OCU Group

Report to Inform Habitats Regulations Assessment

Beaufort Horizontal Directional Drilling

Confidentiality

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Acronyms

Term	Definition
AA	Appropriate Assessment
AEoI	Adverse Effects on Integrity
AoO	Advice on Operations
BHA	Bottom Hole Assembly
CIS	Celtic and Irish Seas
cm	centimetre
cSAC	candidate Special Area of Conservation
EU	European Union
Hz	Hertz
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
IAMMWG	Inter-Agency Marine Mammal Working Group
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
kHz	Kilohertz
km	kilometre
LSE	Likely Significant Effect
m	metre
MBES	Multi Beam Echo Sounder
MU	Management Unit
NRW	Natural Resources Wales
OCSW	Offshore channel, Celtic and Southwest England
pSPA	potential Special Protection Area
QI	Qualifying Interest
SAC	Special Area of Conservation
SPA	Special Protection Area
TeLSE	Test of Likely Significant Effect
UK	United Kingdom
ZoI	Zone of Influence

1 Introduction

1.1 Overview

1.1.1 GoBe Consultants Ltd (GoBe), part of the APEM Group, has been contracted by OCU Utility Services (HDD Division) to prepare a Band 3 marine licence application for the proposed Horizontal Directional Drilling (HDD) works (here after referred to as 'the Project') at Newgale, Pembrokeshire. These works are intended to facilitate the subsequent installation of the Beaufort subsea telecommunications cable, which will be operated by Vodafone's wholly owned subsidiary Apollo Submarine Cable System Limited in the UK (referred to as Vodafone).

1.2 Project Background

1.2.1 To facilitate improved internet connectivity, Vodafone is proposing the installation of a fibreoptic telecommunications cable from Kilmore Quay, Wexford, Ireland to Newgale, Pembrokeshire. Prior to the cable's installation, Horizontal Directional Drilling works are proposed to install cable ducting, through which the cable will later be fed. The cable will come ashore through the car park of the Newsurf Shop, where it will be connected to the onshore infrastructure. This application is for the HDD works only.

1.2.2 Within the Newsurf Shop car park, an area approximately 50 m x 50 m for the operation of the drilling rig and support equipment/vehicles will be required. From here, the drilling operation will begin by drilling a pilot hole. Then, the drilling will be carried out continuously in intervals of 9.5 metres, equivalent to one length of drill pipe, until the Bottom Hole Assembly (BHA) is at an along hole length of roughly 300 m, (i.e., horizontal at the end of the Entry Curve). The drill string will then continue to punch out on the seabed at a drilled length of 920 m.

1.2.3 The HDD will exit from a subsea point approximately 920 m from shore, the exact location of which will be confirmed using a Multibeam Echo Sounder (MBES). Once confirmed, a dive vessel will be mobilised to this exit point, and divers will attach air bags to the Bottom Hole Assembly (BHA). The BHA can then by floated to the surface and retrieved and a bell mouth will be attached to the drill pipe. At the exit point, a marker buoy will be attached to a clump weight to indicate the location.

1.2.4 The HDD works are expected to commence in October 2026 and are anticipated to last approximately 57 days in total, including site mobilisation, construction, MBES surveys and demobilisation from site.

1.3 Habitats Regulations Assessments

1.3.1 Proposed plans or projects that have the potential to affect designated nature conservation sites are required to be considered through the Habitats Regulations Assessment (HRA) process under The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) (the Habitats Regulations).The site is within 12 nm and as such, only the Conservation of Habitats and Species Regulations 2017 are applicable to this application, hereafter known as 'The Habitat Regulations'.

1.3.2 The Habitats Regulations require that an Appropriate Assessment of the implications of any development consent must be made by the relevant competent authority, in this case Natural Resources Wales (NRW), if a project (or plan) is likely to have a significant effect on the conservation objectives of a European Site (defined below), either alone, or in-combination with other plans or projects.

1.3.3 HRA is generally understood to be a progressive, four stage process which determines Likely Significant Effect (LSE) and, where required, assesses potential adverse impacts on the integrity of a European Site, examines alternative solutions and provides justification of Imperative Reasons of Overriding Public Interest (IROPI) (Planning Inspectorate 2017). Further detail on the process followed and the definition of particular terms, is provided in the methodology (Section 3).

1.4 Purpose of the Report

1.4.1 This HRA Screening report considers the work activities (hereafter referred to as 'proposed works') associated with the HDD required prior to the installation of a subsea telecommunications cable at Newgale, Pembrokeshire. The report provides the information necessary for NRW to fulfil its role as the 'competent authority' under the Habitats Regulations and to determine if the proposed works are likely to have a significant effect on the conservation objectives of a European Site, either alone, or in-combination with other plans or projects.

1.4.2 The report outlines the works and explains the HRA Screening and Appropriate Assessment process. The report documents the assessment process and presents the results and conclusion of the screening process.

1.4.3 The information provided allows NRW, as the competent authority, to determine whether the Project is likely to result in LSE on any European Site.

1.4.4 In the context of a HRA, where the potential for LSE cannot be excluded for a Site, the competent authority must make an Appropriate Assessment of the implications of the plan or project for that site, in view of the Site's conservation objectives. The competent authority may agree to the plan or project only after having ruled out adverse effects on the integrity of the European Site. Where an adverse effect on the site's integrity cannot be ruled out, and where there are no alternative solutions, the plan or project can only proceed if there are IROPI and if the necessary compensatory measures can be secured.

2 The Proposed Works

2.1 Location and Context

2.1.1 The indicative HDD launch location and onshore entry point of the HDD are located within the Newsurf Shop car park at Newgale, Pembrokeshire (see Section 3 for a full description of the HDD methodology and onshore works). Drilling will commence from this location and follow the drill path described in Section 1.2, including the pilot hole, entry curve, and offshore punch-out.

2.1.2 The HDD will exit from a subsea point approximately 920 m offshore. The exact exit location will be confirmed prior to the works using the Norbit i77h Winghead Multibeam Echo Sounder (MBES). The MBES emits highly directional acoustic waves (between 200-700 kHz) in a fan shape to accurately identify the seabed exit point. Once confirmed, a dive vessel will be mobilised, and divers will attach air bags to the Bottom Hole Assembly (BHA) to allow it to be floated to the surface for retrieval. A bell mouth will then be attached to the drill pipe, and the exit point will be marked with a buoy attached to a clump weight to indicate the location. The size of the drill exit point will be approximately equivalent to the outer diameter (OD) of the drill pipe, estimated at 16.83 cm (area = 755 cm^2). The site layout and offshore punch-out location are shown in Figure 2.1 and Figure 2.2.

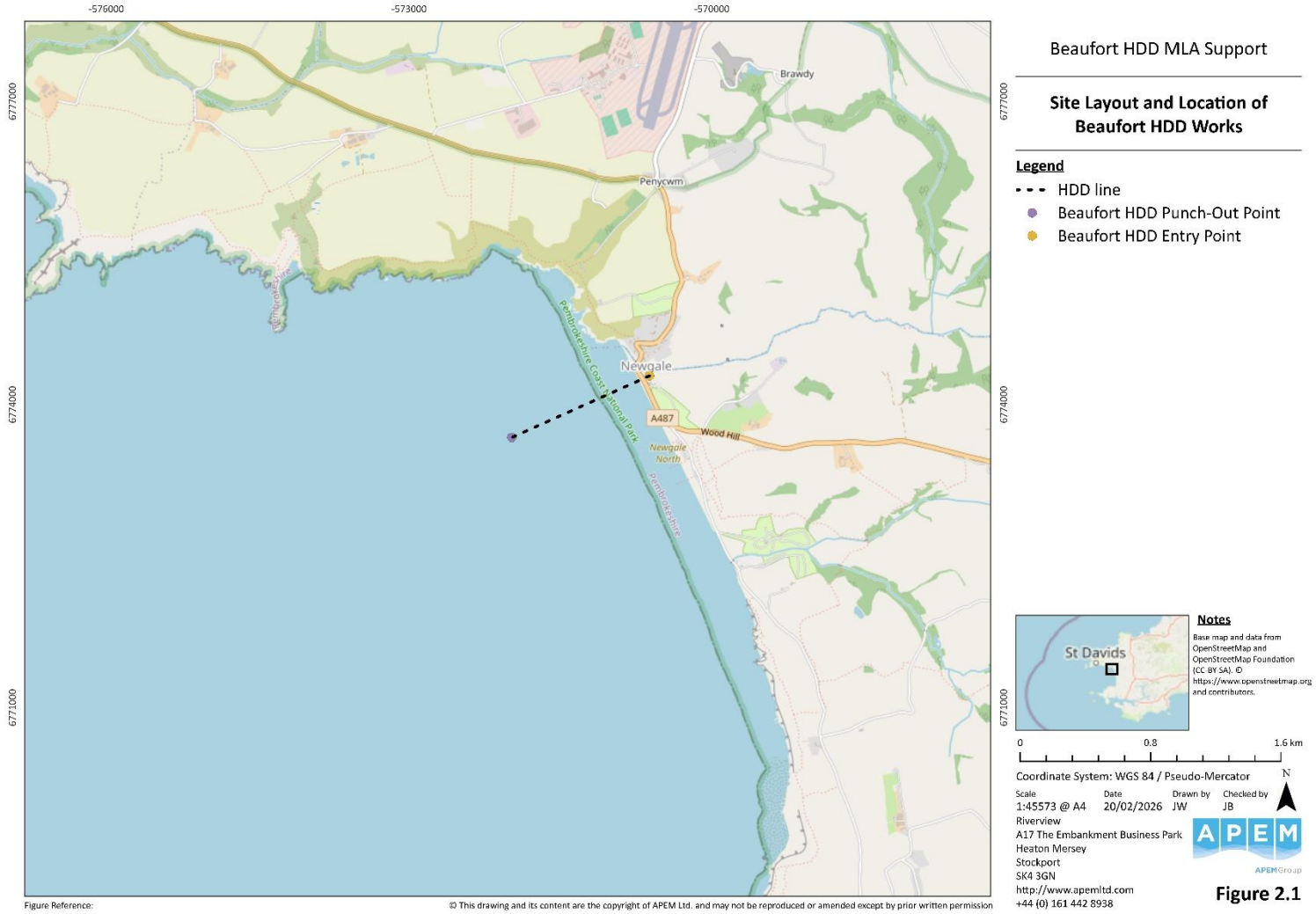

Figure 2.1 Project Location and Part of the Offshore HDD Line

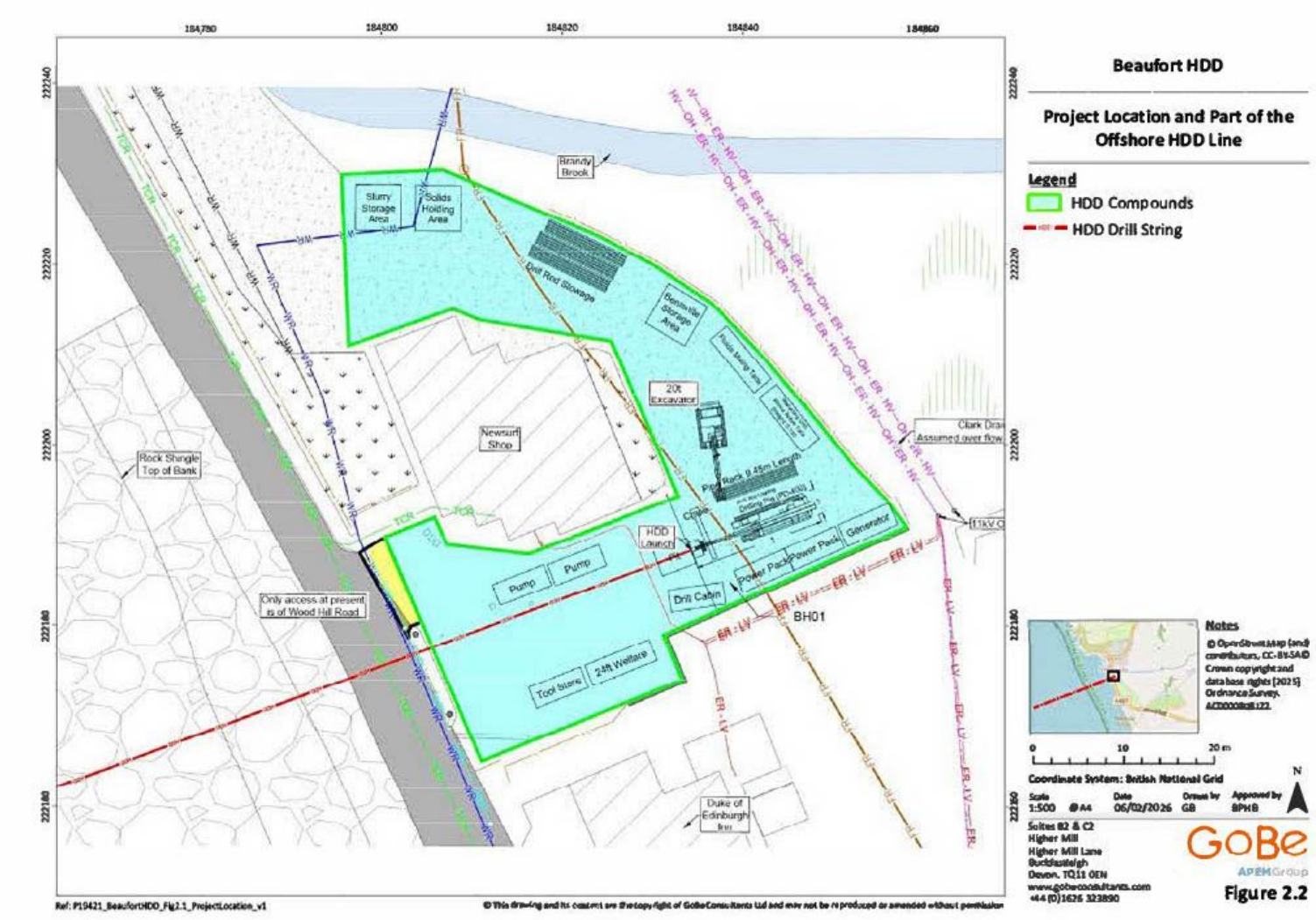

Figure 2.2 Beaufort HDD Site and Location

3 Assessment Methodology

3.1 Legislation and Policy Context

UK Legislation

3.1.1 This section describes the legislative framework as it applies following the UK's departure from the European Union (EU). Guidance on the application of the relevant legislation in the post-Brexit period has been provided by the Department for Environment, Food, and Rural Affairs (DEFRA) in their policy paper published on 1 January 2021. The Habitats Regulations provides protection for particular qualifying features through the designation of sites and the application of specific decision-making procedures within the 'national site network' (Regulation 3 'Interpretation'). The national site network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) designated both while the UK was a member of the EU and since the UK left the EU.

3.1.2 As the provisions of the Habitats Regulations relating to the HRA process continue to refer to these designated sites collectively as 'European Sites', rather than the 'national site network', this terminology has been followed in this HRA Screening report.

Policy Requirements Additional to Domestic Legislation

3.1.3 It is UK Government policy that all competent authorities should treat candidate SACs (cSACs) and potential SPAs (pSPAs) as being within the requirements of the Habitats Regulations (Planning and Environment Decisions Wales, 2025).

3.1.4 Accordingly, in this report the term 'European Site' is used collectively to refer to SACs, cSACs, SPAs and pSPAs.

International, Legal and Policy Obligations

3.1.5 The UK is a contracting party to the Convention on Wetlands of International Importance Especially as Waterfowl Habitat, Ramsar, Iran, 1971 (the 'Ramsar Convention'), which seeks to protect wetlands of international importance, especially those wetlands utilised as waterfowl habitat.

3.1.6 UK Government policy requires competent authorities to treat Ramsar Sites in their decision-making processes as if they are SACs or SPAs. Consequently, Ramsar Sites are considered within the requirements of the Habitats Regulations (Planning and Environment Decisions Wales, 2025) for HRA purposes. In this report, Ramsar Sites are referred to alongside European Sites collectively as European and Ramsar Sites.

3.1.7 Species that are interest features of European and Ramsar Sites may be mobile and not confined to the boundary of the designated site. For example, wintering waterbirds may forage or roost on agricultural land outside of the designated site. Although such agricultural land is not part of the European or Ramsar Site, it is considered 'functionally linked' because it serves a function for waterfowl that are interest features of the designated site. Functionally linked land must be considered in the HRA process, as the loss of such land to development could adversely affect the survival of these wintering waterbirds and potentially reduce their population within the designated site.

3.1.8 Functionally linked land has been defined as follows (Chapman and Tyldesley 2016):

"The term 'functional linkage' refers to the role or 'function' that land or sea beyond the boundary of a European Site might fulfil in terms of ecologically supporting the populations for which the site was designated or classified. Such land is therefore 'linked' to the European Site in question because it provides an important role in maintaining or restoring the population of qualifying species at favourable conservation status."

3.2 The HRA Process

Overview

3.2.1 The requirements of the Habitats Regulations with regard to the implications of plans or projects are set out within Regulation 63. The step-based approach described in this Regulation is referred to as a 'Habitats Regulations Assessment' (HRA), which is the term that has been used throughout this report.

3.2.2 Any public body, referred to as a 'competent authority' under the Habitats Regulations, is required to carry out a HRA when proposing to undertake a project, implement a plan or authorise another party to do so. Competent authorities are required to record the process undertaken, and ensure that the plan or project will not adversely affect on the integrity of any European or Ramsar Site, either alone or in combination with other plans or projects.

Assessment Stages

3.2.3 The assessment of a plan or project follows a number of stages, with guidance published to assist competent authorities to fulfil their responsibilities. These stages are summarised in Table 3.1.

Table 3.1 Stages in the HRA process

Stage	Description	Legislative Context
Stage 1: Screening	Assessment of whether a plan or project, either alone or in combination with other plans or projects, is likely to have a significant effect on any qualifying feature (habitats and species) and the achievement of the conservation objectives of a European or Ramsar Site. This is also known as the 'test of likely significant effect' (ToLSE).	Regulation 63(1)(a)
Stage 2: Appropriate Assessment	Consideration of the effects of the proposals to determine whether or not it is possible to conclude with certainty that the development will not result in any adverse effect on the integrity of European or Ramsar Site, either alone or in combination with other plans or projects and with reference to the conservation objectives of the European or Ramsar Site. This is also known as the test of 'adverse effect on integrity' (AEoI). At this stage consent may be granted for the plan or project if it is possible to conclude with certainty that the proposal will not result in any adverse effect on the integrity of any European or Ramsar Site, either alone or in combination with other plans or projects.	Regulation 63(5)
Stage 3 and Stage 4: Assessment of Alternatives and Consideration of Imperative Reasons of Overriding Public Interest (IROPI).	Assess whether there is an alternative solution to the plan or project i.e. one that better respect the European or Ramsar Sites. If no such alternative solution exists, the process continues to Assessment of IROPI and assess whether a plan or project can be justified as being needed for 'imperative reasons of overriding public interest'.	Regulation 64(1)

In-Combination Assessment

3.2.4 The Habitats Regulations, together with Government policy, require the consideration of the potential effects of a project on European and Ramsar Sites, both alone and in-combination with other plans or projects.

3.2.5 The identification of plans and projects to include in the in-combination assessment will be based on:

- Approved plans;
- Approved, but not yet constructed projects; and
- Projects for which an application has been submitted, are currently under consideration and are expected to be consented before the Project becomes operational.

3.2.6 In preparing this report, consideration has been given to the relevant guidance issued by a number of Governmental, statutory and industry bodies.

Guidance from Government Bodies

- Ministry of Housing, Communities and Local Government online Guidance on the use of Habitats Regulations Assessment https://www.gov.uk/guidance/appropriate-assessment; and
- Defra, NE, Welsh Government and NRW guidance on Habitat Regulations Assessments https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site.

Guidance from Statutory Bodies

- MMO online guidance on Marine Licensing: impact assessments https://www.gov.uk/guidance/marine-licensing-impact-assessments;
- NRW online guidance on HRA in the marine licensing process https://naturalresources.wales/permits-and-permissions/marine-licensing/marine-licence-habitats-regulations-assessment/?lang=en; and
- NRW's position on the use of Marine Mammal Management Units for screening and assessment in Habitats Regulations Assessments for Special Areas of Conservation with marine mammal features https://cdn.cyfoethnaturiol.cymru/media/695250/ps006-mmmus-in-hra-position-statement-may22.pdf.

4 Identification of European and Ramsar Sites and Features Potentially Affected by the Proposed Works

4.1.1 For the screening process, European and Ramsar Sites in the vicinity of the proposed works that could potentially be affected by the Project were identified. The individual interest features within these sites were then considered separately.

4.1.2 If only one site interest feature is considered potentially impacted by the works, the European and/or Ramsar Site is screened into the HRA along with each of its associated interest features.

4.1.3 This screening used the conceptual 'source-pathway-receptor' model to identify potential environmental effects resulting from the works. The model provides a clear route linking the impact sources and potentially sensitive receptors, ensuring a transparent impact assessment. The model parameters are defined as follows:

- Source – the origin of a potential effect (one source may have several pathways and receptors);
- Pathway – the means by which the effect of the activity could impact a receptor; and
- Receptor – the element of the receiving environment that may be impacted.

4.1.4 Where there is no pathway, or where the pathway is so long that the effect from the source has dissipated to a negligible level before reaching the receptor, there is justification that the receptor may be screened out.

4.1.5 Similarly, if a receptor (site interest feature) only occurs in the area seasonally and/or is not present when the works could cause a potential effect, there is justification that the receptor may be screened out.

4.1.6 Potential adverse effects on European and Ramsar Sites were identified using a combination of:

- Advice from NRW and the former Countryside Council for Wales under Regulation 37 of the Conservation of Habitats and Species Regulations 2017 for Pembrokeshire Marine European Marine Site, specifically Advice on Operations (AoO) for the designated features and cable works;
- AoO from Natural England for the Fal and Helford SAC regarding 'Cables: Horizontal Directional Drilling (HDD)'. Flamborough Head SAC was chosen as a proxy for the Pembrokeshire Marine / Sir Benfro Forol SAC due to similar interest features;
- Professional judgement based on experience with similar projects in the vicinity of European and Ramsar Sites; and
- Advice from NRW in relation to the Project.

4.2 Potential European and Ramsar Sites (Receptors)

4.2.1 The proposed HDD works are to take place in Newgale, on the southwest coast of Wales in the county of Pembrokeshire.

4.2.2 A precautionary approach was applied to identify European and Ramsar Sites to be taken through to screening. The criteria were as follows (reasons for the distances considered are indicated below):

- Benthic: Sites within a potential Zone of Influence (ZoI) of 2.5 km of the proposed works based on the tidal ellipse data provided as part of UK Renewables Atlas (ABPMer 2008) and is anticipated to be the maximum potential range for any impacts caused by the Project which is caused by increase in suspended sediment and sediment deposition. This includes sites with only habitat features, only mobile features, or a combination of the two. This distance is considered to be highly precautionary for sites with only habitat features.
- Terrestrial habitats: There is no set distance which defines the scoping range of the proposed works on qualifying features. Connectivity between terrestrial habitats and the proposed works may occur via hydrology, airborne particles arising from the proposed works, in air noise or accidental pollution, the scoping range for terrestrial habitats is direct overlap, with 0.5 km for dust dispersion (IAQM, 2016) and 1 km ZOI for accidental pollution in line with industry standard and professional judgement. All terrestrial habitats are outside of these scopine ranges and therefore though identified in Table 4.1 are not considered any further in this HRA screening.
- Migratory Fish: Sites up to 50 km from the investigation area containing non static mobile receptors (i.e. migratory fish species). The ability for the relevant species to interact with a potential impact is based on the maximum distance the species could be present/travel outside the protected site boundary. For this receptor group the sit scoping range applied is 50 km reflecting the migratory nature of some qualifying features and the spatial scale of the potential effects the project may cause – namely underwater noise. Sites beyond 50 km are considered outside the scope of connectivity to the project and therefore not included in the screening.
- Marine Mammals: Marine mammal sites may be included at greater distances on NRW guidance (NRW, 2022). Where NRW guidance is not applicable or unavailable, a 50 km ZoI is applied as precautionary due to known impact ranges from vessels and MBES equipment on marine mammals. Although the ZoI for geophysical survey noise is typically much smaller (≤3 km; JNCC, 2025), marine mammal populations are managed and assessed at broader spatial scales. Cetaceans are considered within defined management units (MUs), which can extend over hundreds of kilometres, while seal populations may maintain ecological connectivity to activities occurring tens of kilometres from haul out or breeding sites. For some species, such as grey seals and bottlenose dolphins, telemetry data and photo-identification data can assist in identifying connectivity to protected areas.
- Otters: For otters, a precautionary 40 km ZoI was applied, reflecting typical ranges with territories from 2 – 40 km and foraging behaviour (NRW, 2010). Otters usually feed in shallow, sheltered waters ranging approximately 12 km alongshore, and within 100 m seaward from shore (Kruuk *et al.*, 1998) and avoid deeper waters (NRW, 2018).

- Ornithology: For ornithological receptors, a precautionary 2 km ZoI has been defined to capture any localised and short-range disturbance pathways for temporary vessel presence and activity (JNCC, 2022). Designated sites have been included where they fall within the ZoI and within a precautionary 15 km connectivity buffer from the proposed works location for coastal birds and wintering seabirds associated with marine SPAs (divers and sea ducks), and 20 km for sites with geese as a qualifying feature, given typical commuting ranges between roosting and foraging grounds (Mitchell, 2012; SNH, 2016).

Benthic Habitat Features

4.2.3 For benthic habitat features, a 2.5 km ZoI was applied. The potential impacts of the expected works include abrasion/penetration of substrate, smothering/siltation rate change and pollution, which pose a potential risk to benthic habitat features. Given the nature of the works, potential effects will be restricted to the immediate work area with the exception of an accidental spill event or suspended solids concentrations from abrasion evets, which may extend beyond the immediate work area. The 2.5 km ZoI is considered precautionary for habitat features.

Marine Mammals

4.2.4 As marine mammals are highly mobile, the wider population area is defined by species specific MUs by Inter-Agency Marine Mammal Working Group (IAMMWG, 2023), which reflects the best understanding of the structure of biological populations and any ecological differentiation. The principle for range is based on the fact that almost all species of cetaceans found in UK waters are part of larger biological populations whose range extends into the waters of other European states. As grey seals, harbour porpoise and bottlenose dolphins are the main species of interest for the Project's location, these species MUs have informed the screening process. Specifically, the Irish Sea Management Unit (MU) and Offshore Channel, Celtic Sea and SW England MU which captures all protected sites with potential for connectivity with the Project. Telemetry data (seal species) and photo-identification data (seal species and bottlenose dolphins) were used to assess connectivity of marine mammals to protected areas. These data are often used in the process of designating protected areas.

4.2.5 Grey seals along the Welsh coast show connectivity between haul-out sites up to 230 km apart. Photo-identification studies show that grey seals exhibit regular long-range movement (10-100 km) during the non-breeding season, but on average, grey seals typically remain within 50 km of their preferred haul-out site (Langley *et al.,* 2020). During the breeding season, grey seals show high site fidelity, remaining within 10-50 km of their preferred haul-out and only a small number of individuals moved between colonies within the same season.

4.2.6 For elusive species that are challenging to study individually, such as harbour porpoise, protected areas are often designated where species occur at higher densities compared to other regions. Harbour porpoise, the most abundant cetacean species in UK and Irish waters, are likely to use the site; however, it is important to note that protected sites are designated primarily due to higher densities and the relative importance of these areas when compared to neighbouring waters. Consequently, a key Conservation Objective is to ensure that the potential usage of the site by harbour porpoise is maintained (JNCC and NRW, 2019a; 2019b). Although the relevant MU for harbour porpoise (*i.e.,* Celtic and Irish Seas) extends further than the Irish Sea MU and Offshore Channel, Celtic Sea and SW England MU designated for bottlenose dolphins, it is determined that this screening approach considers all relevant sites for connectivity due to the limited spatial extent of potential acoustic and physical impacts from the proposed works.

4.2.7 For bottlenose dolphins, boat-based surveys provide information on distribution, and combined with photo-identification, these data confirm movement of individuals through prospective corridors linking designated SACs in Cardigan Bay, Shannon Estuary and the Moray Firth (Cheney *et al*., 2013; Robinson *et al*., 2012). Although the species are known to range across large distances, it is determined that screening protected sites within the Irish Sea MU and Offshore Channel, Celtic Sea and SW England MU designated for bottlenose dolphins is precautionary considering the limited spatial extent of potential acoustic and physical impacts from the proposed works.

Fish

4.2.8 There is no specific guidance or literature define a screening distance for sites with mobile fish features. Consequently, a distance of 50 km has been used for mobile marine fish species (including anadromous species) as a precautionary approach. Migratory fish could potentially pass through the ZoI if transiting to sites near the proposed works. For sites located further than 50 km from the proposed works, it is considered unlikely that individuals will need to transit through the proposed works area, and if they did, only a small proportion of the population of migratory fish from the SAC would be affected. In addition, fish would be able to avoid an area during the proposed works, if required.

Ornithology

4.2.9 For SPAs with ornithological qualifying features, a connectivity buffer of 15 km has been applied for coastal, intertidal and wintering seabird species sensitive to the effect pathways identified in Section 5 (divers and sea ducks). This buffer follows NatureScot (2023) guidance, which provides a framework in the absence of equivalent guidance from NRW. This buffer is extended to 20 km for geese and swans to reflect typical commuting ranges between roosting and foraging grounds (Mitchell 2012; SNH 2016). These distances are considered highly precautionary, as potential impacts from the proposed works are limited to temporary disturbance from a single dive vessel, thus any potential for effect will be highly spatially and temporarily limited, resulting in a minimal short-term change in baseline conditions. Any localised short-term changes in baseline conditions are considered to fully reversible following completion of proposed works.

4.2.10 As summarised in Section 2, the proposed works will take place outside of the breeding season for migratory seabirds. Post-breeding, migratory seabird qualifying features are no longer restricted to central foraging areas, resulting in wider mixing of populations. Additionally, some breeding seabird qualifying features will be absent entirely as individuals migrate to wintering grounds outside of UK waters. Consequently, the percentage of seabirds which can be attributed to any individual SPA population is significantly reduced. When combined with the minimal short-term change in baseline conditions, the potential for a material effect to occur on such qualifying features can be confidently excluded. Therefore, connectivity to these qualifying features is not considered further.

Identified Sites

4.2.11 The European and Ramsar Sites that fall within the screening criteria described above are listed in Table 4.1. A total of 32 sites were identified, including seven SACs and one SPA. These sites are designated for a variety of habitats and/or bird, fish and marine mammal species.

Table 4.1 European and Ramsar Sites scoped into the assessment based on NRW guidance and/or are within the ZoI (relevant to qualifying features) of the HDD works area

Site	Distance from the proposed works area (km)	Qualifying Features
SACs		
Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116)	0	**[1364] Grey seal (*Halichoerus grypus*)** [1441] Shore dock (*Rumex rupestris)* **[1130] Estuaries** **[1160] Large shallow inlets and bays** **[1170] Reefs** **[1110] Sandbanks which are slightly covered by sea water all the time** **[1140] Mudflats and sandflats not covered by seawater at low tide** **[1150] Coastal lagoons*** **[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)** [8330] Submerged or partially submerged sea caves **[1095] Sea lamprey (*Petromyzon marinus*)** **[1099] River lamprey (*Lampetra fluviatilis*)** **[1102] Allis shad (*Alosa alosa*)** **[1103] Twaite shad (*Alosa fallax*)** **[1355] Otter (*Lutra lutra)***
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	0	**[1351] Harbour Porpoise (*Phocoena phocoena*)**
St David's / Ty Ddewi SAC (UK0013045)	1.03	[1230] Vegetated sea cliffs of the Atlantic and Baltic Coasts [4030] European dry heaths [1831] Floating water-plantain (*Luronium natans*)

Site	Distance from the proposed works area (km)	Qualifying Features
Cardigan Bay / Bae Ceredigion SAC (UK0012712)	35.5	**[1349] Bottlenose dolphin (*Tursiops truncatus*)** **[1364] Grey seal (*Halichoerus grypus*)** [1110] Sandbanks which are slightly covered by sea water all the time [1170] Reefs [8330] Submerged or partially submerged sea caves **[1095] Sea lamprey (*Petromyzon marinus*)** **[1099] River lamprey (*Lampetra fluviatilis*)**
Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC	59.5	**[1351] Harbour porpoise Phocoena phocoena**
Lundy (UK0013114)	85.1	[1170] Reefs [1110] Sandbanks which are slightly covered by seawater all the time [8330] Submerged or partially submerged sea caves **[1364] Grey seal (*Halichoerus grypus*)**
Lleyn Peninsula and the Sarnau / Pen Llyn a`r Sarnau SAC (UK0013117)	87.23	**[1349] Bottlenose dolphin (*Tursiops truncatus*)** [1355] Otter (*Lutra lutra*) **[1364] Grey seal (*Halichoerus grypus*)** [1110] Sandbanks which are slightly covered by sea water all the time [1130] Estuaries [1150] Coastal lagoons* [1160] Large shallow inlets and bays [1170] Reefs [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [8330] Submerged or partially submerged sea caves
Carnsore Point SAC	90	**[1140] Mudflats and sandflats not covered by seawater at low tide** **[1170] Reefs** **[1351] Harbour porpoise (*Phocoena phocoena*)**
Blackwater Bank SAC	99	**[1110] Sandbanks which are slightly covered by seawater all the time** **[1351] Harbour porpoise (*Phocoena phocoena*)**
Saltee Island SAC	99	**[1140] Mudflats and sandflats not covered by seawater at low tide** **[1160] Large shallow inlets and bays** **[1170] Reefs** **[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts** **[8330] Submerged or partially submerged sea caves**

Site	Distance from the proposed works area (km)	Qualifying Features
		[1364] Grey seal (*Halichoerus grypus*)
Hook Head SAC	116.5	[1160] Large shallow inlets and bays [1170] Reefs [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts **[1349] Bottlenose dolphin (*Tursiops truncatus*)** **[1351] Harbour porpoise (*Phocoena phocoena*)**
North Anglesey Marine / Gogledd Môn Forol SAC	176.5	**[1351] Harbour porpoise (*Phocoena phocoena*)**
Rockabill to Dalkey Islands SAC	183	[1170] Reefs **[1351] Harbour porpoise (*Phocoena phocoena*)**
Isles of Scilly Complex SAC	222.8	[1110] Sandbanks which are slightly covered by seawater all the time [1140] Mudflats and sandflats not covered by seawater at low tide [1170] Reefs [1441] Shore dock Rumex rupestris **[1364] Grey seal (*Halichoerus grypus)***
Lambay Island SAC	206	[1170] Reefs [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts **[1351] Harbour porpoise (*Phocoena phocoena*)** **[1364] Grey seal (*Halichoerus grypus*)** **[1365] Harbour seal (*Phoca vitulina*)**
North Channel SAC	277	**[1351] Harbour porpoise (*Phocoena phocoena*)**
Mers Celtiques Talus du golfe de Gascogne (France)	311	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)***
Nord Bretagne DH (France)	352	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)***

Site	Distance from the proposed works area (km)	Qualifying Features
Ouessant-Molène (France)	381	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** [137076] Otter (*Lutra lutra)*
Abers – Côte des légendes (France)	382	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** [137076] Otter (*Lutra lutra)*
Baie de Morlaix (France)	388	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137080] Grey seal (*Halichoerus grypus)***
Côte de Granit rose-Sept-Iles (France)	404	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137080] Grey seal (*Halichoerus grypus)***
Chaussée de Sein (France)	431	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)***
Récifes et lands de la Hague (France)	489	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**
Banc et récifs de Surtainville (France)	493	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**
Tregor Goëlo (France)	499	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** [137076] Otter (*Lutra lutra)*
Anse de Vauville (France)	503	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**
Chausey (France)	513	**[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**
Récifes et marais arrière-littoraux du Cap Lévi à la Pointe de Saire (France)	522	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**
Baie du Mont Saint-Michel (France)	540	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137080] Grey seal (*Halichoerus grypus)*** **[137084] Harbour seal (*Phoca vitulina*)**

Site	Distance from the proposed works area (km)	Qualifying Features
Baie de Seine occidentale (France)	572	**[137117] Harbour porpoise (*Phocoena phocoena*)** **[137111] Bottlenose dolphin (*Tursiops truncatus)*** **[137084] Harbour seal (*Phoca vitulina*)**
SPAs		
Ramsey and St David's Peninsula Coast (UK9014062)	0.9	[A346] Chough (*Pyrrhocorax pyrrhocorax*)

Notes: Features screened in for assessment are in bold; * indicates Priority; numbers in brackets are site codes.

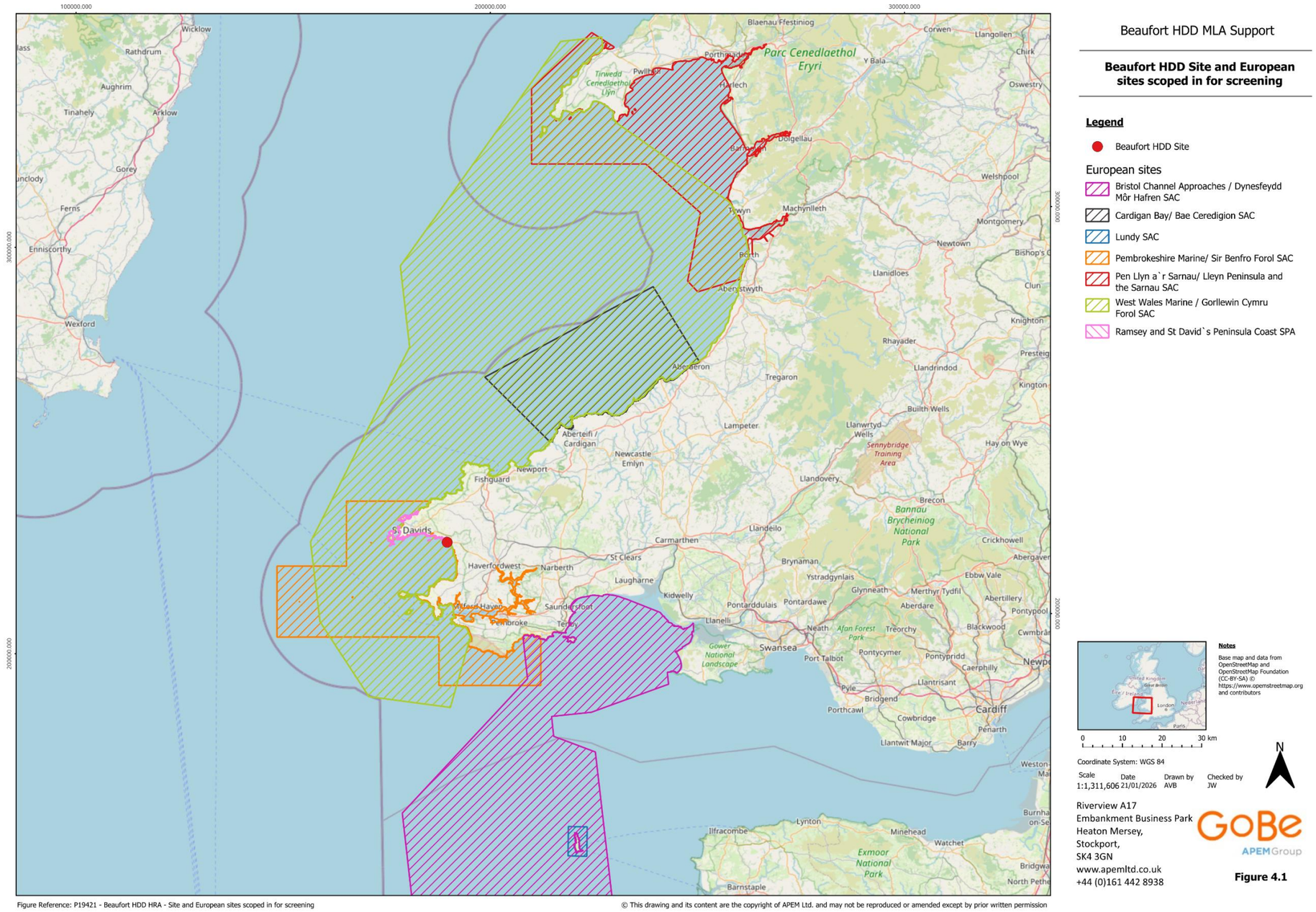

Figure Reference: P19421 - Beaufort HDD HRA - Site and European sites scoped in for screening

Beaufort HDD MLA Support

Beaufort HDD Site and European sites scoped in for screening

Legend

- Beaufort HDD Site

European sites

- Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC
- Cardigan Bay/ Bae Ceredigion SAC
- Lundy SAC
- Pembrokeshire Marine/ Sir Benfro Forol SAC
- Pen Llyn a`r Sarnau/ Lleyn Peninsula and the Sarnau SAC
- West Wales Marine / Gorllewin Cymru Forol SAC
- Ramsey and St David`s Peninsula Coast SPA

Notes

Base map and data from OpenStreetMap and OpenStreetMap Foundation (CC-BY-SA) © https://www.openstreetmap.org and contributors

0 10 20 30 km

N

Coordinate System: WGS 84

Scale	Date	Drawn by	Checked by
1:1,311,606	21/01/2026	AVB	JW

Riverview A17
Embankment Business Park
Heaton Mersey,
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Figure 4.1

Figure 4.1 Beaufort HDD Site and European sites scoped in for screening

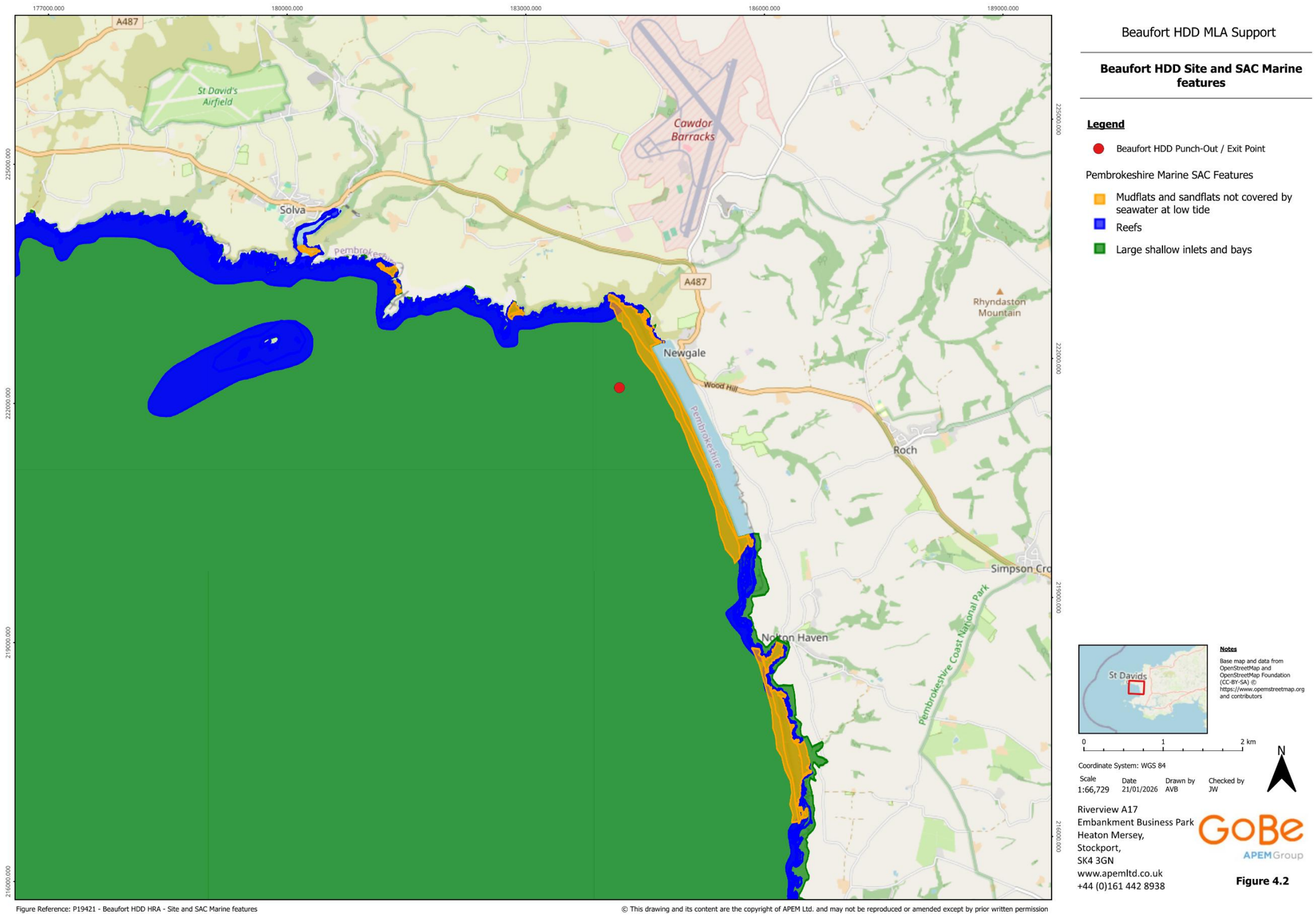

Figure 4.2 Beaufort HDD Site and SAC Marine features

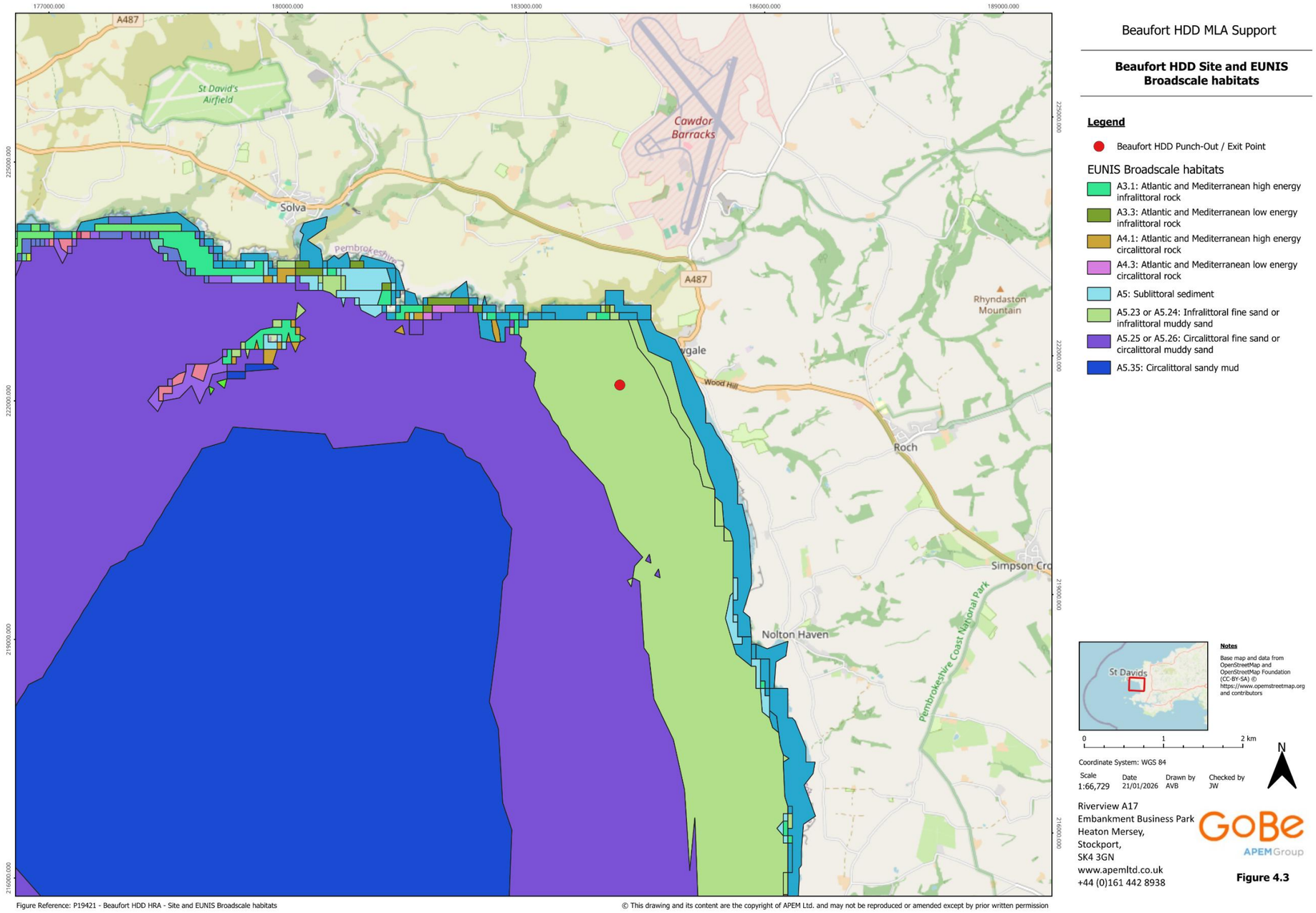

Figure 4.3 Beaufort HDD Site and EUNIS Broadscale habitats

5 Potential Effects of the Proposed Works

5.1.1 Impact scoping involves evaluating the potential impacts on designated sites and their associated qualifying feature. This will conclude which sites and Qualifying Interests (QIs) have the potential to be affected by the considered impacts.

5.1.2 The following section outlines those sources and potential impact pathways for effect to each receptor group. The groups are as follows:

- Benthic, Subtidal and Intertidal Ecology - This receptor group includes Benthic, Subtidal and Intertidal, features below MHWS, and habitats designated under Annex I and II of the Habitats Regulations;
- Migratory Fish and Shellfish Ecology - This receptor group includes marine and migratory Annex II fish and shellfish species designated under the Habitat Regulations;
- Marine Mammal Ecology - This receptor group includes marine mammals species designated under Annex II of the Habitat Regulations;
- Ornithology - This receptor group includes Annex II bird species located in the environment; and
- Otters - This receptor group includes otters designated under Annex II of the Habitats Regulations.

5.1.3 The process of testing for likely significant effects considers the potential adverse effects that might arise from the works and identifies whether there is a possibility that each effect can impact each European Site and their qualifying features.

5.1.4 The assessment process involves identifying if the works will generate effects that could affect any of the interest features of the relevant European and Ramsar Sites. At this point, the pathway will be identified and the likelihood that it will interact with any feature of a designated site will be assessed Only when there is a source, a pathway and an effect that reaches the interest feature is it concluded that a LSE exists that requires the more detailed assessment that is carried out in stage 2 of the HRA and the Report to Inform Appropriate Assessment.

5.1.5 Potential adverse effects of the works on European and Ramsar Sites have been identified using a combination of:

- Conservation Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulation 2017 (2018);
- Natural England's AoO; and
- Professional judgement based on experience of conducting numerous assessments of similar works in the vicinity of European and Ramsar Sites.

Benthic Ecology

5.1.6 Pressures indicated as being of medium-high risk, which could be associated with the works and potentially affect European and Ramsar Site features, were considered in this screening, in line with the AoO guidance. These pressures were as follows:

- Abrasion or disturbance of the substrate on the surface of the seabed;
- Smothering and siltation rate changes (light);
- Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion;
- Introduction of new habitat from placement of new substrate; and
- Introduction or spread of invasive non-native species (INNS).

5.1.7 Medium-high risk pressures that were not anticipated to be associated with the proposed works and/or did not have the potential to affect designated site features were excluded from the screening, in line with the AoO guidance. These pressures included:

- Habitat structure changes – removal of substratum (extraction); and
- Barrier to species movement.

Migratory Fish and Shellfish

5.1.8 Pressures indicated as being of medium-high risk, which could be associated with the works and potentially affect European and Ramsar Site features, were considered in this screening, in line with the AoO guidance. These pressures were as follows:

- Underwater noise changes and vibration;
- Pollution from vessels and equipment (Hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) contamination); and
- Smothering and siltation rate changes (light) causing a barrier to migration.

5.1.9 Medium-high risk pressures that were not anticipated to be associated with the proposed works and/or did not have the potential to affect designated site features were excluded from the screening, in line with the AoO guidance. These pressures included:

- Habitat structure changes – removal of substratum (extraction);
- Barrier to species movement; and
- Above water noise.

Marine Mammals

5.1.10 Pressures indicated as being of medium-high risk, which could be associated with the works and potentially affect European and Ramsar Site features, were considered in this screening, in line with the AoO guidance. These pressures were as follows:

- Underwater noise changes and vibration;
- Visual disturbance;
- Collision risk (vessels);
- Pollution from vessels and equipment (Hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) contamination);

- Reduction in prey availability (all aspects of works generating underwater noise and vibration); and
- Above water noise (for species dependant on land such as grey seals).

5.1.11 Medium-high risk pressures that were not anticipated to be associated with the proposed works and/or did not have the potential to affect designated site features were excluded from the screening, in line with the AoO guidance. These pressures included:

- Barrier to species movement.

Ornithology

5.1.12 Pressures indicated as being of medium-high risk, which could be associated with the works and potentially affect European and Ramsar Site features, were considered in this screening, in line with the AoO guidance. These pressures were as follows:

- Visual disturbance;
- Pollution from vessels and equipment (Hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) contamination); and
- Reduction in prey availability (all aspects of works generating underwater noise and vibration).

5.1.13 Medium-high risk pressures that were not anticipated to be associated with the proposed works and/or did not have the potential to affect designated site features were excluded from the screening, in line with the AoO guidance. These pressures included:

- Habitat structure changes – removal of substratum (extraction);
- Barrier to species movement; and
- Above water noise.

Otters

5.1.14 Pressures indicated as being of medium-high risk, which could be associated with the works and potentially affect European and Ramsar Site features, were considered in this screening, in line with the AoO guidance. These pressures were as follows:

- Underwater noise changes and vibration;
- Visual disturbance
- Collision risk (vessels)
- Pollution from vessels and equipment (Hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) contamination);
- Reduction in prey availability (all aspects of works generating underwater noise and vibration);
- Above water noise (for species dependant on land such as otter).

5.1.15 Medium-high risk pressures that were not anticipated to be associated with the proposed works and/or did not have the potential to affect designated site features were excluded from the screening, in line with the AoO guidance. These pressures included:

5.1.16 Barrier to species movement; and

5.1.17 Above water noise.

5.1.18 In addition for all qualifying features of European and Ramsar sites the following low-risk pressures were also excluded from the screening, in line with the AoO guidance:

- Deoxygenation;
- Genetic modification and translocation of indigenous species;
- Introduction of light;
- Introduction of microbial pathogens;
- Litter;
- Nutrient enrichment;
- Organic enrichment;
- Radionuclide contamination;
- Salinity decrease;
- Salinity increase;
- Synthetic compound contamination (inc. pesticides, antifoulants, pharmaceuticals);
- Temperature decrease;
- Temperature increase;
- Transition elements and organo-metal contamination;
- Water flow (tidal current) changes, including sediment transport considerations; and
- Wave exposure changes.

6 Screening Test for LSE

6.1.1 Table 6.1 details the test for LSE for European Sites within the ZoI of the proposed works, details the test for LSE and the following information:

- The pressures being considered (based on the sources of conservation advice and professional judgement);
- The features being assessed;
- Whether there is an LSE, alone or in-combination, for each pressure / feature combination; and
- Justification for the assessment.

Table 6.1 Test for LSE for European Sites within the ZoI of the proposed works

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
SACs					
Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116)	[1130] Estuaries [1160] Large shallow inlets and bays [1170] Reefs [1110] Sandbanks which are slightly covered by sea water all the time [1140] Mudflats and sandflats not covered by seawater at low tide [1150] Coastal lagoons* [1330] Atlantic salt meadows (*Glauco-*	Abrasion / disturbance of the substrate on the surface of the seabed	Yes	The exit point of the drill and placement of the clump weight are expected to directly impact the immediate area of the seabed. The drill will break through the surface of the seabed, leading to disturbance to surface substrate. As such, there is potential for LSE from this impact pathway.	Screened In Grey seal Otter [1160] Large shallow inlets and bays [1170] Reefs
		Penetration and /or disturbance of the substratum below the surface of the seabed, including abrasion	Yes	The drilling operations will penetrate substrate below the seabed at depths of up to 17 m below the seabed. The drill will break through the surface of the seabed from the substrate below at the exit point. As such, there is potential for LSE from this impact pathway.	
		Introduction of new habitat from placement of new substrate	Yes	The placement of a bellmouth and clump weight at the exit point may change the structure and function of the existing habitat due to the introduction of a new substrate that is different to the existing substrate. As such, there is potential for LSE from this impact pathway.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
	Puccinellietalia maritimae) [8330] Submerged or partially submerged sea caves	Smothering and siltation rate changes (light)	Yes	The exit point of the drill and placement of the clump weight are expected to disturb sediment in the immediate area of the seabed. As such, there is potential for LSE from this impact pathway.	
		Introduction or spread of invasive non-native species (INNS)	Yes	The use of a vessel and equipment has the potential to introduce non-native species into the marine environment. As such, there is potential for LSE from this impact pathway.	
	[1099] River lamprey [1102] Allis shad [1103] Twaite shad [1095] Sea lamprey	Underwater noise and vibration	No	Drilling operations and vessel use will generate continuous noise and vibrations in the marine environment. However, risk of disturbance to migratory fish features from underwater noise and vibration is low due to the small scale and temporary nature of the proposed works. Any potential acoustic impacts are expected to remain highly localised due to the relatively low intensity of underwater noise anticipated within the proposed works area. Underwater noise generated from drilling operations will be of low intensity due to the activity predominantly taking place up to 17 m beneath the surface of the seabed. Furthermore, the works are not located within an estuary or enclosed area, therefore, it's unlikely any underwater noise and vibrations would impact fish migrations or lead to entrapment. As such, there is no potential for LSE from this impact pathway.	
		Smothering and siltation rate	No	The exit point of the drill and placement of the clump weight are expected to disturb sediment in the immediate area of the seabed. This activity has the potential to lead a temporary increase in suspended fine sand or sandy mud	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		changes (light) causing a barrier to migration		due to surface abrasion and disturbance. However, due to the small surface area of the exit point (estimated area of 224 cm^2) and clump weight (160 cm by 116 cm in surface area), as well as the short duration of disturbance (max 1 day), it is not likely to lead to significant changes to suspended sediment in the area. As such, there is no LSE from this impact pathway and any potential impacts are anticipated to be negligible.	
	[1364] Grey seal [1355] Otter	Underwater noise and vibration	Yes	Drilling operations and survey vessel use will generate continuous noise and vibrations in the marine environment within the hearing range of grey seal and otters; therefore, there is potential for LSE. Potential impacts included for consideration of LSE include auditory injury and disturbance from vessel presence/noise, MBES and drilling operations. An MBES will be used to locate the exit point which will generate underwater noise at a frequency between 200 kHz and 700 kHz, with 400 kHz used for the majority of the works. The operation frequency of the MBES is above the hearing ranges for all seal and otter FHG (Southall *et al.,* 2019). As there is no overlap between the hearing range of grey seal (40 Hz to 90 kHz) or otter (124 Hz to 40 kHz) and the expected sound frequency of the equipment, there is expected to be no potential for detecting this sound nor reduction in hearing abilities. Therefore, LSE to these features from the MBES specifically can be screened out.	
		Visual Disturbance	Yes	Drilling operations and vessel activities are operating close to the coast where seals haul-out and otters have holts. Due to the SAC's importance to the UK's population of grey seal pupping and overlap in the Project to the breeding season, there is potential for LSE from visual disturbance.	
		Collision risk	No	The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). A review of collisions between vessels and large marine megafauna did find reports of vessel collisions with	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				grey seals (Schoeman *et al.,* 2020). However, vessel collisions appear to be rare, although a lack of reporting and/or witnessing of such events should not be ruled out. Given the slow speeds and predictable movement of the vessel, the risk of collision is considered negligible and as such, there is no LSE from this impact pathway. Otters can be found near the coastline where there is a freshwater source. They can use the marine environment to forage; however, foraging is usually close to shore, often within 100 m (Watson, 1986). As such, they are unlikely to be in the works area, and it is considered that there will be no LSE to otters from this impact pathway.	
		Reduction in prey availability (all aspects of works generating underwater noise and vibration)	No	Prey species of grey seals may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is relatively short in nature, meaning any displacement of prey is likely to be short term. Grey seals are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
		Above water noise	Yes	Works on and close to land have the potential to disturb grey seals while hauled out. Pupping sites have been confirmed within 1 km of the Project. Due to works commencing in October and estimated to occur across 57 days, this could cause disturbance during a sensitive life-history stage; pupping. Grey seals pup between August and December, with a peak in September across the Welsh coastline. During the initial three weeks of birth, grey seals are sensitive to disturbance as their lanugo coat prevents them from being able to swim and maintain temperature in the water. Therefore, there is potential for LSE.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
	All features	Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	[1351] Harbour Porpoise	Underwater noise and vibration	Yes	Drilling operations and survey vessel use will generate continuous noise and vibrations in the marine environment within the hearing range of harbour porpoise; therefore, there is potential for LSE. Potential impacts included for consideration of LSE include auditory injury and disturbance from vessel presence/noise, and drilling operations. An MBES will be used to locate the exit point which will generate underwater noise at a frequency between 200 kHz and 700 kHz, with 400 kHz used for the majority of the works. The operation frequency of the MBES is above the hearing range for VHF cetaceans (Southall *et al.,* 2019). As there is no overlap between the hearing range of harbour porpoise (200 Hz to 165 kHz) and the expected sound frequency of the equipment, there is expected to be no potential for detecting this sound nor reduction in hearing abilities. Therefore, LSE to this feature from the MBES specifically can be screened out.	Screened In Harbour porpoise
		Visual Disturbance	Yes	Harbour porpoise are highly sensitive to vessel disturbance; therefore, there is potential for LSE.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		Collision risk	No	The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). Studies from the UK suggest that incidents of mortality or injury of harbour porpoise caused by vessels remain a very rare occurrence, although numerous instances are expected to remain unreported (Deaville *et al.,* 2018). Of 537 post-mortem examinations on stranded harbour porpoises in the UK between 2011 and 2017, 10 deaths (1.9%) were attributed to probable effect of a vessel collision (Deaville *et al.,* 2018). A further 33 harbour porpoises died from physical trauma of unknown origin, which may be the result of vessel strike but could also be undiagnosed bycatch or caused by bottlenose dolphin attacks (Deaville *et al.,* 2018). Given the slow speeds and predictable movement of the vessel, the risk of collision is considered negligible and as such, there is no LSE from this impact pathway.	
		Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European and Ramsar Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		Reduction in prey availability	No	Prey species of harbour porpoise may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is relatively short in nature, meaning any displacement of prey is likely to be short term. Harbour porpoise are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
	[1095] Sea lamprey [1099] River lamprey [	Underwater noise and vibration	No	Drilling operations and vessel use will generate continuous noise and vibrations in the marine environment. However, risk of disturbance to migratory fish features from underwater noise and vibration is low due to the small scale and temporary nature of the proposed works. Any potential acoustic impacts are expected to remain highly localised due to the relatively low intensity of underwater noise anticipated within the proposed works area. Underwater noise generated from drilling operations will be of low intensity due to the activity predominantly taking place up to 17 m beneath the surface of the seabed. Furthermore, the works are not located within an estuary or enclosed area, therefore, it's unlikely any underwater noise and vibrations would impact fish migrations. As such, there is no potential for LSE from this impact pathway.	Screened Out
		Smothering and siltation rate changes (light) causing a barrier to migration	No	The exit point of the drill and placement of the clump weight are expected to disturb sediment in the immediate area of the seabed. This activity has the potential to lead a temporary increase in suspended fine sand or sandy mud due to surface abrasion and disturbance. However, due to the small surface area of the exit point (estimated area of 224 cm2) and clump weight (160 cm by 116 cm in surface area), as well as the short duration of disturbance (max 1 day), it is not likely to lead to significant changes to suspended sediment in the area. As such, there is no LSE from this impact pathway and any potential impacts are anticipated to be negligible.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European and Ramsar Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
Cardigan Bay / Bae Ceridigion SAC (UK0012712)	[1349] Bottlenose dolphin [1364] Grey seal	Underwater noise and vibration	No	HDD drilling operations and vessel use will generate continuous noise and vibrations in the marine environment. However, risk of disturbance to marine mammal features from underwater noise and vibration from these works is considered low due to the small scale and temporary nature of the proposed works and distance between the Project and SAC (approximately 35.5 km). Bottlenose dolphins from the SAC range widely within the Irish Sea MMMU, within which the project is located. Based on the latest literature, the anticipated footprint of vessel disturbance is 2–4 km (Brandt *et al.*, 2018; Graham *et al.*, 2019; Benhemma-Le Gall *et al.*, 2021; 2023). In turn, the area over which disturbance may occur would account for less than 0.01% of the Irish Sea MMMU. Any disturbance responses would also be transient, with animals typically returning once vessels have departed (Pirotta *et al.*, 2013; Anderwald *et al.*, 2013; New *et al.*, 2013). An MBES will be used to locate the exit point which will generate underwater at a frequency between 200 kHz and 700 kHz, with 400 kHz used for the	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				majority of the works. The operation frequency of the MBES is above the hearing ranges for all cetacean and seal functional hearing groups (Southall *et al.,* 2019). As there is no overlap between the hearing range of both bottlenose dolphin (150 Hz to 160 kHz) and grey seal (40 Hz and 90 kHz), and the expected sound frequency of the equipment, there is expected to be no potential for reduction in hearing abilities. Therefore, LSE to these features from the MBES specifically can be screened out. Overall, predicted underwater noise impacts from the proposed works are negligible. There is no direct impact of injury or disturbance to individuals within this site due to the distance between the Project and the SAC. As such, there is no LSE from this impact pathway.	
		Visual Disturbance	No	The Project is approximately 35.5 km from the boundary of the SAC, therefore there is no impact pathway for visual disturbance to bottlenose dolphins or grey seals within this site. As such, it is considered that there would be no LSE on either species from this impact pathway.	
		Collision risk	No	The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). A review of collisions between vessels and large marine megafauna did find reports of vessel collisions with grey seals (Schoeman *et al.,* 2020). However, vessel collisions appear to be rare, although a lack of reporting and/or witnessing of such events should not be ruled out. Given the slow speeds and predictable movement of the vessel, the risk of collision is considered negligible and as such, there is no LSE from this impact pathway.	
		Reduction in prey availability	No	Prey species of bottlenose dolphins and grey seals may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				relatively short in nature, meaning any displacement of prey is likely to be short term. Bottlenose dolphins and grey seals are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
		Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
		Above water noise	No	The Project is approximately 35.5 km from the boundary of the SAC, therefore there is no impact pathway for disturbance from above water noise to bottlenose dolphins or grey seals within this site. As such, it is considered that there would be no LSE on either species from this impact pathway.	
	[1095] Sea lamprey [1099] River lamprey	Underwater noise and vibration	No	Drilling operations and vessel use will generate continuous noise and vibrations in the marine environment. However, risk of disturbance to migratory fish features from underwater noise and vibration is low due to the small scale and temporary nature of the proposed works. Any potential acoustic impacts are expected to remain highly localised due to the relatively low intensity of underwater noise anticipated within the proposed works area. Underwater noise generated from drilling operations will be of low intensity due to the activity predominantly taking place up to 17 m beneath the surface of the seabed. Furthermore, the works are not located within an estuary or enclosed area, therefore, it's unlikely any underwater noise and vibrations	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				would impact fish migrations. As such, there is no potential for LSE from this impact pathway.	
		Smothering and siltation rate changes (light) causing a barrier to migration	No	The exit point of the drill and placement of the clump weight are expected to disturb sediment in the immediate area of the seabed. This activity has the potential to lead a temporary increase in suspended fine sand or sandy mud due to surface abrasion and disturbance. However, due to the small surface area of the exit point (estimated area of 224 cm2) and clump weight (160 cm by 116 cm in surface area), as well as the short duration of disturbance (max 1 day), it is not likely to lead to significant changes to suspended sediment in the area. As such, there is no LSE from this impact pathway and any potential impacts are anticipated to be negligible.	
		Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European and Ramsar Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC	[1351] Harbour porpoise	Underwater noise and vibration	No	Although drilling noise and vessel use will generate continuous noise, the impact range for disturbance is small scale and temporary. Due to the Project being located approximately 59.5 km away from the SAC, there is no direct impact pathway for harbour porpoise with the site. Any disturbance from the impact range surrounding the Project will not impede the site's primary	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		Visual disturbance		objective of ensuring the site maintains favourable conservation status (FCS); therefore the Project has no LSE for this site.	
		Collision risk		The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). Given the slow speeds and predictable movement of the vessel, alongside the high traffic recorded along the Welsh and southwest English coastline, the addition of one vessel involved in the Project does not increase vessel traffic above baseline for the area and therefore risk of collision is considered negligible and as such, there is no LSE from this impact pathway.	
		Reduction in prey availability		Prey species of harbour porpoise may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is relatively short in nature, meaning any displacement of prey is likely to be short term. harbour porpoise are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
		Pollution from vessels and equipment		Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
Lundy (UK0013114)	[1364] Grey seal	Underwater noise and vibration	No	Although drilling noise and vessel use will generate continuous noise, the impact range for disturbance is small scale and temporary. Due to the Project being located approximately 85.1 km away from the SAC, there is no direct impact pathway for grey seals with the site. Any disturbance from the impact range surrounding the Project will not impede the site's primary objective of ensuring that the integrity of the site is maintained and ensure that the site contributes to achieving FCS; therefore, the Project has no LSE for this site.	Screened Out
		Visual Disturbance			
		Above water noise			
		Collision risk	No	The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). A review of collisions between vessels and large marine megafauna did find reports of vessel collisions with grey seals (Schoeman *et al.,* 2020). However, vessel collisions appear to be rare, although a lack of reporting and/or witnessing of such events should not be ruled out. Given the slow speeds and predictable movement of the vessel, the risk of collision is considered negligible and as such, there is no LSE from this impact pathway.	
		Pollution from vessels and equipment	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and is therefore not considered mitigation for the purposes	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
		Reduction in prey availability	No	Prey species of grey seals may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is relatively short in nature, meaning any displacement of prey is likely to be short term. Grey seals are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
Pen Llyn a`r Sarnau / Lleyn Peninsula and the Sarnau SAC (UK0013117)	[1349] Bottlenose dolphin [1364] Grey seal	Underwater noise and vibration Visual Disturbance Above water noise	No	HDD drilling operations and vessel use will generate continuous noise and vibrations in the marine environment. However, risk of disturbance to marine mammal features from underwater noise and vibration from these works is considered low due to the small scale and temporary nature of the proposed works and distance between the Project and SAC (approximately 87.23 km). Bottlenose dolphins from the SAC range widely within the Irish Sea MMMU, within which the project is located. Based on the latest literature, the anticipated footprint of vessel disturbance is 2–4 km (Brandt *et al.*, 2018; Graham *et al.*, 2019; Benhemma-Le Gall *et al.*, 2021; 2023). In turn, the area over which disturbance may occur would account for less than 0.01% of the Irish Sea MMMU. Any disturbance responses would also be transient, with animals typically returning once vessels have departed (Pirotta *et al.*, 2013; Anderwald *et al.*, 2013; New *et al.*, 2013). An MBES will be used to locate the exit point which will generate underwater at a frequency between 200 kHz and 700 kHz, with 400 kHz used for the	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				majority of the works. The operation frequency of the MBES is above the hearing ranges for all cetacean and seal functional hearing groups (Southall *et al.,* 2019). As there is no overlap between the hearing range of both bottlenose dolphin (150 Hz to 160 kHz) and grey seal (40 Hz and 90 kHz), and the expected sound frequency of the equipment, there is expected to be no potential for reduction in hearing abilities. Therefore, LSE to these features from the MBES specifically can be screened out. Overall, predicted underwater noise impacts from the proposed works are negligible. There is no direct impact of injury or disturbance to individuals within this site due to the distance between the Project and the SAC. As such, there is no LSE from this impact pathway.	
		Collision risk	No	The risk of and outcome (e.g. injury or mortality) of collision between marine mammals and vessels is directly influenced by the type of vessel and the speed at which it is travelling (Laist *et al.,* 2001). A review of collisions between vessels and large marine megafauna did find reports of vessel collisions with grey seals (Schoeman *et al.,* 2020). However, vessel collisions appear to be rare, although a lack of reporting and/or witnessing such events should not be ruled out. Of 23 post-mortem examinations on stranded bottlenose dolphins in the UK between 2011 and 2017, no deaths were attributed to probable effect of a vessel collision, and one animal died from physical trauma of unknown origin (Deaville *et al.,* 2018). Given the slow speeds and predictable movement of the vessel, the risk of collision is considered negligible and as such, there is no LSE from this impact pathway.	
		Pollution from vessels	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		and equipment		and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and is therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	
		Reduction in prey availability (all aspects of works generating underwater noise and vibration)	No	Prey species of bottlenose dolphins and grey seals may be affected by the proposed works due to disturbance; however, the number of individuals will be small in relation to the availability of prey in the wider area. The activity is relatively short in nature, meaning any displacement of prey is likely to be short term. Bottlenose dolphins and grey seals are highly mobile and could move to other nearby prey patches, therefore, any potential impact on prey species is likely to have negligible to no effect and there will be no LSE.	
Carnsore Point SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 90 km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	Screened Out
Blackwater Bank SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
				equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 99 km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	
Saltee Island SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 99 km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	Screened Out
Hook Head SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 116.5 km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	Screened Out

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
North Anglesey Marine / Gogledd Môn Forol SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 176.5 km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	Screened Out
Rockabill to Dalkey Islands SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately 183km away from the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	Screened Out
Isles of Scilly Complex SAC	All features	All pressures	No	Although the Project has the potential for a range of pressures (e.g. disturbance, collision risk, reduction in prey, pollution from vessels and equipment), all of these pressures are limited to a small ZoI around the activity, and any disturbance is thought to be short-term. Embedded mitigation (e.g. following best practice guidance such as MARPOL and the Sea Wise Code) further reduces any risk for protected species who may show connectivity with the site. Due to the Project being located approximately >200 km away from	Screened Out
Lambay Island SAC					
North Channel SAC					

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
Mers Celtiques Talus du golfe de Gascogne (France)				the SAC, there is no direct impact pathway for protected species and habitats of this site that impede the conservation objectives; therefore, the Project has no LSE for this site.	
Nord Bretagne DH (France)					
Ouessant-Molène (France)					
Abers – Côte des légendes (France)					
Baie de Morlaix (France)					
Côte de Granit rose-Sept-Iles (France)					
Chaussée de Sein (France)					
Récifes et lands de la Hague (France)					
Banc et récifs de Surtainville (France)					
Tregor Goëlo (France)					
Anse de Vauville (France)					
Chausey (France)					
Récifes et marais arrière-littoraux du Cap Lévi à la Pointe de Saire (France)					

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
Baie du Mont Saint-Michel (France)					
Baie de Seine occidentale (France)					
SPAs					
Ramsey and St David's Peninsula Coast SPA (UK9014062)	[A346] Chough	Visual disturbance (due dive vessel and associated activity)	No	The Project is within the connectivity buffer and ZoI for the qualifying feature. Chough primarily feed in coastal and grazed grasslands areas, and do not forage at sea (Coombs, 1978). There is therefore no reasonable impact pathway between vessel activity and this feature.	Screened Out
		Reduction in prey availability	No	The Project is within the connectivity buffer and ZoI for the qualifying feature. Chough primarily feed in coastal and grazed grasslands areas, and do not forage at sea (Coombs, 1978). There is therefore no reasonable impact pathway between vessel activity and this feature.	

Site name	Qualifying features scoped into screening	Pressure	LSE?	Justification	Screened in / Screened out
		Pollution	No	Pollution will be controlled by adhering to relevant MARPOL guidance for pollution prevention and marine pollution legislation for which compliance is required by law. All vessels will be MARPOL compliant. Published guidelines and best working practices will be followed to ensure that the likelihood of accidental spills is extremely low. This compliance is a basic requirement under UK law and should be adhered to even when no European Sites are involved and are therefore not considered mitigation for the purposes of HRA. Furthermore, in the event of a spill, the volumes of potential contaminants released would likely be small and would rapidly disperse, thus any effects would be anticipated to be negligible, and therefore will have no LSE.	

6.2 LSE Conclusion

6.2.1 Following the Screening stage for LSE on the European and Ramsar Sites, Table 6.2 highlights the following sites which have been screened in for further assessment.

Table 6.2 Sites screened in for Stage 2 Appropriate Assessment

Site name	Qualifying features screened into AA	Impact Pathway
Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116)	[1160] Large shallow inlets and bays [1170] Reefs	Abrasion / disturbance of the substrate on the surface of the seabed Penetration and /or disturbance of the substratum below the surface of the seabed, including abrasion Introduction of new habitat from placement of new substrate Smothering and siltation rate changes (light) Introduction or spread of INNS
	[1364] Grey seal [1355] Otter	Underwater noise and vibration Visual Disturbance Above water noise
West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)	[1351] Harbour Porpoise	Underwater noise and vibration Visual Disturbance

6.2.2 The following European and Ramsar Sites have been screened out of further assessment as no LSE were identified (all screened sites beyond 50 km with no identified LSE have not been listed here):

- Cardigan Bay / Bae Ceridigion SAC (UK0012712);
- Bristol Channel Approaches/ Dynesfeydd Mor Hafren (UK0030396);
- Lundy (UK0013114);
- Lleyn Peninsula and the Sarnau / Pen Llyn a`r Sarnau (UK0013117); and
- Ramsey and St David's Peninsula Coast SPA (UK9014062).

6.2.3 Based on these conclusions the proposed works have been carried through to Stage 2 Appropriate Assessment for the sites highlighted in Table 6.2.

7 Information to Support Appropriate Assessment

7.1.1 An Appropriate Assessment (AA) of the implications of any development must be made by the relevant competent authority if a project is likely to have a significant effect on the conservation objectives of a European or Ramsar Site. Section 6 presented the screening test for LSE and concluded that two sites would need to be assessed in Stage 2, including;

- Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116) for [1160] large shallow inlets and bays, [1170] reef, grey seal [1364] and otter [1355]; and
- West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397) for harbour porpoise [1351].

7.1.2 The impact pathways highlighted as having potential for LSE for [1160] large shallow inlets and bays and [1170] reef included abrasion / disturbance of the substrate on the surface of the seabed, penetration and /or disturbance of the substratum below the surface of the seabed, including abrasion, introduction of new habitat from placement of new substrate, smothering and siltation rate changes (light) and introduction or spread of INNS.

7.1.3 The impact pathways highlighted as having potential for LSE for grey seal [1364] and otter [1355] included underwater and airborne noise and vibration from the Project's drilling and vessel activity, and visual disturbance. This section provides information to support this Stage 2 assessment.

7.1.4 The AA (i.e. Stage 2) entails the consideration of impacts on the integrity of a European Site, in relation to the site's structure and function and considers if the Project could have an AEoI.

7.2 Assessment of Adverse Effects on Site Integrity Alone

Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116)

7.2.1 The Pembrokeshire Marine SAC is an area of approximately 1,380 km^2 which extends just north of Abereiddy on the north Pembrokeshire coast to just east of Manorbier in the south (NRW, 2018c). The region consists of a range of inlets, estuaries, sea caves, reefs, lagoons and sheltered bays which makes it a key habitat to support key life-history stages for both grey seals and otters.

7.2.2 Pembrokeshire Marine includes the Daugleddau estuary, which hosts a variety of benthic habitats and species. Tide-swept sponge communities on shell/cobble substrates and bedrock in the upper reaches of the Daugleddau are exceptional in their diversity, and wide intertidal mudflats with rich and productive invertebrate annelid and mollusc communities, occur in 'pills' (creeks). Intertidal sandy/muddy areas also support extensive beds of narrow-leaved eelgrass *Zostera angustifolia*. High-salinity water and rocky substrates penetrate far upstream, and communities characteristic of fully saline conditions occur. A wide range of subtidal and intertidal rocky habitats are present, ranging from rocky reef to rich underboulder communities. Reefs are comprised mainly of igneous rock, but include areas of more friable Old Red Sandstone and some limestone. Extensive areas of sublittoral rocky reef stretch offshore from the west Pembrokeshire coast and between the Pembrokeshire islands and many small rocky islets. Reef habitat diversity is increased by caves, tunnels and surge gullies in both subtidal and intertidal zones. The wide variation in exposure to water movement, the range of rock type, slope, aspect and topography, and the high water quality, together with local exposure to abrasion from adjacent sediments and reduced salinity in the Daugleddau, are reflected in the wide diversity and species abundance of biological communities.

7.2.3 The region provides secure breeding habitat for grey seals where the Pembrokeshire coast supports Wales' main grey seal breeding colony, providing for more than 2% of the UK population (JNCC, 2015). The diverse range of habitat support key prey species, such as sandeels, whiting, flatfish and gadoids. Although grey seals utilise the SAC as a key foraging ground, individuals from this region can also undertake long offshore foraging trips, showing connectivity with the wider Celtic and Irish Sea region. Grey seals pups are highly sensitive to disturbance during the pupping season (August – December; SCOS, 2024). Pupping sites have been identified within 1 km of the Project, and the largest grey seal breeding colony is found approximately 12 km away at Ramsey Island where more than 380 pups are born annually (Morgan, Morris and Stringell, 2018).

7.2.4 Otters are also widespread across the SAC, especially at river-coast transition zones. The population is part of a large interconnected Welsh population, with individuals using shallow marine waters to feed (preying on a range of marine invertebrates and fish), freshwater to bathe and densely vegetated terrestrial areas for resting and breeding at sites called 'holts'. No holts are identified within 4.5 km from the Project (Kean and Chadwick, 2021; NRW, 2025).

Conservation Objectives

7.2.5 The Conservation Objectives for qualifying features for this SAC are, to ensure the integrity of the site is maintained or restored, and that it contributes to achieving the FCS of its qualifying features (NRW, 2018c), by ensuring the following:

- The overall distribution and extent of the habitat features within the site, and each of their main component parts is stable or increasing;
- The physical biological and chemical structure and functions necessary for the long-term maintenance and quality of the habitat are not degraded. Important elements include;
    - Geology

- Sedimentology
- Geomorphology
- Hydrography and meteorology
- Water and sediment chemistry
- Biological interactions.

- In the Milford Haven waterways complex, inputs of nutrients and contaminants to the water column and sediments derived from human activity must remain at or below levels at the time the site became a candidate SAC.
- The population of grey seals is maintaining itself on a long-term basis as a viable component of its natural habitat;
- The grey seal population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future;
- The presence, abundance, condition and diversity of habitats and species required to support grey seals is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing.

7.2.6 Further objectives for grey seals and otters include that populations must not be reduced as a consequence of human activity and contaminant burdens must remain below levels that may cause physiological damage, or immune or reproductive suppression.

Alone Assessment

7.2.7 During the drilling works, the exit point of the drill and placement of the clump weight are expected to directly impact the immediate area of the seabed. The drill will break through the surface of the seabed, leading to disturbance to surface substrate. As such, there is potential for LSE from this impact pathway.

7.2.8 Drilling works and associated vessel activities could disturb grey seal and otter due to underwater noise and vibration, visual presence and above water noise. The Project overlaps directly with this SAC, therefore, there is potential for LSE. As the three pressures are interlinked, this assessment considers the pressure of HDD operations and vessels separately.

7.2.9 To assess the potential sound impacts on grey seals and otters, predicted emission levels are compared to available estimated thresholds for injury and disturbance. To improve the accuracy of impact assessments, Southall *et al.* (2019) produced guidance categorising marine mammals into groups of species with similar auditory capabilities (Functional Hearing Groups; FHGs). This categorisation enables the application of species-specific weighting filters to acoustic data, providing a more realistic representation of how different species perceive underwater sound. National Marine fisheries Service (NMFS, 2024) updated the underwater and in-air criteria for onset of auditory injury (including permanent threshold shift (PTS)) and temporary threshold shift (TTS) on marine mammals; therefore, although the terminology used is primarily based on Southall *et al*. (2019), updated hearing ranges and sensitivities are based off the most up to date data available at the time of writing.

7.2.10 FHGs are defined according to hearing ranges and sensitivities. These classifications are critical for determining potential impacts because they account for variations in auditory thresholds and behavioural responses to different acoustic stimuli. Incorporating FHGs into the assessment process ensures that mitigation measures are appropriately targeted and proportionate to the level of risk. As both grey seal and otter use marine and terrestrial habitats, they each fall under two FHGs as shown in Table 7.1.

Table 7.1 Generalised hearing ranges for grey seal and otter (Southall *et al.*, 2019; NMFS, 2024)

Functional Hearing Group	Species	Estimated hearing range	Estimated region of greatest sensitivity[1]	Estimated peak sensitivity
Phocid Carnivore in Water (PCW)	Grey seal	40 Hz – 90 kHz	1.9 – 30 kHz	8.6 – 13 kHz
Other Marine Carnivores in Water (OMCW)	Otter	125 Hz – 40 kHz	No information	No information
Phocid Carnivore in Air (PCA)	Grey seal	42 Hz – 52 kHz	10 kHz	10 kHz
Other Marine Carnivores in Air (OMCA)	Otter	125 Hz – 32 kHz	2 – 16 kHz	No information

7.2.11 The main energy of continuous noise from proposed works including drilling is largely below 1 kHz (MMO, 2005). Noise from large vessels is typically up to 10 kHz and small vessels are typically up to 40 kHz (Duarte *et al.*, 2021). All these frequencies overlap with the hearing frequencies of grey seal and otter. Persistence of non-impulsive sounds can lead to cumulative exposure, resulting in auditory masking, physiological stress, and potential habitat displacement.

7.2.12 To evaluate potential effects of anthropogenic noise on marine mammals, predicted sound levels from proposed works must be compared against scientifically derived thresholds for auditory injury. These thresholds provide a benchmark for determining whether exposure could result in harm. Current best practice follows updated guidance from Southall *et al.* (2019) and NMFS (2024), which refine earlier frameworks by incorporating FHGs, auditory weighting functions, and separate criteria for underwater and in-air exposures. Two primary acoustic metrics are applied:

- Unweighted peak Sound Pressure Level (SPL_{peak}), captures the maximum instantaneous pressure of a sound wave, relevant for impulsive sources; and

[1] Region of greatest sensitivity represents low-frequency (F1) and high-frequency (F2) inflection points, while peak sensitivity is the frequency at which the lowest threshold was measured (T0) (Southall *et al.,* 2019).

- Weighted Sound Exposure Level (SEL), accounts for both the intensity and duration of exposure, adjusted using species-specific auditory weighting functions. SEL is expressed as either single-strike SEL (SEL_{ss}) for individual impulsive events or cumulative SEL (SEL_{cum}) for multiple exposures aggregated over a 24-hour period (SEL24h).

7.2.13 These metrics are essential because they capture different aspects of acoustic energy that contribute to potential injury. SPL_{peak} reflects the risk of mechanical damage from high-pressure impulses, while SEL accounts for metabolic fatigue effects associated with prolonged or repeated exposure.

7.2.14 Hearing impairment in marine mammals is defined as a measurable shift in auditory sensitivity; the minimum sound level required for detection. This impairment can manifest as either:

- Temporary threshold shift (TTS), where hearing sensitivity recovers after a period of rest; or
- Permanent threshold shift (PTS), where the loss is irreversible and constitutes an auditory injury under UK legislation.

7.2.15 Both conditions can affect an animal's ability to communicate, forage, and detect predators, with implications for survival and reproductive success.

7.2.16 Direct measurement of PTS onset in marine mammals is ethically prohibited; therefore, PTS thresholds are estimated by extrapolating from experimental TTS data. The likelihood of TTS or PTS onset depends on multiple factors, including the received sound level, exposure duration, and the frequency characteristics of the noise relative to the species' hearing range. Table 7.2 presents the SPL_{peak} and weighted SEL thresholds for TTS and PTS in grey seals and otters in air and water.

Table 7.2 Impulsive SPL_{peak} and non-impulsive SEL criteria for PTS and TTS in marine mammals from Southall *et al.* (2019) (and NMFS (2024) in brackets)

Functional Hearing Group	Species	Impulsive unweighted SPL_{peak} (dB re µ Pa)		Non-impulsive weighted SEL (dB re 1 µPa2s)	
		PTS	TTS	PTS	TTS
PCW	Grey seal	218 (223)	212	201 (195)	181 (175)
OMCW	Otter	232	226	219	199
PCA	Grey seal	144 (162)	138	154	134
OMCA	Otter	167	161	177	157

Large Shallow Inlets and Bays and Reefs

7.2.17 Two LSIBs make up the feature in the SAC. The embayment of St Brides Bay and the ria of Milford Haven. St Brides Bay is a large, deeply indented, embayment located within a predominantly rocky coastline and is geographically isolated from very large bays to the north and the east (Carmarthen Bay and Cardigan Bay) by large headlands. The lower Milford Haven waterway is also a LSIB and comprises part of the feature. This LSIB overlaps with the majority of the estuaries feature in the Milford Haven. The LSIB includes the main waterway channel from the confluence of the eastern and western Cleddau rivers to the entrance of the Haven between St Anne's Head and Sheep Island. There is an extremely wide range and complex mosaic of sediment habitats in St Brides Bay. Ranging from moderately and well sorted sands and muds to poorly sorted muddy gravels. Intertidal and subtidal reefs are also present throughout the bay.

7.2.18 Reefs across southwest Wales and within the Pembrokeshire Marine SAC are mostly composed of igneous rock, but some reefs also include areas of red sandstone or limestone. n shallow areas, rocky reefs generally support different types of seaweed community dominated by kelps and other brown or red seaweeds. In deeper water they are dominated by animal species such as sponges, sea anemones, sea squirts, hydroids, bryozoans and molluscs. Varied assemblages of mobile species such as fish, crabs and other species are also part of the reef communities. Reef habitats are considered to be sensitive to a number of pressures relating to HDD operations for cable installation, including: abrasion/disturbance of the substrate at the surface of the seabed, penetration and/or disturbance of the substratum below the surface of the seabed, light smothering and changes in suspended solids.

7.2.19 For reefs and large shallow inlets and bays, due to the small surface area of the exit point (estimated 16.83 cm diameter and area of 755 cm^2) and clump weight (160 cm by 116 cm in surface area), only a small area of the seabed will be subject to abrasion / disturbance.

7.2.20 The exit point overlaps with the feature 'Large Shallow inlets and bays' (LSIB) within the Pembrokeshire Marine / Sir Benfro Forol SAC Figure 4.2. Sediment type within this feature and at the potential exit point location is likely made up of infralittoral fine sand or infralittoral muddy sand (A5.23 or A5.24) (Figure 4.3). As this feature is recorded as being not sensitive to small areas of abrasion to surface substrate (Laffoley *et al.,*2000; Tyler-Walters and Hiscock, 2005), especially considering the small footprint of the activity (<0.001% of LSIB feature area), the impact is expected to be negligible.

7.2.21 Additionally, the placement of the bellmouth and clump weight may change the structure of the existing habitat due to the introduction of a new substrate that is different to the existing sandy habitat. This may provide a 'stepping stone' mechanism by which INNS could spread. However, the footprint of the introduced hard substrate is small (bellmouth = ~706 cm^2, clump weight = 160 cm by 116 cm in surface area) and any benthic species that are likely to colonise hard subsurface infrastructure in the area are unlikely to differ from species that already commonly occur in small areas across the region on comparable substrates. As such, any impact is anticipated to negligible with no appreciable effect.

7.2.22 The drilling rig will be located onshore and will drill seaward and continue out beneath the seabed to an exit point located roughly 920 m offshore. The exit point will be very small (755 cm^2) and will completely avoid reef habitat within Pembrokeshire Marine SAC, with the closest reef features being roughly 850 m away. The small scale and short-term nature of the works is not anticipated to lead to changes in suspended sediment or sediment deposition which would be impactful to reef habitat and would likely disperse soon after the works have concluded.

Grey Seals and Otters

7.2.23 Nedwell *et al*. (2012) report underwater noise levels of 129.5 dB re 1 µPa during HDD operations in a shallow riverine environment where drilling occurred directly beneath the riverbed. The measurements were taken in an exceptionally quiet setting with no other significant noise sources.

7.2.24 These measurements can be compared to expected underwater noise baseline levels in the proposed area of HDD operations. Merchant *et al.* (2024) reported that, in 2022, over 15% of the UK Celtic Seas exceed 120 dB re 1 µPa, with some areas exceeding 130 dB re 1 µPa. The area around Pembrokeshire may be exposed to noise levels above 115 dB re 1 µPa (Merchant *et al.,* 2024). Furthermore, Merchant *et al*. (2016) reported baseline underwater noise root-mean-square (RMS) levels of 99.9–113.3 dB re 1 µPa, depending on the specific 1/3-octave frequency band between 63 Hz and 500 Hz, across twelve UK coastal sites. At the Celtic Sea site, the location closest to the works, RMS levels ranged from 99.9 to 102.9 dB re 1 µPa.

7.2.25 It is highlighted that the proposed onshore works are located at the popular beach of Newgale, a coastal marine environment where natural oceanographic processes, including breaking waves and general hydrodynamic turbulence against the substrate, create a higher and more variable baseline underwater noise environment. Furthermore, the general area surrounding the location of the onshore works is the popular beach of Newgale with high levels of anthropogenic activity from recreational activities (e.g., windsurfers, surfers and canoeists). Therefore, the baseline noise levels at the Newgale location are expected to sit in the higher range of those reported by Merchant *et al.* (2016; 2024).

7.2.26 When comparing the predicted HDD operation noise to the likely underwater noise baseline levels in the area, any increase in underwater noise attributable to HDD operations is expected to be small relative to baseline levels. The predicted noise level produced by the HDD operations are also significantly below the grey seal or otter hearing thresholds for injury or disturbance.

7.2.27 Given the onshore location is already an area with high recreational traffic and the onshore works will occur from a car park which is located off the beach and already developed with high movement of vehicles and people, the additional equipment required for HDD operations is not considered a risk for visual or in-air noise disturbance beyond baseline levels.

7.2.28 Overall, HDD operations emit very low noise which is likely to fall under baseline levels for a coastal environment. Therefore, this source is unlikely to cause behavioural disturbance at either the individual or population level. Given the temporary nature of HDD operations and the limited acoustic footprint if any disturbance were to occur as a result it would be short-lived, localised and reversible with no implications for survival, reproduction, or population viability.

Vessel Disturbance

7.2.29 The physical presence of vessels and associated underwater noise may result in disturbance to marine fauna through avoidance, displacement and behavioural or vocalisation changes. Disturbance arising from vessel presence and underwater noise are intrinsically linked and occur simultaneously, except when vessels are idle. There is insufficient evidence to support assessment of these pressures separately, as vessel noise studies are often subject to observer bias and cannot reliably distinguish between responses to physical presence and acoustic emissions (Erbe *et al*., 2018; Pirotta *et al*., 2015). Furthermore, the magnitude of disturbance from both pressures generally increases with vessel size and vessel activity. Accordingly, underwater noise and physical presence are considered together as a single disturbance pressure for this assessment.

7.2.30 Commercial and survey vessels introduce continuous underwater noise into the marine environment, primarily generated by propellers, thrusters, and onboard machinery such as pumps and generators. Source levels for small craft and boats (<50 m) are approximately 160-175 dB re 1 µPa, however, this is highly dependent on speed and other operational characteristics. They produce a greater sound energy in higher frequency bands (above 1 kHz) than larger ships; due to this, and their near-shore operation, underwater noise from small vessels is generally regarded as having more geographically limited environmental impacts (OSPAR, 2009). Support and supply vessels (50–100 m) typically range between 165–180 dB re 1 µPa, with most acoustic energy concentrated below 1 kHz (OSPAR, 2009). Larger vessels (>100 m) produce predominantly low-frequency sound, often below several hundred hertz, which propagates efficiently underwater and may be detectable over several kilometres depending on vessel size and operating conditions (Thomsen *et al.,* 2006).

7.2.31 Vessel noise is non-impulsive and generally occurs at source and received levels well below established thresholds for permanent or temporary auditory impacts in marine mammals. In addition, many species exhibit evasive behaviour in response to elevated noise levels, further reducing the likelihood of harmful exposure. On this basis, the risk of auditory injury from vessel noise is considered negligible and is not assessed further. However, documented behavioural and acoustic responses, auditory masking, and stress effects (Erbe *et al.,* 2018) warrant consideration, and disturbance effects are therefore assessed in this section.

7.2.32 For most marine mammal species, vessel-related disturbance is typically short-term and localised, with individuals resuming normal behaviour once the vessel has passed (Christiansen *et al.,* 2015; Pirotta *et al.*, 2015; Silva *et al.*, 2024). For seals, vessels may cause disturbance both at sea and at haul-out sites. There is limited quantitative evidence for at-sea displacement distances for grey seals in response to vessels is currently available. In the absence of species-specific evidence, the 4 km displacement threshold derived for harbour porpoise (Benhemma-Le Gall *et al.*, 2021) has been used, and is considered precautionary given harbour porpoises' overall higher sensitivity to underwater noise. Assuming that vessel activity during the proposed works (comprising of one or two vessels operating in close proximity) could displace grey seals out to 4 km, the maximum temporary loss of potential habitat would be 50.27 km². This estimate is highly precautionary, as the works will occur within 1 km of the shoreline, resulting in the area of displacement being constrained by the coastline and therefore smaller by up to one third of the total area. Nevertheless, assuming a habitat loss of 50.27 km^2, this represents 3.64% of the Pembrokeshire Marine SAC within which vessel-based disturbance could occur. Given the very low proportion of the SAC affected on any given day, and the layers of precaution in the assessment, any displacement arising from vessel activity during the works would not constitute significant disturbance.

7.2.33 At haul-out sites, documented responses include avoidance behaviour, increased vigilance, stress reactions, and in some cases TTS (Southall *et al.*, 2019; Anderwald *et al.*, 2013; Bishop *et al.*, 2015; Karpovich *et al.,* 2015; Jones *et al.*, 2017). Disturbance is of particular concern where vessel activity overlaps with productive coastal waters adjacent to sites used for breeding and moulting (Robards *et al.*, 2016). Studies have shown that vessel approaches can disturb hauled-out seals at distances of up to approximately 400 m for grey seals (Richardson *et al.*, 1995; Back *et al.*, 2018; Cowling *et al.*, 2015; Ruiz-Mar *et al.*, 2022; Osinga *et al.*, 2012). However, telemetry studies of harbour seals in UK waters have reported no consistent behavioural response to close-passing vessels at sea (Onoufriou *et al.,* 2016; which are a more sensitive species of seal compared to grey seals and can be used as a precautionary proxy), and no evidence of reduced seal presence despite cumulative noise exposures potentially exceeding TTS thresholds (Jones *et al.*, 2017).

7.2.34 The physical presence of the survey vessel(s) in the nearshore may cause some temporary disturbance to otters should they be in the immediate vicinity of the landfall site. This may result in otters temporarily avoiding their chosen feeding/resting location; however, they are likely to willingly move to another nearby location. As the nearest holts have been identified to be located more than 4.5 km from the onshore works, the proposed works are not thought to be able to disturb individuals at their most sensitive location (Kean and Chadwick, 2021; Natural Resources Wales, 2025). The presence of up to two extra vessels in the area for a limited duration is not deemed a significant increase in vessel activity.

7.2.35 Overall, vessel noise generated during the proposed survey is non-impulsive and remains well below established thresholds for permanent auditory injury in marine mammals. When combined with the small vessel size, limited survey duration, slow operating speeds, and adherence to best-practice mitigation measures, the risk of auditory injury is considered negligible. Behavioural disturbance may occur but is expected to be minor, temporary, and spatially restricted, and is unlikely to interfere with critical life functions such as survival, reproduction, or migration, or to result in population-level effects. Due to the area being a key region for grey seal pupping, however, the Project will ensure that vessels do not approach seals hauled out within 500 m to limit risk of disturbance.

Conclusion

7.2.36 Based on the assessment above and taking into consideration the small-scale footprint and short duration of the works, there are no anticipated impacts to the habitat features of Pembrokeshire Marine SAC. Provided best practice guidance will be followed including maintaining at least 500 m from pupping sites, underwater and in-air noise and visual disturbance from the Project is considered unlikely to alter population trajectories of grey seal or otter, or significantly disturb the species, its habitat or prey species within the SAC. It is therefore not likely to result in any AEoI of the Pembrokeshire Marine / Sir Benfro Forol SAC.

West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397)

7.2.37 The West Wales Marine SAC is an area of approximately 7,376 km^2 situated between the Llŷn peninsula in the north, and the Pembrokeshire coast in the south-west, and extending into Cardigan Bay. This SAC is designated for the protection of harbour porpoise and was selected because it represents one of the top 10% of persistent high-density areas for harbour porpoise in UK waters (NRW and JNCC, 2015). The site supports important summer habitat across the entire area and particularly Cardigan Bay in the winter (Heinänen and Skov, 2015). Survey modelling (from the Joint Cetacean Protocol) indicates that the site supports an estimated ~9% of the UK portion of the Celtic and Irish Sea Management Unit population, a level of importance classed as Grade B (2–15% of the population; NRW and JNCC, 2015).

7.2.38 The SAC contains environmental conditions known to influence porpoise distribution and prey availability, including shallow waters (~30-50 m water depth), coarse seabed sediments (e.g., sand/gravel) linked to sandeel presence (a key prey of harbour porpoise, alongside whiting, gobies, herring and sprat) and key feeding hydrodynamics (e.g., areas of tidal eddies and medium current speeds (0.4-0.6 m/s; NRW and JNCC, 2015).

Conservation Objectives

7.2.39 The Conservation Objectives for qualifying features for this SAC aim to avoid deterioration of the habitats of harbour porpoise or significant disturbance to the species, ensuring the integrity of the site and its contribution to maintaining FCS of the UK harbour porpoise population. To ensure this, subject to natural change, the following is stipulated to be maintained or restored in the long term:

- The species is a viable component of the site;

- There is no significant disturbance of the species; and
- The supporting habitats and processes relevant to harbour porpoises and their prey are maintained.

Alone Assessment

7.2.40 Drilling works and associated vessel activities could disturb harbour porpoise due to underwater noise and vibration, and visual presence of vessels. The Project overlaps directly with this SAC, therefore, there is potential for LSE. As these pressures are interlinked, this assessment considers the pressure of HDD operations and vessels separately.

7.2.41 Harbour porpoise fall under the FHG of very high frequency cetaceans as summarised in Table 7.3 and Table 7.4 presents the SPL_{peak} and weighted SEL thresholds for TTS and PTS.

Table 7.3 Generalised hearing ranges for harbour porpoise (Southall *et al.*, 2019; NMFS, 2024)

Functional Hearing Group	Species	Estimated hearing range	Estimated region of greatest sensitivity[2]	Estimated peak sensitivity
Very High frequency (VHF)	Harbour porpoise	200 Hz – 165 kHz	12 – 140 kHz	105 kHz

Table 7.4 Impulsive SPL_{peak} and non-impulsive SEL criteria for PTS and TTS in harbour porpoise from Southall *et al.* (2019) (and NMFS (2024) in brackets)

Functional Hearing Group	Species	Impulsive unweighted SPL_{peak} (dB re µ Pa)		Non-impulsive weighted SEL (dB re 1 µPa2s)	
		PTS	TTS	PTS	TTS
VHF cetacean	Harbour porpoise	202 (202)	196	173 (181)	153 (161)

HDD Operations

7.2.42 The main energy of continuous noise from proposed works including drilling is largely below 1 kHz (MMO, 2005) which is outside of the peak range of sensitivity for harbour porpoise (Table 7.3). Considering the low noise levels reported by Nedwell *et al.* (2012), if these works were audible above the baseline soundscape of the coastal region at Newgale, this source is unlikely to cause behavioural disturbance at either the individual or population level. Given the temporary nature of HDD operations and the limited acoustic footprint if any disturbance were to occur as a result it would be short-lived, localised and reversible with no implications for survival, reproduction, or population viability.

[2] Region of greatest sensitivity represents low-frequency (F1) and high-frequency (F2) inflection points, while peak sensitivity is the frequency at which the lowest threshold was measured (T0) (Southall *et al.,* 2019).

7.2.43 Harbour porpoises are particularly sensitive to anthropogenic noise, with the species having been documented to actively avoid vessels (for example, Culloch *et al.,* 2016; Benhemma-Le Gall *et al.,* 2021). Although vessel operating frequencies overlap with the hearing frequencies of harbour porpoise, they are not within the species' peak hearing sensitivity. Roberts *et al*. (2019) observed that harbour porpoise presence, resting and feeding behaviour reduced in response to increasing vessel frequencies. Frequent, lower-level noise exposures can cause masking and behavioural disruption that may be hard to detect but can have cumulative long-term effects on populations (Tougaard *et al*., 2015).

7.2.44 Harbour porpoises were observed being displaced up to 4 km from construction vessels during the construction of the Beatrice and Moray East Offshore Wind Farm in the Moray Firth, with increased vessel activity leading to a significant decrease in the acoustic detections and activity (Benhemma-Le Gall *et al*., 2021). Gradient analyses from this study showed that the probability of detecting harbour porpoises within the site decreased by up to 35.2% with increased vessel intensity and a decrease in distance to the nearest vessel. Similar impacts were also observed in a large-scale study of harbour porpoise density across UK waters (Heinänen and Skov, 2015). Using statistical analysis of multiple datasets, Heinänen and Skov (2015) found that increased vessel presence was associated with lower harbour porpoise densities.

7.2.45 Vessel disturbance has also been found to impact foraging activity in harbour porpoise. Wisniewska *et al*. (2018) collected telemetry data to study the change in foraging rates of harbour porpoise in response to vessel noise in coastal waters in the inner Danish waters and Belt seas. The results suggest that foraging may be disrupted at greater distances of up to 7 km as a result of vessel disturbance. In turn, a reduction in foraging activity will result in energy intake costs. Other behavioural responses of harbour porpoise to vessel disturbance include increased fluking, interrupted foraging, change to vocalisations, prolonged dives, 'porpoising' (a stereotypical disturbance behaviour) and directed movement away from the sound source (Dyndo *et al.*, 2015; Oakley *et al.*, 2017; Wisniewska *et al.*, 2018). Thus, the presence of vessels nearby to harbour porpoise will likely have an energetic cost.

7.2.46 Disturbance from vessels may also lead to displacement from important foraging grounds, resulting in loss of foraging opportunities (Nabe-Nielsen *et al*., 2018). Harbour porpoise are small cetaceans which makes them susceptible to heat loss and as a result, requires them to forage frequently in order to maintain a high metabolic rate with little energy remaining for fat storage (Rojano-Doñate *et al*., 2018; Wisniewska *et al*., 2016). Therefore, overall fitness may be impacted if foraging activity is disrupted or they are displaced from high-quality foraging grounds and are unable to find alternative suitable foraging grounds that will provide sufficient food to meet their metabolic needs. Despite this, results from studies using tags suggest that harbour porpoises are able to respond to short-term reductions in food intake and therefore, may have some resilience to disturbance (Wisniewska *et al.,* 2016).

7.2.47 Assuming that vessel activity associated with the proposed works (comprising of one or two vessels operating in close proximity) could displace harbour porpoises by up to 4 km (Benhemma-Le Gall *et al.*, 2021), this would equate to a temporary loss of 50.27 km² of potential habitat. To note, because the works occur within 1 km of the shoreline, the area of displacement would be constrained by the coastline and therefore smaller by up to one third of the total area. Nevertheless, assuming a habitat loss of 50.27 km^2, this represents only 0.68% of the summer area of the West Wales Marine SAC within which the vessels operations would be located. The area of habitat loss does not overlap with the winter area of the West Wales Marine SAC. The proportion of the summer area disturbed is well below the threshold for significant disturbance outlined in the guidance from JNCC (2020), defined as where more than 20% of the relevant SAC area is excluded to harbour porpoise on any given day. Given the very low proportion of the SAC affected on any given day, the seasonal threshold for significant disturbance would also not be exceeded. Accordingly, any displacement arising from vessel activity during the works would not constitute significant disturbance.

7.2.48 Considering the works are planned to occur across 57 days from October, this will overlap with the winter season for harbour porpoise (October to March). During the winter season, harbour porpoise distribution within the West Wales Marine SAC condenses more within Cardigan Bay (Heinänen and Skov, 2015), which lies approximately 35.5 km north along the coastline. Therefore, St. Brides Bay which encompasses the Project's location is not considered a key region for harbour porpoise during the winter season. If any disturbance does occur, harbour porpoise have more suitable regions within their range to support feeding and resting behaviours. Given the anticipated local spatial range of impact, any disturbance impact is considered to potentially affect a low number of animals and be recoverable.

7.2.49 The waters surrounding the Pembrokeshire coast is known as an area of high traffic including both commercial and private watercraft. EMODnet's EU Vessel Density Map (https://emodnet.ec.europa.eu) indicates that vessels commonly use Milford Haven as a popular port and transit through a variety of routes towards Ireland, the English Channel and north into the Irish Sea. The average annual vessel density between 2017 and 2024 around Milford Haven often exceeding 100 hours per square km, with up to 3112.37 hours per square km being recorded in some areas. Vessels visiting St. Brides Bay or transiting past the entrance range from cargo, military, passenger, pleasure, and tanker watercraft. A high concentration of tanker activity is shown along the south coastline of St. Brides Bay where an anchorage area lies. EMODnet's EU Vessel Density Map indicates that average annual vessel density within St. Brides Bay is also high, often exceeding 20 hours per square km, with some areas exceeding 100 hours per square km. Therefore, the small number of vessels (up to two) that will be required for the works will not significantly increase vessel traffic in the area.

7.2.50 The exact vessel type to be used for the works is currently unknown, however the vessel will either be the C-Force or C-Odyssey vessel. Both are shallow draft multicat, non-dynamic positioning (DP) vessels less than 30 m in length and with a maximum speed of 10 knots. Given the absence of DP systems, there will be no additional noise from the use of DP, resulting in lower overall noise levels compared to vessels with DP. Shipton *et al*. (2025) found that both length and speed of vessels had a significant impact on source levels, with slow-moving, smaller vessels typically producing underwater noise levels at the lower end of the spectrum for commercial craft. Consequently, the relatively small size, slow speed, and lack of DP on the vessels, will ensure that underwater noise emissions remain low, only elevated over a limited spatial area, and will not measurably increase vessel noise above what is already present in the baseline environment.

Conclusion

7.2.51 Based on the assessment above, underwater noise and vibration from the Project is considered unlikely to alter the population trajectory of harbour porpoises, or significantly disturb the species, its habitat or prey species within the SAC. It therefore is not likely to result in any AEoI of the West Wales Marine / Gorllewin Cymru Forol SAC.

8 In-Combination

8.1.1 No designated sites were identified to result in any AEoI for the proposed works alone, as the effects are considered negligible. On this basis, any residual effects from the proposed works alone are considered sufficiently low that they would not contribute materially to an in-combination effect. Therefore, an in-combination assessment is not considered necessary.

9 Conclusions

9.1.1 The proposed works at Newgale have the potential to interact with European and Ramsar Sites. As part of this assessment, designated sites in the vicinity of the proposed works which could potentially be affected were identified. Within these sites, individual designated features were then considered. Screening was undertaken using the conceptual 'source-pathway-receptor' model.

9.1.2 In accordance with the HRA Process guidance, the following impact pathways were assessed:

- Visual disturbance;
- Underwater noise changes and vibration;
- Pollution from vessels and equipment (Hydrocarbon and Polycyclic Aromatic Hydrocarbon (PAH) contamination);
- Reduction in prey availability (all aspects of works generating underwater noise and vibration);
- Abrasion / disturbance of the substrate on the surface of the seabed;
- Penetration and /or disturbance of the substratum below the surface of the seabed, including abrasion;
- Introduction of new habitat from placement of new substrate;
- Smothering and siltation rate changes (light);
- Introduction or spread of invasive non-native species (INNS); and
- Barrier to species movement.

9.1.3 The test for LSE carried out on the European and Ramsar Sites concluded that there is potential for LSE for the following sites due to the potential effects of penetration and /or disturbance of the substratum below the surface of the seabed, including abrasion, Introduction of new habitat from placement of new substrate; smothering and siltation rate changes (light), introduction or spread of invasive non-native species (INNS) on benthic features and underwater noise, visual disturbance and above water noise on designated marine mammal features:

- Pembrokeshire Marine / Sir Benfro Forol SAC (UK0013116); and
- West Wales Marine / Gorllewin Cymru Forol SAC (UK0030397).

9.1.4 The assessment has considered all relevant impact pathways associated with the Project, in relation to reefs, large shallow inlets and bays, grey seal and otter, the qualifying features of the Pembrokeshire Marine SAC and harbour porpoise as the qualifying feature of the West Wales Marine SAC. Potential effects from the pressures listed above have been evaluated against the site's conservation objectives.

9.1.5 For benthic features, there are no anticipated impacts from the proposed works as they are located a sufficient distance away from the sensitive features of the site such as subtidal reefs, and where they do overlap with benthic features (such as with large shallow inlets and bays), these areas consist of sedimentary habitat which is not assessed to be sensitive to this small scale and short-term disturbance.

9.1.6 All predicted impacts resulting from the proposed works (whether relating to auditory injury or behavioural disturbance) are temporary, spatially limited, and subject to embedded mitigation measures (e.g. following best-practice guidelines and ensuring no vessel approaches within 500 m of seal haul-outs). No individuals from the SAC population are expected to be exposed to injury-level noise, and behavioural responses are not anticipated to result in sustained displacement or population-level effects. It is therefore concluded that the Project will not result in AEOI of any relevant SAC or SPA, and that the conservation objectives for qualifying features will continue to be met.

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