within 315 m; TTS could be experienced within 430 m of source.
- USBL: PTS could be experienced within 70 m; TTS occurring at 1,285 m of the source.

For context, it should be noted that the directionality of the SBP beam significantly reduces the potential for injury and temporary threshold shifts in hearing. However, it does indicate that mitigation would be required to ensure animals are not within 500 m of the SBP when the device is switched on. For other functional groups (including pinnipeds) the impact distances are <165 m.

The magnitude of the impact has been assessed as negligible. There is no direct evidence to link physical auditory injury in cetaceans and geophysical surveys (JNCC, 2021). The most likely response of a marine mammal to noise levels that could induce auditory injury is to flee from the ensonified area (Southall *et al.*, 2007). There is evidence that cetaceans exhibit short-term behavioural responses to geophysical survey e.g., Gordon *et al.* (2003), Southall *et al.* (2007), Thompson *et al.* (2013), and Sarnocińska *et al.*, (2020). While in some literature the onset of TTS is referred to as the fleeing response (RPS, 2024), and thus could be assessed to be behavioural response, as outlined in Section 10.8.2, there is little empirical evidence with regard to behavioural response to underwater noise (discussed further in Section 10.8.2.2).

Cetaceans and pinnipeds can suffer from TTS and PTS from underwater noise, depending on the Sound Exposure Level (SEL). Continuous sound if at the SEL can cause injurious effects, but this takes the duration of exposure into account as well. A harbour porpoise is a VHF cetacean and is most susceptible to TTS or PTS; the SEL for TTS or PTS requires a porpoise to be within the threshold range of the continuous noise for 24 hours, this is applicable for all geophysical surveys. There is evidence that harbour porpoise would swim away from the source in about 90 seconds, injury from continuous noise is therefore unlikely. Bottlenose dolphins are HF cetaceans so have similar sensitivity to harbour porpoises to PTS and TTS. Minke whale are a LF cetacean so have a lesser sensitivity (Southall *et al.*, 2019) with little evidence of injury to underwater noise, though recent studies show their hearing may be higher than expected (Dorian S. Houser *et al.,* 2024).

JNCC guidelines for minimising the risk of injury and disturbance to marine mammals from geophysical surveys (2017) would be applied to reduce the risk of injury occurring from the SBP and USBL systems to negligible. The new draft guidance (issued for consultation by JNCC in February 2025 (JNCC, 2025)) has been reviewed and any differences are noted below in italics. It should be noted that this guidance has not come into effect and may still change prior to formal publication.

The survey equipment and activities proposed are well within the envelope of those for which the guidelines were designed. The 2025 draft guidance states that if parametric SBPs are used, the system is in a fixed position (e.g., hull or pole mounted and not towed), the beam width is <5˚ and no other systems are used at the same time, then mitigation is not required. If none of the above applies, then mitigation should be implemented. Currently the expectation is the JNCC guidance would be followed for all surveys, alongside the EPS licence and MMMP.

The embedded mitigation would include the production of a MMMP to include and outline the following:

- Covering a 24hr period, a marine mammal observer would conduct a pre-shooting search for a minimum of 30 minutes prior to commencement of the start of SBP systems. If a marine mammal is observed within a 500 m mitigation zone around the acoustic source, survey commencement would be delayed until 20 minutes after the marine mammal has left the mitigation zone or was last observed. Pre-shooting should take place during the day, so that MMOs can ensure visual mitigation, Passive Acoustic Monitoring (PAM) would only be used in the event visual mitigation is not possible (JNCC, 2017).
- Soft-start: The JNCC guidelines require that, if possible, the operating power of the equipment would be ramped up gradually, in a uniform manner from a low-energy start-up, over a minimum period of 15 minutes. As acknowledged in the guidelines, this would not be possible with most SBP systems as they are either off or on. If a soft start can be used it would be implemented. *The draft 2025 guidance also states a maximum of 25 minutes from the start of the soft-start to the start of the survey line.*
- Line change: If line changes are expected to be longer than 40 minutes, equipment operation would be stopped at the end of the survey line and the pre-shooting search would be completed prior to resuming survey at full power. Where practical, equipment operation would also be stopped or operated at a reduced power or pulse rate during line changes/pauses expected to be less than 40 minutes.
- Unplanned breaks: Where there is a gap in data acquisition of greater than 10 minutes, a pre-shooting start would be completed prior to resuming survey at full power.
- Nearshore survey lines and the offshore survey lines would start at the shore end and progress offshore to minimise risk of flushing animals towards the beach.
- Time-sharing: When vessels engaged on adjacent surveys take turns to run service lines to avoid interference from noise of each other's airguns.

Following the JNCC *et al.*, 2010 (JNCC 2010) guidance on whether activities constitute an offence under regulation 39 and 41 of the Habitats Regulations 2010 it can be concluded that with mitigation, the impact of noise produced by the operation of equipment used during the geophysical survey (MBES, SBP USBL) is unlikely to be detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range. There is no potential for an offence to occur as a result of the proposed survey alone and therefore the assessment has concluded that the effect has been assessed as Minor and Not Significant.

Minke whale feature of the Southern Trench NCMPA

The Southern Trench NCMPA is designated for minke whale, a LF cetacean. Therefore, the assessment provided above is applicable with respect to injury and a conclusion of Minor significance has been reached, provided embedded mitigation is implemented. The mitigation proposed would be implemented for all SBP surveys within 5 km of the MPA. Overall, the significance of the effect of injury from geophysical surveys to minke whale has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

Bottlenose dolphin feature of the Moray Firth SAC

The Moray Firth SAC is designated for bottlenose dolphin, a HF cetacean. Therefore, the assessment provided above is applicable with respect to injury and the conclusion of Minor significance is reached, provided embedded mitigation is implemented. The Moray Firth SAC is 92.5 km away from the affected area, so bottlenose dolphin within the SAC would not be affected by the Proposed Works. Overall, the significance of the effect of injury from geophysical surveys to bottlenose dolphin has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

Harbour porpoise feature of the Southern North Sea SAC

The Southern North Sea SAC is designated for harbour porpoise, a VHF cetacean. Therefore, the assessment provided above is applicable with respect to injury and a conclusion of Minor significance is reached, provided embedded mitigation is implemented. The Southern North Sea SAC is 133.1 km away from the affected area so harbour porpoise within the SAC would not be affected by the Proposed Works. Overall, the significance of the effect of injury from geophysical surveys to harbour porpoise has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

10.8.2.2. Disturbance

Cetaceans and Pinnipeds

For geophysical surveys, an Effective Deterrent Range (EDR) of 5 km may be assumed based on JNCC *et al.* (JNCC 2020). Although this EDR is provided for harbour porpoise, as the species represents the most sensitive functional hearing group, it is used as a worst-case proxy for other species. This indicates that disturbance effects may be observed in a 5 km radius from the source of other geophysical surveys. The geophysical surveys would be transient in any one location, moving in a linear nature through the Proposed Development. Approximately 78.5 km of sea would experience underwater noise changes sufficient to cause disturbance effects at any one time. This ZoI would move as the survey progresses. As outlined above, there is evidence that cetaceans exhibit short-term behavioural responses to geophysical survey. However, the geophysical surveys are temporary and transient, and animals are able to return to the Proposed Development as soon as the vessel passes through; as evidenced by observations following a 2D seismic survey in the Moray Firth, where harbour porpoise returned to the area within 19 hours of survey ceasing (BEIS, 2018). Disturbance would therefore fit under the JNCC *et al.* (JNCC 2010) classification of trivial as it would only lead to "sporadic disturbances without any likely negative impact on the species". The sensitivity of cetaceans to disturbance has been assessed as low and the magnitude of the impact has been assessed as negligible. The significance of the effect is therefore concluded to be Negligible and Not Significant.

Minke whale feature of the Southern Trench NCMPA

Minke whales are generally considered to be sensitive to low-frequency sounds; however, novel research indicates that they may be sensitive to higher frequency sound. The disturbance is of medium sensitivity due to the limited proximity of the installation site to the Southern Trench NCMPA and the relatively low density of minke whales throughout the year. Persistent noise, however, can interrupt key life-cycle activities such as feeding and breeding, and there is little information on recovery from displacement of the Southern Trench NCMPA. The magnitude for reduced fertility in minke whale, from displacement of the Southern Trench NCMPA has been assessed as low, since only 3.8% of the NCMPA would be affected by the geophysical surveys (Table 10-28). Minke whales who are displaced would still have plenty of alternative feeding grounds from within the site, so the significance of the effects has been assessed as Minor and Not Significant. It should be noted that the implementation of seasonal mitigation to avoid surveys and cable laying in the summer and autumn months would be a matter of best industry practice.

Table 10-28 presents the calculated areas of the NCMPA that would be affected by a 5 km EDR either side of the cable route.

The density of individual minke whales in the southern section of the Southern Trench NCMPA is 0.0 to 0.1 animals per km^2 (NatureScot, 2020). The 3.8% of the ground affected by a geophysical survey is 92.063 km^2 in total, from this it is estimated a total of 9.20 animals per km^2 would be affected by one survey, as a worst-case scenario. This is a small number of animals compared to the rest of the Southern Trench MPA, which has much higher densities in the north; the footprint on the site is minimal. Overall, the significance of the effect of injury from geophysical surveys to minke whale has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

Table 10-28: Calculation of disturbance effects in Southern Trench NCMPA

MPA Grounds	Area
Total area of grounds	2398.86 km^2
Total area affected by noise (5 km buffer)	92.063 km^2
% of ground affected	3.8%
Density of animals in ground affected	9.20 per km^2

Bottlenose dolphin feature of the Moray Firth SAC

Bottlenose dolphins are sensitive to high-frequency sounds; the greatest TTS range for HF cetaceans is from MBES and is 300 m from the source, which could indicate a behavioural response within this range. The 5km EDR (JNCC 2020) can be applied for HF cetaceans. Therefore, the assessment provided above is applicable with respect to disturbance and the conclusion of Minor significance is reached, provided mitigation is implemented. The Moray Firth SAC is 92.5 km away from the affected area, so bottlenose dolphin within the SAC would not be affected by the Proposed Works. Overall, the significance of the effect of injury from geophysical surveys to bottlenose dolphin has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

Harbour porpoise feature of the Southern North Sea SAC

The greatest range of TTS for VHF cetaceans is from MBESis 430 m, which could indicate a behavioural response within this range. The Southern North Sea SAC is designated for harbour porpoise, a VHF cetacean. The 5km EDR (JNCC 2020) can be applied for VHF cetaceans. Therefore, the assessment provided above is applicable with respect to disturbance and a conclusion of Minor significance is reached, provided mitigation is implemented. The Southern North Sea SAC is 133.1 km away from the affected area so harbour porpoise within the SAC would not be affected by the Proposed Works. Overall, the significance of the effect of injury from geophysical surveys to harbour porpoise has been assessed as Minor and Not Significant and therefore not detrimental to the maintenance of the population of the species at FCS.

10.9. Project Specific Mitigation Measures

The assessment of the effects of the Proposed Development on marine mammals identified effects not exceeding 'minor' significance for the construction and operation and maintenance phases of the Proposed Development. These effects can be adequately controlled from the design and control measures embedded in the Proposed Development. No additional mitigation is proposed.

10.10. Residual Effects

The appraisal of the impacts of the Proposed Development on marine mammal receptors identified no effects not exceeding 'minor' significance for the construction and operation and maintenance phases. No residual effects are predicted.

10.11. Cumulative Effects

If the construction or decommissioning of other plans and projects have a temporal overlap with the construction of the Proposed Development, there is potential for cumulative adverse effects on marine mammals greater than that caused solely by the Proposed Development. As outlined by Chapter 4: Marine Environmental Appraisal Scope and Methodology, a four-stage approach has been undertaken to assess the cumulative adverse effects from other plans and projects in-combination with the construction of the Proposed Development.

10.11.1. Stage 1: Identification of ZoI

10.11.1.1. Change in distribution of prey species

Chapter 8: Marine Physical Processes concluded that the furthest distance that suspended sediment would be deposited from the Proposed Development would be 13.6 km, dependent on peak flow speed. All sedimentation outside the RLB would be from fine particulates that would settle in 1 mm (at 6.5 km from the plume source) or less thicknesses, which is indistinguishable from background levels. Additionally, Sinclair *et al.* (2023) reported that 90 % of sediments suspended during cable laying activities are predicted to resettle within 1 km of the RLB and Gooding *et al.* (2012) suggests that fine particles may travel 1-2 km from the source. Therefore, the ZoI for the cumulative effects assessment for marine mammals is 2 km. Any sedimentation outside of this 2 km ZoI as a result of the Proposed Development would not cause significant cumulative adverse effects on marine mammal receptors.

10.11.1.2. Underwater noise changes

Surrounding offshore wind farms would have a much larger underwater noise impact than the Proposed Development. JNCC *et al.* (2020) recommended applying an effective deterrent range (EDR) of 26 km for piling of monopile foundations and 15 km for pin-piles

(smaller diameter piles used for floating offshore wind farms). Therefore, the ZoI for the cumulative effects assessment for marine mammals is 15 km for floating OWFs (using pin-piles) and 26 km for OWFs that would be monopiled or for which the design is currently unknown.

All plans and projects within the ZoI are assessed in-combination with the Proposed Development to determine if there would be any significant cumulative adverse effects to marine mammal receptors (Section 10.11.4).

10.11.2. Stage 2: Shortlist of Plans and Projects Relevant to Marine Mammals

Chapter 4: Marine Environmental Appraisal Scope and Methodology outlines a longlist of plans and projects within 30 km of the Proposed Development. From this longlist, nine plans/projects within 26 km of the Proposed Development have been shortlisted to inform the cumulative effects assessment for marine mammal receptors (Table 10-29). Infrastructure within this ZoI that is already operational has been scoped out, since the effects of the maintenance of operational projects has influenced the baseline assessment.

Table 10-29: Shortlist of projects

Application Reference	Plan or project	Type of project	Distance from Proposed Development	Status
SCOP-0056	Bowdun Offshore Wind Farm (OWF)	OWF	5.78 km	Pre Application - Scoping Report
00011026	Muir Mhor OWF	OWF	~3 km	Application – EIA submitted
00010861	Ossian OWF	OWF	2.66 km	Application – EIA submitted
00010344	Morven OWF	OWF	1.98 km	Pre Application - Scoping Report
00011091	Cenos Floating OWF – transmission infrastructure	Export cable	0 km/crosses	Application – EIA submitted
SCOP-0066	Aspen Floating OWF – transmission infrastructure	Export cable	0 km/crosses	Pre Application – Scoping Report
SCOP-0020	MarramWind OWF	Export cable	0 km/crosses	Pre Application – Scoping Report
06771 & 06870	NorthConnect	Cable	0 km/crosses	Licence expired
00009943	Eastern Green Link 2 (EGL 2)	Cable	0 km/crosses	Licence granted

10.11.3. Stage 3: Information Gathering and Identification of Pressure-Receptor Pathways

Construction of the Proposed Development is scheduled to commence in 2028 with the latest possible completion by 2033. Within this window, construction (including pre-lay activity) is expected to take 55 months.

Bowdun OWF is situated approximately 5.87 km from the RLB and is due to commence construction in 2029 (RPA, 2025), with commissioning planned for 2032 (Scottish Government, 2024). As such, there may be a temporal overlap in construction between the two projects. If works were to occur simultaneously there could be in-combination effects from underwater noise changes and changes in distribution of prey species (resulting from temporary increase and deposition of suspended sediments). However, due to the application stage of Bowdun OWF, there is no EIA available for this project and its project-alone impact to marine mammals is unknown. Therefore, Bowdun OWF cannot be assessed in-combination with the Proposed Development and would not be taken forward to stage 4 of the cumulative effects assessment.

The export cable corridor of Miur Mhòr OWF is situated approximately 3 km from the RLB of the Proposed Development. Miur Mhòr OWF is currently in its application phase, having submitted EIA in December 2024 (application reference number: 00011026) (Scottish Government, 2024), and is scheduled to commence construction in 2030, with construction activities lasting up to four years (MMOWF Ltd, 2024). As such, there may be a direct temporal overlap in construction between the two projects and potential for cumulative adverse effects from underwater noise changes. As such, this project has been taken forward to stage 4 of the cumulative effects assessment.

Ossian OWF is a floating OWF that is situated approximately 2.66 km outside of the RLB, and is planning to commence construction in early 2030 (SSE Renewables, 2025). As such, there may be a temporal overlap in construction between the two projects. If works

were to occur simultaneously or sequential construction in quick succession of the two projects there could be in-combination effects from underwater noise changes. As such, this project has been taken forward to stage 4 of the cumulative effects assessment.

Morven OWF is situated approximately 1.98 km from the Proposed Development and is due to commence construction in 2027, with commercial operation scheduled to begin in 2030 (Power Technology, 2024). Thus, there could be a temporal overlap in construction between the two projects. As Morven OWF is situated outside of the RLB of the Proposed Development, simultaneous construction or sequential construction in quick succession of the two projects has the potential for in-combination effects from underwater noise changes and changes in distribution of prey species. However, due to the application stage of Morven OWF, there is no EIA available for this project and its project-alone impact to prey species is unknown. Therefore, Morven OWF cannot be assessed in-combination with the Proposed Development and would not be taken forward to stage 4 of the cumulative effects assessment. Northconnect is planned to cross the Proposed Development at approximately KP 576. However, construction of Northconnect has been placed on hold by the Norwegian Government, and the current Marine Licence for this project has expired (expiration date 2024) (Northconnect, 2025). It is understood that the Cenos Offshore Wind Farm has taken on the planned cable route from NorthConnect and a new licence application has been submitted. NorthConnect is therefore not considered further, Cenos OWF export cable crossing a likely required crossing for the Proposed Development, it has therefore been assessed as part of the baseline for the Proposed Development.

Cenos Floating OWF's export cable corridor crosses the Proposed Development at KP 576, utilising the DC routing of NorthConnect within 12 NM to reduce the need for additional infrastructure (Scottish Government, 2025a). Cenos Floating OWF is currently in its application phase, having submitted its EIA in January 2025 (application reference number: 00011091) (Scottish Government, 2025a), and is scheduled to commence construction from 2030, with operation in 2031. As such, there may be a direct temporal overlap in construction between the two projects. As Cenos Floating OWF's export cable corridor overlaps the RLB of the Proposed Development, there is potential for cumulative adverse effects from underwater noise changes and changes in the distribution of prey species. As such, this project has been taken forward to stage 4 of the cumulative effects assessment.

Aspen Floating OWF is currently in pre-application, having submitted the Scoping Report in May 2025 (application reference number: SCOP-0066) (Scottish Government, 2025b), and is scheduled to begin construction in 2028 with operation commencing in 2029/2030. As such, there may be a direct temporal overlap in construction between the two projects. The export cable corridor scoping boundary of Aspen Floating OWF overlaps with the Proposed Development and, due to the uncertainty of overlap in construction timelines, it is unclear as to which project will carry out cable installation first. Due to the application stage of Aspen Floating OWF, there is no EIA available for this project and its project-alone impact to marine mammal and marine reptile receptors is unknown. Therefore, Aspen Floating OWF cannot be assessed in-combination with the Proposed Development and will not be taken forward to stage 4 of the cumulative effects assessment.

MarramWind OWF is currently in pre-application, having submitted the Scoping Report in January 2023 (application reference number: SCOP-0020) (Scottish Government, 2023). Construction is scheduled to begin in the late 2020s, following planning decisions in 2026, and MarramWind OWF is scheduled to be operational in the 2030s. Therefore, there may be a direct temporal overlap in construction between the two projects. The scoping boundary of MarramWind OWF overlaps with the RLB of the Proposed Development at Peterhead nearshore. However, due to the application stage of MarramWind OWF, there is no EIA available for this project and its project-alone impact to marine mammal and marine reptile receptors is unknown. Therefore, MarramWind OWF cannot be assessed in-combination with the Proposed Development and will not be taken forward to stage 4 of the cumulative effects assessment.

The construction of EGL 2 is currently underway, with cable operation scheduled for 2029 (Eastern Green Link 2, 2025). Additionally, EGL 2 and the Proposed Development share the same landfall at Sandford Bay, Peterhead. Therefore, it is expected that there will be a temporal overlap in construction with the Proposed Development for one year. The Marine Licence for EGL 2 has been granted and can be viewed using MD-LOT website (Licence Number: MS-00009943). EGL 2 overlaps the RLB of the Proposed Development at Sandford Bay landfall and Peterhead nearshore.

In summary, four of the above listed projects have been taken forward to stage 4 of the cumulative effects assessment:

- Muir Mhòr OWF
- Ossian OWF
- Cenos Floating OWF – transmission infrastructure
- EGL 2

10.11.4. Stage 4: Assessment

10.11.4.1. Changes in distribution of prey species

Changes in the distribution of prey species has been assessed with regards to the potential for a disturbance of or reduction in the habitat for prey species such as herring and sandeel as a result of the installation of the cable itself and/or the deposition of cable protection during construction and operation of the Proposed Development. In accordance with the ZoIs identified in Section 10.11.1,

only those projects within 2 km of the Proposed Development have been assessed for the potential for cumulative effects on changes in the distribution of prey species.

Although both EGL 2 and EGL 3 project cables would occur within the same area, these cables would run adjacent to one another and not overlap for the majority of the Proposed Development. Furthermore, each project cable would be buried within its own trench. EGL 2 overlaps with the Proposed Development at Sandford Bay landfall and Peterhead nearshore (KP 582 – KP579). The temporal overlap of EGL 2 is expected to be one year, as it is expected to become operational by 2029 (Eastern Green Link 2, 2025), and the Proposed Development would commence construction in 2028. Changes in distribution of prey species was not an impact considered in the EGL 2 Environmental Appraisal Report, potentially due to their highly mobile nature and the abundance of alternative feeding grounds for marine mammals to disperse into and forage within.

The transmission infrastructure for Cenos Floating OWF would cross the Proposed Development at KP 576. The temporal overlap would be expected to be one year, as construction of Cenos Floating OWF transmission infrastructure is scheduled to commence in 2030, with operation in 2031. The Cenos EIA: Chapter 11 – Marine Mammal Ecology (Xodus, 2024) concluded that the potential for marine mammals to be affected by changes in prey distribution as a result of construction activities would be negligible and not significant in EIA terms due to the highly mobile nature of marine mammals and the short-term temporary nature of construction activities.

Chapter 3: Project Description of this MEAp states that at present the locations and footprints of cable protection proposed for EGL 3 are limited to the seven identified infrastructure crossings. At present the locations of any remedial cable protection which may be required due to the cable not reaching target burial depth during construction or following cable repair works are unknown. The seven infrastructure crossings which would require cable protection during the construction phase are not located within the 2 km ZoI, and there is therefore no potential for cumulative impacts on marine mammals receptors. The closest distance between cable crossings is the Cruden Pipeline, which is crossed by both EGL 2 and EGL 3. The crossings are located 3.14 km apart and therefore outside the ZoI.

Appendix 5A: Habitats Regulation Appraisal (HRA) Stage 1 Screening and Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening completed an assessment on cumulative effects for the following designated sites:

- Southern North Sea SAC
- Moray Firth SAC
- Southern Trench NCMPA

It was concluded for all of the designated sites that the Proposed Development would not have a cumulative effect with the surrounding wind farms or with EGL 2 on marine mammals. Therefore, it is concluded that there would be no detectable contribution to a cumulative effect resulting from this impact. The cumulative effect of changes in distribution of prey species has been assessed as Negligible and Not Significant.

10.11.4.2. Underwater noise changes

Underwater noise changes have been assessed with regards to the potential for disturbance, displacement or injury of marine mammals due to noise exposure during geophysical surveys for the Proposed Development. In accordance with the ZoIs identified in Section 10.11.1, only those projects within 15 km of the Proposed Development have been assessed for the potential for cumulative effects of underwater noise changes.

EGL 2 overlaps with the Proposed Development at Sandford Bay landfall and Peterhead nearshore (KP 582 – KP579). The temporal overlap of EGL 2 is expected to be one year, as it is expected to become operational by 2029 (Eastern Green Link 2, 2025), and the Proposed Development would commence construction in 2028. EGL 2 would use MBES and SBP geophysical surveys during pre-construction. The worst-case scenario would be both developments undergoing a geophysical survey simultaneously. The JNCC guidance (JNCC, 2020) recommends a 5 km buffer for geophysical surveys; the ZoI of underwater noise from a single survey is 78.5 km^2.

EGL 2 has completed a significance assessment on the effects of SBP to marine mammals and concluded that there is potential for injury from the use of the SBP; embedded mitigation measures recommended in the JNCC guidelines for minimising the risk of injury in marine mammals (JNCC, 2017) would be adopted. The inclusion of embedded mitigation for SBP operation results in the magnitude of the impacts being reduced. After mitigation the significance of impact has been assessed as Minor and Not Significant.

The transmission infrastructure for Cenos Floating OWF would cross the Proposed Development at KP 576. The temporal overlap would be expected to be one year, as construction of Cenos Floating OWF transmission infrastructure is scheduled to commence in 2030, with operation in 2031. The Cenos EIA: Chapter 11 – Marine Mammal Ecology (Xodus, 2024) concluded that the potential for marine mammals to be affected by changes in prey distribution as a result of underwater noise changes arising from piling activities would be negligible and not significant in EIA terms. Up to two geophysical survey campaigns of maximum 60 days each are expected to be carried out during the pre-construction phase for the Cenos Floating OWF transmission infrastructure (Xodus, 2024). The worst-

case scenario would be pre-construction geophysical surveys for both projects being undertaken simultaneously. Cenos Floating OWF completed a significance assessment for the potential effects of underwater noise during geophysical and geotechnical surveys, and concluded that there would be the potential for injury from the use of the SBP. The inclusion of embedded mitigation measures based on JNCC guidance (JNCC, 2020) reduces the evaluation of significance to negligible and not significant in EIA terms.

The Ossian OWF is a floating OWF, so piling associated with Ossian would have a lesser impact than that of Morven or Bowdun, since smaller diameter piles are used to secure the marine structures (JNCC 2020). Ossian has the potential to cause injury and disturbance from pin piling and UXO. Pin piling during construction can result in the barrier effect, so the response to move away from an effected area can prevent the usual transit of cetaceans to feeding and breeding grounds. This can affect the mammals' feeding and breeding, possibly leading to mortality as a result (Thompson et al 2020).

With regards to the Proposed Development there is potential for an overlap of geophysical surveys. Such as, vessel noise from pin pilling for Ossian, due to the avoidance of construction in winter periods, as well as UXO. The JNCC guidance (JNCC, 2020) recommends a 15 km EDR for pin piling. The JNCC guidance (JNCC, 2020) states that the area impacted from a single pin piling event based on an EDR of 15 km would be approximately 707 km^2, at any one time. JNCC recommends a 26 km buffer for UXO High order detonation, this results in a one-off explosion and would result in a startle response and would not cause long-term displacement. This is the worst-case scenario of low order disposal of UXO failing. In comparison, the largest ZoI for underwater noise as a result of the Proposed Development is 5 km EDR from geophysical surveys, meaning that at any one time a maximum area of approximately 78.5km^2 could be affected. The temporal overlap for Ossian and the Proposed Development is unknown but expected, since Ossian is due to start construction in the early 2030s, and the Proposed Development would begin construction in 2028. The Proposed Development is likely to overlap with pin piling activities as UXO clearance would be completed before the windfarm begins construction.

This overlap would have a cumulative effect; however, Ossian must implement mitigation to gain consent. Ossian OWF has completed a significance assessment for injury and disturbance form underwater noise and concluded that the effect would, of minor adverse significance, which is not significant in EIA terms (RPS, 2024a). This is due to the implementation of embedded mitigation, initiation and soft start, which preventatively give marine mammals time to evacuate the affected area before ramp up of pin piling activities (RPS 2024a). Since the underwater noise impact of pin piling is 10x that of the Proposed Development, the cumulative impact of geophysical surveys is unlikely to be detectable compared to the piling. Standard mitigation measures would be implemented regardless of the level of impact. Sound contours at appropriate intervals would be generated by sound modelling and overlaid on species density surfaces to predict the number of animals and habitats affected.

The export cable corridor of Muir Mhòr OWF is situated approximately 3 km from the RLB of the Proposed Development. There is the potential for temporal overlap, as construction of Muir Mhòr is scheduled to begin in 2030. The Muir Mhòr OWF completed a significance assessment for the potential for PTS and/or disturbance from piling activities, and concluded that the significance of the effect(s) on marine mammals would be of negligible to minor significance, neither of which are considered significant in EIA terms (SMRU Consulting, 2024). The Muir Mhòr OWF completed a significance assessment for the potential effects of underwater noise during pre-construction geophysical surveys, and concluded that the inclusion of embedded mitigation measures based on JNCC guidance (JNCC, 2020) would ensure that the significance of the effect of underwater noise arising from geophysical surveys on marine mammals would be negligible and not significant in EIA terms (SMRU Consulting, 2024).

Appendix 5A: Habitats Regulation Appraisal (HRA) Stage 1 Screening and Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening Compliance (MPA) Assessment completed an assessment on in-combination impacts for the following designated sites:

- Southern North Sea SAC
- Moray Firth SAC
- Southern Trench NCMPA

It was concluded for all of the designated sites that the Proposed Development would not have cumulative underwater noise effects with EGL 2 or the surrounding wind farms on marine mammals. Both the Proposed Development and the other projects considered within this section concluded that impacts would not be significant for underwater noise from geophysical surveys, and the cumulative impact does not have a large enough ZoI to adversely affect the designated sites due to their distance from the RLB. With regards to piling noise associated with the construction of Ossian Floating OWF and Muir Mhòr OWF, Appendix 5A: Habitats Regulation Appraisal (HRA) Stage 1 Screening and Appendix 5C: Marine Protected Area Assessment Stage 1 Initial Screening concluded that the Proposed Development would not have a cumulative effect with the surrounding wind farms on marine mammals, as the piling is a much more dominant noise source than the largest underwater noise buffer imposed by the Proposed Development (5 km). Therefore, it is concluded that there would be no detectable contribution to a cumulative effect resulting from this impact. The cumulative effect of underwater noise has been assessed as Negligible and Not Significant.

10.11.4.3. Stage 4 assessment conclusion

Cumulative effects have been assessed for changes in the distribution of prey species and underwater noise changes for Muir Mhòr OWF, Ossian Floating OWF, Cenos Floating OWF – transmission infrastructure and EGL 2. In all cases, no cumulative effects were concluded.

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