

# ALCATEL SUBMARINE NETWORKS

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## Stage 1 Screening for Appropriate Assessment

Havingsten fibre-optic telecommunication cable landing at Loughshinny, Co. Dublin

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P2228\_R4694\_Rev5 | December 2019

## DOCUMENT RELEASE FORM

### Alcatel Submarine Networks

**P2228\_R4694\_Rev5**

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Authors

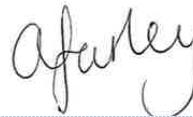
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## GLOSSARY

### AA

Appropriate Assessment

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### ASN

Alcatel Submarine Networks

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### BSL

Below Sea Level

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### DCCAE

Department of Communications, Climate Action  
& Environment

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### DEHLG

The Department of Environment, Heritage and  
Local Government

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### EC

European Commission

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### ERL

Effects Range Low

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### EU

European Union

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### EUNIS

European Nature Information System

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### GIS

Geographic Information System

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### HRA

Habitats Regulations Assessment

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### ICES

International Council for the Exploration of the  
Sea

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### IROPI

Imperative Reasons of Overriding Public Interest

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### KP

Kilometre Point

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### MU

Management Unit

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### NIS

Natura Impact Statement

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### NM

Nautical Mile

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### NMFS

National Marine Fisheries Service

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### NPWS

National Parks and Wildlife Service

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### OSPAR

Convention for the Protection of the marine  
Environment of the North-East Atlantic

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### PAH

Polycyclic Aromatic Hydrocarbons

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### PTS

Permanent Threshold Shift

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### SAC

Special Area of Conservation

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### SPA

Special Protection Area

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### TTS

Temporary Threshold Shift

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### UXO

Unexploded Ordnance

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### Waterfowl

Term to describe collectively wildfowl (ducks,  
geese and swans) and wading species

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# 1. INTRODUCTION

## 1.1 Project Background

Alcatel Submarine Networks (ASN) has been selected as the Supplier of the Havhingsten fibre optic submarine cable system linking Ireland, Isle of Man (IOM), UK and Denmark. This Havhingsten open cable system (hereafter referred to as Havhingsten cable) will span more than 940km and deliver a boost to bandwidth between the respective countries (Figure 1-1, DWG P2228-LOC-007).

Intertek Energy & Water Consultancy Services (Intertek) has been appointed by ASN to provide environmental consents and permitting services related to the installation of the marine elements of the Havhingsten cable.

**Figure 1-1 Havhingsten cable route**



This Stage 1 Screening for Appropriate Assessment (AA) covers the Irish marine components of the Havhingsten cable from mean high-water springs (MHWS) at the Irish landfall at Loughshinny, North County Dublin to the Ireland/UK median line (Figure 1-2). This is defined as the project and comprises:

- Installation of one fibre-optic telecommunications cable;
- All associated works required to install, test, commission and complete the aforementioned cable;
- All associated works required to operate, maintain, repair and decommission the aforementioned cable, including repair events over the lifetime of Havhingsten.



*“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”*

This provision is transposed into Irish law in respect of this foreshore application by Part 5 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. No. 477 of 2011), (as amended). Regulation 42(1) of the 2011 Regulations provides for screening for Appropriate Assessment as follows:

*“A screening for Appropriate Assessment of a plan or project for which an application for consent is received, or which a public authority wishes to undertake or adopt, and which is not directly connected with or necessary to the management of the site as a European Site, shall be carried out by the public authority to assess, in view of best scientific knowledge and in view of the conservation objectives of the site, if that plan or project, individually or in combination with other plans or projects is likely to have a significant effect on the European site.”*

Regulations 42(6) and 42(7) provide for the outcome of screening for Appropriate Assessment as follows:

*“The public authority shall determine that an Appropriate Assessment of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site. Alternatively, a public authority shall determine that an Appropriate Assessment of a plan or project is not required where: the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it can be excluded on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site.”*

Pursuant to the Foreshore Acts 1933 – 2011 (the “Foreshore Acts”) this NIS will be submitted to the Foreshore Unit to support the application for a Foreshore Licence in respect of the project.

### 1.3 Aim of this report

The purpose of this report is to inform the AA process in determining whether the project, both alone and in combination with other plans or projects, is likely to adversely affect the integrity of any Natura 2000 site. The effects of the project on the Natura 2000 site are considered in the context of the site’s conservation objectives and specifically on the habitats and species for which the sites have been designated. If significant effects are likely then effects are examined to determine if they will either alone, or in combination with other plans or projects effect the integrity of the Natura 2000 site.

The report provides a description of the proposed installation and maintenance activities (Section 3); and the receiving baseline environment (Section 4). It determines if there is any connectivity between the proposed installation and maintenance activities and any Natura 2000 sites (Section 5, Stage 1 AA Screening) and considers the potential for adverse effects on the conservation objectives and qualifying interests within the affected Natura 2000 site(s) (Section 5.4). It concludes with a statement for each Natura 2000 site.



This report has been prepared in accordance with current guidance:

- Managing Natura 2000 sites. The provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC (European Commission, EC 2018a);
- Guidance on Energy Transmission Infrastructure and EU nature legislation, (EC 2018b);
- The European Commission Guidance - Article 6 of the Habitats Directive – Rulings of the European Court of Justice. Final Draft, September 2014 (EC 2014);
- The Department of Arts, Heritage and the Gaeltacht - Marine Natura Impact Statements in Irish Special Areas of Conservation: A Working Document, April 2012 (DAHG 2012a);
- The Department of Environment, Heritage and Local Government (DEHLG) Guidance - Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities, 11 February (DEHLG 2010);
- EU Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC (EC 2007); and
- Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (EC 2002).

## 1.4 Consultation

The Havhingsten project recognise that consultation is an important activity in the planning and pre-application phase for a development. As such consultation with the Foreshore Unit, local planning authorities and other stakeholder groups commenced in 2018. Table 3-2 lists the organisations and people contacted, meetings and discussions held prior to submission of the Foreshore Application, which this Stage 1 AA Screening accompanies.

**Table 1-1 Consultation for Ireland route**

Stakeholder	Date	Objective
Marine Institute	19/06/2018	Meeting – to introduce the project and identify constraints
Department of Culture, Heritage and the Gaeltacht	20/06/2018	Contact to arrange a meeting with Foreshore Unit to introduce the project while on site visits.
Department of Culture, Heritage and the Gaeltacht	21/06/2018	Discussion with FU on the proposed Donabate Landing Site and existing Survey Foreshore licence. Enquire about potential variation to foreshore licence.
Department of Culture, Heritage and the Gaeltacht	25/06/2018	Confirmation and guidance on archaeological assessment requirements
Underwater Archaeology Unit	25/06/2018	Introduce the project and identify constraints
Department of Culture, Heritage and the Gaeltacht	24/08/2018	Submission of Foreshore Pre-Application Enquiry
	11/09/2018	ASN meeting request / enquiry /introduction to Case Officer – advised no meeting required at this stage.
National Parks and Wildlife Service (NPWS)	06/09/2018	Contacted to introduce the project and identify constraints – advised NPWS will respond to main application
Marine Institute	11/09/2018	Queries on technical information provided for pre-application
Department of Culture, Heritage and the Gaeltacht	12/09/2018	Foreshore Unit confirmed that the project can proceed to Application Stage

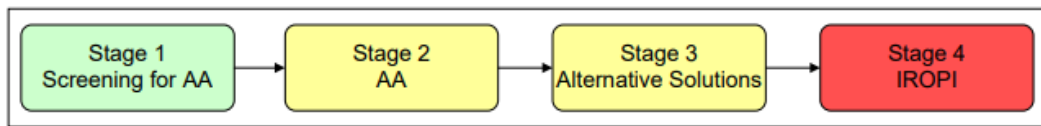
Fingal County Council	13/09/2018, 01/11/2018, 20/11/2018; 11/06/2019	Introduction to scope of project and enquiry for need for terrestrial consent; Introduce project to harbour master.
Irish Fish Producers Organisation	03/02/2019	Contacted to introduce the project
Bird Watch Ireland	14/02/2019	Contacted regarding availability of Loughshinny and surrounding area Bird Count data
Fingal County Council	15/05/2019	Provide intertidal installation information for discussion
Mr Faulkner (Fisherman)	11/06/2019	Introduce the project to Loughshinny fishermen and provide point of contact.
Bord Iascaigh Mhara (BIM)	11/06/2019	Introduce the project to Loughshinny fishermen and provide point of contact.
Mr Hickey (Fisherman)	11/06/2019	Introduce the project to Loughshinny fishermen and provide point of contact.
Loughshinny Community Association	11/06/2019	Introduce the project and provide point of contact.
Irish South & East Fish Producers Organisation (ISEFPO)	12/06/2019	Introduce the project to Loughshinny fishermen and provide point of contact.
Mr Flanning (Fisherman)	13/06/2019	Introduce the project to Loughshinny fishermen and provide point of contact.

## 2. APPROPRIATE ASSESSMENT PROCESS

### 2.1 Legislative context

The European Commission’s methodological guidance (EC 2002) outlines a four-stage approach to the AA process, where the outcome at each successive stage determines whether a further stage in the process is required. The four stages are shown in Figure 2-1 and described below:

Figure 2-1 Stages of AA



#### 2.1.2 Stage 1 - Screening for Appropriate Assessment

Stage 1 of the AA process is referred to as screening for Appropriate Assessment and identifies whether the proposed plan or project, either on its own or in combination with other plans or projects, would be “likely to have a significant effect” upon any European site. A likely effect is one that cannot be ruled out on the basis of objective information. The test is a ‘possibility’ of effects rather than a ‘certainty’ of effects. The test of significance is whether a plan or project could undermine the site’s conservation objectives.

#### 2.1.3 Stage 2 - Appropriate Assessment

If effects are considered likely to be significant, potentially significant or uncertain, or if the screening process becomes overly complicated, the process must proceed to Stage 2: Appropriate Assessment, with the preparation of a Natura Impact Statement to inform the Appropriate Assessment that is to be conducted by the competent authority.

The European Court of Justice has also made a relevant ruling on what should be contained within an Appropriate Assessment:

“[The Appropriate Assessment] cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned”.

#### 2.1.4 Stage 3 – Alternative Solutions

This stage examines any alternative solutions or options that could enable the plan or project to proceed without adverse effects on the integrity of a Natura 2000 site. Demonstrating that all reasonable alternatives have been considered and assessed, and that the least damaging option has been selected, is necessary to progress to Stage 4.

#### 2.1.5 Stage 4 - Imperative Reasons of Overriding Public Interest (IROPI)/Derogation

Stage 4 is the main derogation process of Article 6(4) which examines whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project that will have adverse effects on the integrity of a Natura 2000 site to proceed in cases where it has been established that no less damaging alternative solution exists.

The extra protection measures for Annex I priority habitats come into effect when making the IROPI case. IROPI reasons that may be raised for sites hosting priority habitats are those relating to human

health, public safety or beneficial consequences of primary importance to the environment. In the case of other IROPI, the opinion of the European Commission is necessary and should be included in the AA. Compensatory measures must be proposed and assessed. The European Commission must be informed of the compensatory measures. Compensatory measures must be practical, implementable, likely to succeed, proportionate and enforceable, and they must be approved by the Minister for Housing, Planning, Community and Local Government.

### 3. PROJECT DESCRIPTION

Full details of the scope of the proposed installation and maintenance activities are described in the Project Description (Section 2) of the Irish Planning Report. Below is a brief overview of the project.

Within the Irish waters the Havhingsten submarine cable has a total length of approximately 55.7km, of which 29.8km is within the Irish 12nm territorial water boundary.

From the MHWS seaward the 40mm diameter cable will be buried to a target depth of 1.5m below the seabed. The cable will be buried using various industry standard burial tools including water jetting and ploughing. The cable lay will be performed by an installation vessel with a dynamic positioning system, anchors are unlikely to be used due to current speeds, however where divers are deployed, anchors may be a requirement for safety reasons. The fibre optic cable will occupy up to 40mm width of the seabed following installation.

The cable route survey identified that the cable laying area is predominately composed of sands and clay, there were no obvious areas where cable burial may be significantly less than target depth. The requirements for cable burial, installation tools to be used and potential cable protection were established during the cable burial risk assessment, these methods are described in Section 2.6 of the Irish Planning Report. External cable protection is only proposed at the crossing with the existing Interconnector 1 pipeline within the Irish EEZ. This crossing will have a footprint of approximately 687.5m<sup>3</sup>.

Planned activities such as ploughing and trenching operations will temporarily suspend sediments in the water column, changing water clarity and increasing turbidity. Modelling presented in Appendix H of the Irish Planning Report concluded:

- Within the nearshore area the medium graded sands noted by the cable route survey, are likely to be suspended into the water column from the installation tool but will settle back to the seabed in a worst case of 6 minutes during jetting activities in a spring tide (assuming current speeds of 0.605m s<sup>-1</sup>) (Appendix H). In the worst-case sandy sediments will be dispersed up to 107m from the installation tool in a thin median veneer of less than 2.3mm.
- With increasing distance from the landing site, a greater percentage of silt is encountered within the sediments. Finer sediment particles remain suspended within the water column for longer (up to 28 hours) and will be dispersed over a greater median distance of 30km, in a median veneer of 0.003mm (Appendix H).

Subject to the award of installation consents, the cable installation is scheduled to begin in the fourth quarter of 2019 and is expected to be operational by the end of 2019. Following installation, the cable is expected to be operational for at least 25 years. During operation there may be a potential requirement for maintenance work such as cable repair at fault locations due to unexpected damage. These works will be similar in nature to cable installation works described above but shorter in duration.

Embedded mitigation is available in the Planning Report (Section 6).

## 4. DESCRIPTION OF THE RECEIVING ENVIRONMENT

### 4.1 Introduction

The receptors which could potentially be affected by the proposed installation and maintenance activities and could be the Qualifying Interest features of Natura 2000 sites in the region are: benthic habitats; fish; birds; and marine mammals. This section focuses on the presence of these receptors within 30km of the marine cable corridor (as defined by breeding bird (maximum) foraging range, marine mammals have been considered within their management unit). It should be noted that distances of any Natura 2000 sites to the marine cable corridor discussed in this section are detailed in Table 5-3 in this report. The location of features and habitats are described as Kilometre Post (KP) distances along the route. The marine cable corridor crosses the Ireland / UK median line at KP25.058 and enters Irish territorial waters (12nm limit) at KP51.351. The Loughshinny landing site is at KP80.621.

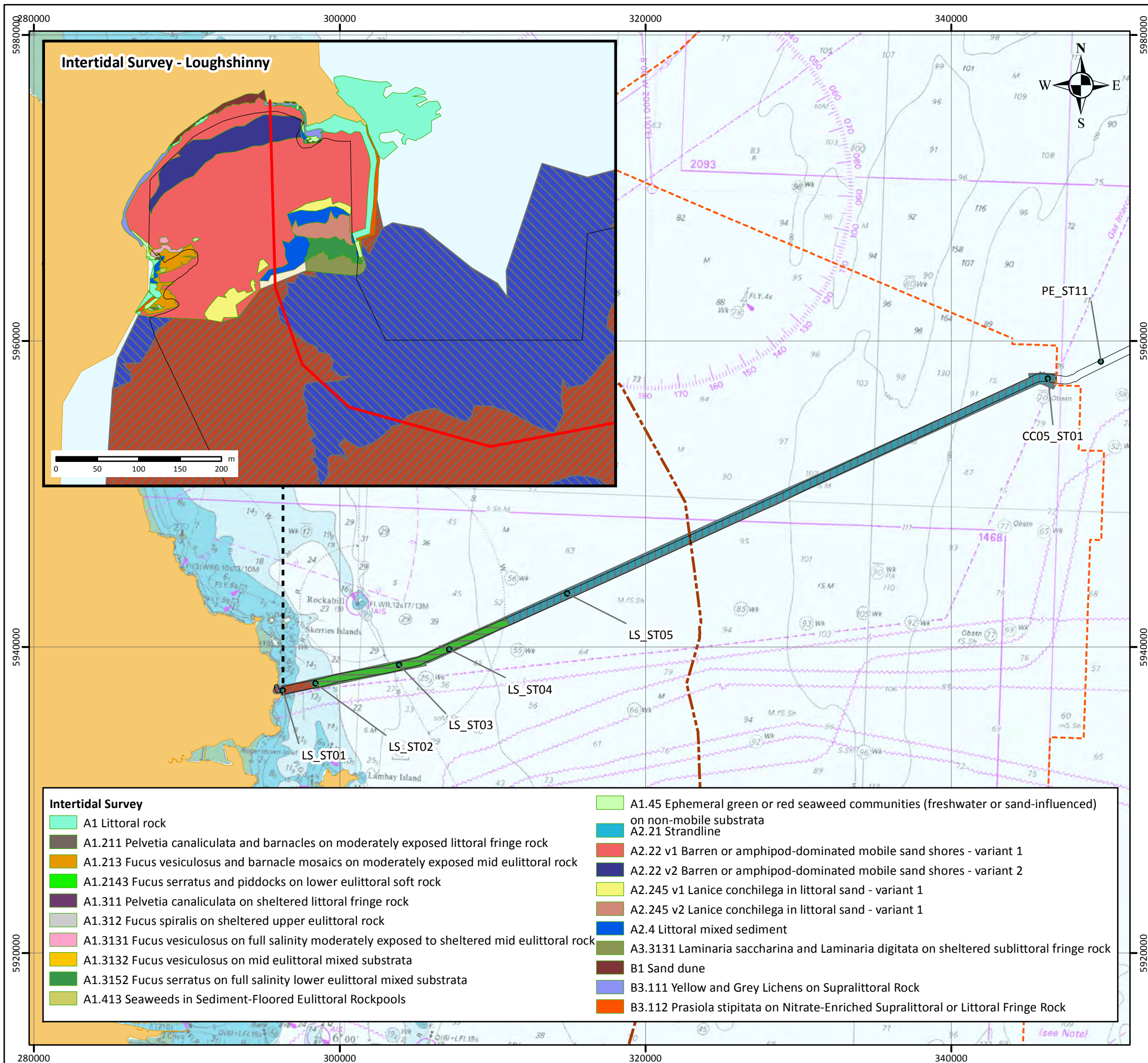
#### 4.1.1 Biotopes

Biotope mapping information was gathered during environmental survey to inform the Benthic Characterisation Report for the Irish section of the marine cable route (Fugro 2019a). Figure 4-2 (DWG P2228-HAB-008, overleaf) shows the biotopes recorded over the entire Irish cable route corridor.

The seabed sediments within the marine cable corridor at the cable landing site at Loughshinny and offshore are fairly homogenous, with muddy sand characterising the majority of the seabed. This does differ closer to shore at KP1.120 however, with the European Nature Information System (EUNIS) biotope complex A4.21 (Echinoderms and crustose communities on circalittoral rock) being recorded at a depth of between 7 and 8m below sea level (BSL). The sediment here consists of boulder/bedrock outcrops with sand in between. Characteristic epibiota include starfish (*Asterias rubens*), anemones (including *Metridium* sp.), red seaweed including (*Palmaria palmata*), faunal turf (Hydrozoa/Bryozoa) and tube worms (Serpulidae). Figure 4-1 below presents a photograph of the biotope complex.

**Figure 4-1 Biotope Complex A4.21: Echinoderms and crustose communities on circalittoral rock**





**Intertidal Survey - Loughshinny**



**Intertidal Survey**

- A1 Littoral rock
- A1.211 *Pelvetia canaliculata* and barnacles on moderately exposed littoral fringe rock
- A1.213 *Fucus vesiculosus* and barnacle mosaics on moderately exposed mid eu littoral rock
- A1.2143 *Fucus serratus* and piddocks on lower eu littoral soft rock
- A1.311 *Pelvetia canaliculata* on sheltered littoral fringe rock
- A1.312 *Fucus spiralis* on sheltered upper eu littoral rock
- A1.3131 *Fucus vesiculosus* on full salinity moderately exposed to sheltered mid eu littoral rock
- A1.3132 *Fucus vesiculosus* on mid eu littoral mixed substrata
- A1.3152 *Fucus serratus* on full salinity lower eu littoral mixed substrata
- A1.413 Seaweeds in Sediment-Floored Eu littoral Rockpools
- A1.45 Ephemeral green or red seaweed communities (freshwater or sand-influenced) on non-mobile substrata
- A2.21 Strandline
- A2.22 v1 Barren or amphipod-dominated mobile sand shores - variant 1
- A2.22 v2 Barren or amphipod-dominated mobile sand shores - variant 2
- A2.245 v1 *Lanice conchilega* in littoral sand - variant 1
- A2.245 v2 *Lanice conchilega* in littoral sand - variant 1
- A2.4 Littoral mixed sediment
- A3.3131 *Laminaria saccharina* and *Laminaria digitata* on sheltered sublittoral fringe rock
- B1 Sand dune
- B3.111 Yellow and Grey Lichens on Supralittoral Rock
- B3.112 *Prasiola stipitata* on Nitrate-Enriched Supralittoral or Littoral Fringe Rock

**HAVINGSTEN  
TELECOMMUNICATIONS CABLE  
BENTHIC HABITATS  
ROI Route Survey Data**

Drawing No: P2228-HAB-008

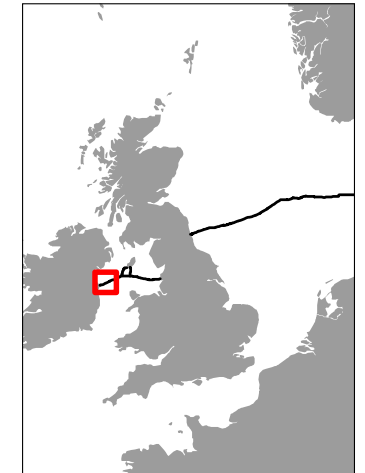
B

**Legend**

- Havhingsten Cable Route
- Application Corridor
- Median Line
- 12nm Territorial Sea Limit

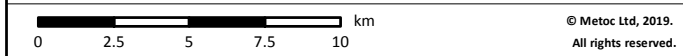
**Offshore Survey**

- Grab Sample Location
- A4.21 Echinoderms and Crustose Communities on Circalittoral Rock
- A5.26 Circalittoral Muddy Sand
- A5.261 *Abra alba* and *Nucula Nitidosa* in Circalittoral Muddy Sand or Slightly Mixed Sediment
- A5.351 *Amphiura filiformis*, *Kurtiella bidentata* and *Abra nitida* in Circalittoral Sandy Mud



NOTE: Not to be used for Navigation

Date	Tuesday, August 13, 2019 15:20:54
Projection	WGS_1984_UTM_Zone_30N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	UKHO; CDA; GEBCO; Fugro; MarineFind; ASN
File Reference	J:\P2228\Mxd\05_HAB\ P2228-HAB-008.mxd
Created By	Chris Goode
Reviewed By	Chris Carroll
Approved By	Paula Daghish



The EUNIS biotope A5.261 (*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment) was also recorded at KP1.120, at a depth of 8m BSL. The sediment type of this biotope is muddy sand, hosting infaunal species such as bivalves (*Abra alba*, *Nucula nitidosa*, *Kurtiella bidentata*) and polychaetes (*Nephtys hombergii*). Characteristic epibiota include hermit crabs (Paguridae). No representative picture of this biotope was taken during the survey.

Moving further offshore, from KP 2.940 to 11.960 the EUNIS biotope A5.351 (*Amphiura filiformis*, *Kurtiella bidentata* and *Abra nitida* in circalittoral sandy mud) was recorded at depths ranging from 17m to 41m BSL. The sediment here is comprised of muddy sand or slightly gravelly muddy sand, with infaunal species including brittlestar (*Amphiura filiformis*), bivalves (*K. bidentata*, *N. nitidosa*), polychaete (*Diplocirrus glaucus*) and horseshoe worm (*Phoronis* sp.). Characteristic epibiota include hermit crabs, anemone (Actiniaria, including *Metridium* sp.), brittlestar and fish (Gadidae). Figure 4-3 below presents a photograph of the biotope.

The final EUNIS biotope recorded along the marine cable route was biotope complex A5.26 (circalittoral muddy sand), between KP 20.570 and 55.220 and with depths ranging from 66m to 82m BSL. The seabed in this biotope complex is characterised exclusively by muddy sand and hosts a range of infauna and epibiota. Infaunal species include bivalves (*Abra nitida*, *Thyasira flexuosa*, *Nucula nitidosa*), polychaetes (*Nephtys incisa*, *Notomastus* sp.) and worms (*Phoronis* sp.). Epibiota include hermit crabs, sea pen (*Virgularia mirabilis*), Norway lobster (*Nephrops norvegicus*), cat shark (*Scyliorhinus canicula*) and worm tubes (Polychaeta). Figure 4-4 below presents a photograph of the biotope complex.

**Figure 4-3** Biotope A5.351: *Amphiura filiformis*, *Kurtiella bidentata* and *Abra nitida* in circalittoral sandy mud



**Figure 4-4** Biotope complex A5.26: Circalittoral muddy sand



The epifaunal communities along the marine cable corridor are expected to be able to absorb change without significantly altering their character

Another notable habitat found near the marine cable corridor is the Annex 1 subtidal reef habitat found throughout the Rockabill to Dalkey Island SAC as intertidal and subtidal reef surrounding headlands and the offshore islands. The subtidal reefs are home to a range of species including *Laminaria hyperborea*, soft corals (*Alcyonium digitatum*), blue mussel (*Mytilus edulis*) and the common sea star (*Asterias rubens*), among other species (NPWS 2014b). no reef habitat has been identified within the marine cable corridor. The corridor passes within approximately 2km of the nearest identified reef habitat within the SAC according to the latest available reef survey data (NPWS 2013d).



#### 4.1.2 Sediment contaminants

Upon analysis of the gas chromatographic profiles for the survey area, it was determined that the sediments shared a similar underlying aliphatic hydrocarbon distribution, with some evidence of petroleum hydrocarbons likely being due to historic fossil fuel discharge or industrial activity. This was only at trace levels, however. All polycyclic aromatic hydrocarbons (PAH) assessed were below their respective Effects Range Low (ERL) value, indicating that they are unlikely to cause a detrimental effect on the benthic community. All analysed heavy metal concentrations were also below their respective ERL value, with any variability in concentrations being expected due to natural variation in sediment characteristics and any currents affecting their sedimentation and deposition. In conclusion, the sediments within the Irish cable corridor are not contaminated.

### 4.2 Fish and shellfish

Four Annex II listed fish species are likely to be found within or near to the marine cable corridor at certain times of the year:

- Sea lamprey (*Petromyzon marinus*) – late April to early June;
- River lamprey (*Lampetra fluviatilis*) – September to June;
- Atlantic salmon (*Salmo salar*) – May to June and autumn months; and
- European eel (*Anguilla Anguilla*) – February – April.

These species are diadromous meaning they migrate between marine and freshwater as part of their lifecycle; the Celtic and Irish Sea is an important migration route for these species. The four species are Qualifying Interests for the SACs north of the project area and may pass the marine cable corridor during migration to the Atlantic.

### 4.3 Birds

#### 4.3.1 Ecology

The coastal sea cliffs, estuaries and offshore islands of Ireland are host to several nationally and internationally important bird species, with many areas designated as SPAs or SACs. Coastal habitats provide important breeding sites for many species of seabird, several which are protected under national and European legislation.

At least 45 species of seabird (including divers and grebes) have been recorded during at-sea surveys in Irish waters, of which 23 species regularly breed around Ireland (Pollock et al. 2007, Mackey et al. 2004). Aerial surveys, reported in Rogan et al. (2018), for the ObSERVE project have identified that the Northern Irish Sea is important for herring gull, common gull, black backed gull and tern species. Other birds present in the region offshore include kittiwake, Manx shearwater (summer only) and puffin,

In addition, a further 59 species of waterfowl and wader regularly occur at coastal sites such as estuaries around Ireland; including 5 grebe species, 2 heron species, 26 species of wildfowl and 26 wader species (Crowe 2005). Some of these species are migratory and are present only during migration periods in spring and autumn; others come to Ireland to breed or to spend the winter, while some are resident all year round.



The cable landing site at Loughshinny is not within a designated area for birds. However, the intertidal area provides a sheltered intertidal feeding resource for overwintering seabirds and foraging tern species during the breeding season (which takes place during the summer months (Tierney, Whelan and Valentín 2016), in addition to habitat provided within the SPAs designated in the region. Review of low tide count data between 2011 and 2016 (BirdWatch Ireland 2019) indicates that the landing site is occasionally important for two species of wading birds; turnstone and sanderling. The count data for these species indicates annual peak counts above nationally important numbers (1% of the all-Ireland population (Crowe and Holt 2013) during November for turnstone and December for sanderling. Large numbers of grey plover were recorded during 2011/12 however numbers are generally low (BTO 2019). The remainder of the overwintering period numbers are below nationally important numbers within Loughshinny bay.

Annual peak counts above nationally important numbers have been recorded of ringed plover on the Skerries coast. All other species recorded are present at the landing site during the winter but not in nationally important numbers (BirdWatch Ireland 2019). While the summer months are quieter in terms of overall bird numbers, the season is still important for several species including terns which breed in the summer months. Around the Loughshinny coast in the summer, the roseate tern can be found feeding offshore on sandeel and sprat (Fingal County Council 2004). The roseate tern has two breeding grounds in Ireland, one of which is on the nearby island of Rockabill. This breeding colony is the most important in Europe, holding up to 1200 breeding pairs (BirdWatch Ireland 2019). There is also a resident breeding colony of northern fulmar that is present during the summer months at Loughshinny, with 113 individuals being recorded here (Fingal County Council 2004).

#### **4.3.2 SPAs within 30km**

The following Natura 2000 sites list bird species as a Qualifying Interest and are located within 30km of the marine cable corridor within Irish territorial waters:

##### **4.3.2.1 Rockabill SPA**

The marine cable corridor crosses the southeast corner of the SPA, covering approximately 0.69km<sup>2</sup> of the site. The proposed installation centreline lies outside the SPA (Figure 4-1, DWG P2228-PROT-002). The site is designated to maintain nationally important numbers of overwintering Purple Sandpiper (48 individuals) and breeding populations of Roseate tern (1207 nests recorded in 2012), common tern (2,031 nests recorded in 2012) and Arctic tern (165 nests recorded in 2012) (NPWS 2013a). The Rockabill SPA is co-located with the Rockabill to Dalkey Island SAC.

##### **4.3.2.2 Skerries Islands SPA**

The marine cable corridor is located approximately 2.28km from this SPA (NPWS 2009). The Skerries Islands is a group of three low lying small, uninhabited islands situated between 0.5km and 1.5km off the north Dublin coastline with maximum heights from 8m to 13m above sea level. Shenick's Island has extensive expanses of intertidal rocky shore and sand flats, while St. Patrick's Island and Colt Island have low cliffs. The site has a nationally important breeding colony of great cormorant. The site also has nationally important breeding populations of European shag, European herring gull and great black-backed gull. In winter the site is visited by a diverse range of waterfowl. It has an internationally important population of light-bellied Brent goose and nationally important populations of cormorant, purple sandpiper and turnstone. European golden plover occurs regularly but in relatively small numbers.

##### **4.3.2.3 Rogerstown Estuary SPA**

The marine cable corridor is located approximately 2.74km from this SPA (NPWS 2014C). The site provides a small estuarine habitat including extensive intertidal sand and mudflats and shallow water areas fringed by saltmarsh, sand dune and field systems. The site is of high importance to wintering waterfowl with internationally important numbers of light-bellied Brent goose (5.9% of national total).

It supports nationally important populations of a further 15 species and notably red knot (8.6% of national total), common shelduck (5.3% of national total) and grey plover (4.5% of national total). It is an important and regular site for a range of autumn passage migrants, especially little stint, curlew, sandpiper, ruff and green sandpiper. Little tern has bred in the past within the SPA, but not in recent years.

#### 4.3.2.4 Lambay Island SPA

The marine cable corridor is located approximately 4.9km from this SPA (NPWS 2013b). The island is found approximately 4km from the north Dublin coastline, with a channel 10-13m separating the island from the mainland. Rising up to 127m above sea level, the island has an area of 2.5km<sup>2</sup> above the high tide mark, with the northern, eastern and parts of the southern coastline comprising of steep cliffs ranging from 15 to 50m in height. The island is home to an internationally important colony of seabirds, with the populations of shag, cormorant and guillemot being of international importance, as well as being the largest populations in Ireland. A further six species have breeding populations of national importance. These are the fulmar, greylag goose, lesser black-backed gull, herring gull, kittiwake, razorbill and puffin.

#### 4.3.2.5 Malahide Estuary SPA

The marine cable corridor is located approximately 7.56km from this SPA (NPWS 2013c). The site comprises the River Broadmeadow estuary and habitats include extensive areas of intertidal sandflats and some areas of salt marsh. The habitats support internationally important numbers of light-bellied Brent goose and nationally important populations of a further 12 overwintering species. The site is one of the few in eastern Ireland where substantial numbers of goldeneye occur. It also features regionally important populations of bar-tailed godwit and European golden plover. The site is an important and regular site for a range of autumn passage migrants, especially curlew, sandpiper and ruff. It also supports a regular flock of non-breeding mute swan.

#### 4.3.2.6 Baldoyle Bay SPA

Located approximately 14.09km from the marine cable corridor, Baldoyle Bay SPA is a narrow estuary found to the south of County Dublin (NPWS 2014a). Separated from the open sea by a large sand dune system, it receives input from two small rivers, the Mayne and Sluice rivers. At low tide large areas of intertidal flats are exposed, with the majority comprised of sand with areas of mud in the inner sheltered sections of the estuary. This provides an important foraging site for numerous overwintering bird species. The site is home to an internationally important population of light-bellied Brent goose, along with a nationally important assemblage of overwintering birds, including shelduck, ringed plover and grey plover. Also present at this site are the Annex 1 listed species golden plover and bar-tailed godwit.

#### 4.3.2.7 Ireland's Eye SPA

Located approximately 14.26km from the marine cable corridor, Ireland's Eye SPA is an uninhabited island located roughly 1.5km of County Dublin (NPWS 2011). The island has an area of 0.24km<sup>2</sup> above the high tide mark, with the site also encompassing Rowan Rocks, Thulla, Thulla Rocks, Carrageen Bay and a seaward component extending 200m west and 500m to the north and east. The northern and eastern sides of the island are characterised by steep cliffs up to 69m high. The island is home to nationally important populations of cormorant, herring gull, kittiwake, guillemot and razorbill, along with a breeding pair of Peregrine, an Annex 1 listed species.

#### 4.3.2.8 River Nanny Estuary and Shore SPA

Located approximately 14.58km from the marine cable corridor, the River Nanny Estuary and Shore SPA is found in County Meath and is roughly 3km in length (NPWS 2012). The estuarine channel is well sheltered, with the banks being characterised by muddy sediments, saltmarsh and freshwater marsh/wet grassland. Towards the mouth of the estuary the shoreline is well exposed with coarse

sand sediments. The site is home to nationally important populations of wintering waders, including the Annex 1 listed species golden plover and bar-tailed godwit. Also present are ringed plover, oystercatcher, knot and sanderling. The populations of knot and sanderling are of particular importance, comprising 4% of their respective national populations.

## 4.4 Annex II listed pinniped species

Grey seal and common/harbour seal (herein harbour seal) are listed under Annex II of the EC Habitats Directive and therefore their conservation requires the designation of SACs.

There are three periods in the seal's life cycle which are of particular importance: breeding, moulting and pupping. At these times seals tend to be restricted to haul out sites e.g. males defending territory and females, females feeding pups which can't swim, animals undergoing the moult, and are unlikely to be found offshore. These seasons vary between species and sometimes regions.

Grey seal and harbour seal are a Qualifying Interest of the Lambay Island SAC (NPWS 2013a), which lies 5.33km from the marine cable corridor. Both species of seal occupy aquatic and terrestrial habitats in the SAC, including intertidal shorelines that become exposed during the tidal cycle and outlying rocky skerries when these are not inundated by wave action. All suitable aquatic habitat is considered relevant to the species range having the potential to be used by seal. Grey and harbour seal are present at the site throughout the year during all aspects of their annual life cycle which includes breeding, moulting and non-breeding foraging and resting phases (NPWS 2013a). Both species are vulnerable to disturbance during periods when time is spent ashore by individuals or groups of animals.

### 4.4.1 Grey seal

Grey seal at and around the Lambay Island SAC spend time ashore prior to the annual breeding season which takes place predominantly during the months of August-December. Pups are born on land, usually on remote beaches and uninhabited islands or in sheltered caves (NPWS 2013). The breeding population was estimated at 196 - 250 individuals in 2005, with an estimated 56 pups born on Lambay Island SAC in 2005. After three weeks the pups moult with adults congregating in large numbers on beaches between December and February to moult.



### 4.4.2 Harbour seal

Harbour seal spend time ashore immediately prior to and during the annual breeding season which takes place predominantly during the months of May - July. Pups are born on land, usually on sheltered shorelines, islets or skerries and uninhabited islands removed from the risk of predation and human interference (NPWS 2013a). Pups are able to swim soon after birth and may be observed accompanying their mother close to shore in the early days or weeks of life. They are nursed for a period of several weeks by the mother prior to weaning and abandonment. During this period, adult females mate with adult males, an activity that takes place in the water. Due to harbour seal pup mobility soon after birth, count numbers are not available.



Harbour seal moulting takes place predominantly between August – September, which is when the species is most vulnerable. A total of 31 harbour seal were recorded within Lambay Island SAC during the 2003 moult season.

## 4.5 Annex II and IV listed cetacean species

All cetaceans are European Protected Species (EPS) protected under Annex IV of the Habitats Directive, which lists species of Community Interest in need of strict protection. It is an offence to deliberately kill, injure or disturb animals classed as EPS.

There are 24 species of cetacean recorded in Irish waters. There are five species of cetacean likely to be present within and adjacent to the marine cable corridor; harbour porpoise, bottlenose dolphin, short-beaked common dolphin, white-beaked dolphin and minke whale. Other recorded species in the region are occasional to rare visitors. It is unlikely that deep water species such as the blue whale, fin whale and long-finned pilot whale will be present, with very low numbers of sightings being recorded for such species within the Irish Sea (Reid et al. 2003). Generally, the greatest numbers of cetacean species are present in coastal waters within the summer months<sup>1</sup>.

Harbour porpoise and bottlenose dolphin are listed under Annex II of the EC Habitats Directive. The closest Natura 2000 site to the marine cable corridor designated to conserve harbour porpoise is the Rockabill to Dalkey Island SAC; the marine cable corridor crosses the south-eastern corner of the SAC. The closest Natura 2000 site for bottlenose dolphin is in UK waters; Cardigan Bay SAC approximately 16km distance.

**Table 4-1 Frequency of sightings of harbour porpoise and bottlenose dolphin**

Annex IV Species	Frequency of sightings*	IWDG sightings (March 2018 – March 2019)**	Estimation of density (animals/km <sup>2</sup> )***	Applicable MU****	Abundance of animals in MU****
<b>Toothed whales (odontocetes)</b>					
Harbour porpoise ( <i>Phocoena phocoena</i> )	Common from July through the autumn/winter. Peak period in July and August.	Regularly sighted - observations including 20 individuals recorded feeding off Rockabill Island in December 2018. Other sightings include Skerries - Apr (1); May (1); Dec (2); Feb (4); Balbriggan - Jan (3); Bullock Harbour – Nov (2); Dalkey – Jul (2); Sep (5); Nov (2); Jan (4); and Howth – Aug (4); Sep(5); Nov (8); numerous sightings from Howth Head.	0.118	Celtic and Irish Seas	47,229
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	Occasional sightings in Irish Sea waters. Observations have occurred year-round but most frequently in summer.	15 individuals recorded south of Lambay Island in April 2018. Other sightings include 2 individuals at Balbriggan in June.	0.0086	Irish Sea	397

Sources: \* Marine Institute (2019) and Reid et al. (2003), \*\* IWDG (2019); \*\*\* Hammond et al (2017) ICES Management Units D (Irish Seas); and \*\*\*\* DECC (2016).

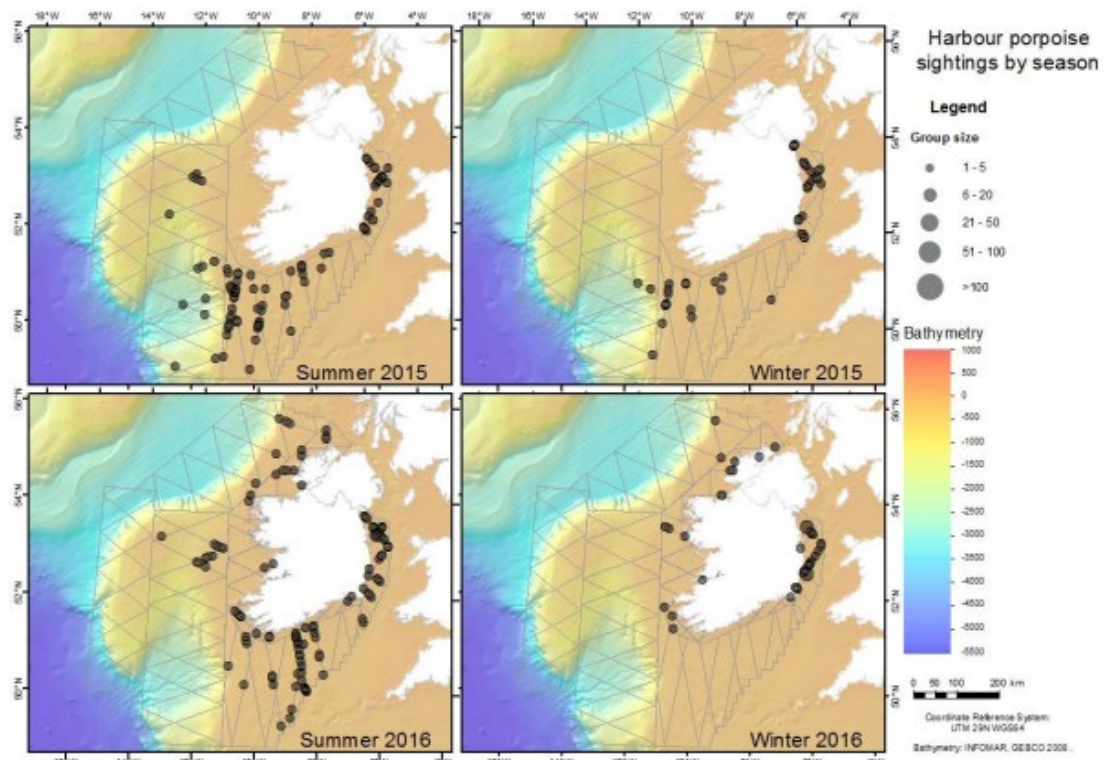
<sup>1</sup> Summer is classed as April to September and winter as October to March.

## 4.5.2 Harbour porpoise



Harbour porpoise is the most common cetacean in Irish and UK waters. It is wide-ranging and abundant, both coastally and offshore, with the most sightings occurring in the coastal area, close to islands and headlands with strong tidal currents (DECC 2016). Harbour porpoise generally prefer coarser sediments which is the habitat of sandeel, a known prey species. Many sightings of harbour porpoise have been recorded by the obSERVE Project around the Irish Sea (Rogan et al. 2018). The obSERVE programme was set up by the Department of Communications, Climate Action & Environment (DCCAE) to document protected species and habitats in Ireland's seas, with the data gathered being used to inform sustainable management practices (DCCAE 2019). Figure 4-5 shows that harbour porpoise near the marine cable corridor are observed all year round, with the greatest number of sightings recorded during the summer months (Rogan et al. 2018).

**Figure 4-5 Sightings of harbour porpoise in the summer and winter of 2015 and 2016**



Within the Celtic and Irish Sea harbour porpoise management unit (MU), there are currently six SACs additional to the Rockabill to Dalkey Island SAC which have been designated for Harbour Porpoise (North Channel SAC, North Anglesey Marine SAC, West Wales Marine SAC, Bristol Channel SAC and the Llyn Peninsula and the Sarnau SAC within UK waters). These sites are located between 7km, and 222km from the marine cable corridor within Irish territorial waters. This network of protected sites will contribute towards maintaining the favourable conservation status of the wider population of harbour porpoise (JNCC 2017). Harbour porpoise may range across their MU (or further), and animals from the designated sites may be visitors to the marine cable corridor. Harbour porpoise distribution is linked to the availability of their preferred prey items (gobies, sandeel, whiting, Atlantic herring and

sprat) however, further studies are required to identify if there is a migratory pattern within the Irish Sea as is observed in the North Sea (JNCC 2015).

As indicated by Table 4-1, harbour porpoise are likely to be present along the marine cable corridor throughout the year, but densities will be highest during the summer and autumn months.

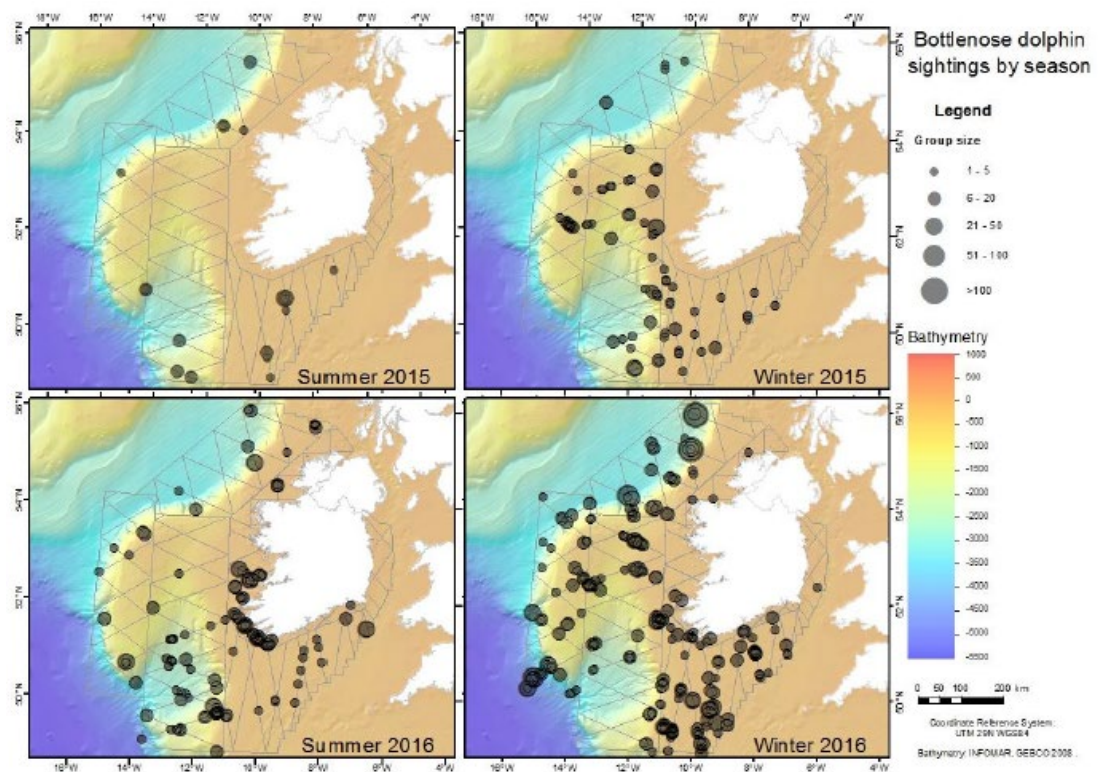
### 4.5.3 Bottlenose dolphin



This species has been recorded all around the Irish coast and is most often recorded close to land. In coastal waters, bottlenose dolphins favour river estuaries, headlands and sandbanks, mainly where there is uneven bottom relief and/or strong tidal currents. The species has also been recorded offshore, with low densities in St George’s Channel and the Celtic shelf and in the north eastern Irish Sea. There have been occasional sightings around the marine cable corridor (Table 4-1). Figure 4-6 shows that bottlenose dolphin are not common

near the marine cable corridor and are more likely to be located further south and at the continental shelf slope (Rogan et al. 2018).

**Figure 4-6 Sightings of bottlenose dolphin in the summer and winter of 2015 and 2016**



There are no SACs with bottlenose dolphin as their designated feature within Irish Waters. The species is protected within the Irish Sea MU within Welsh waters through the Cardigan Bay/Bae Ceredigion SAC, located approximately 160km from the marine cable corridor. Within the Welsh SACs and nearby areas, it has been reported that coastal sighting rates drop in late winter and early spring, but this may be a reflection of poorer weather conditions and observers watching the coast (Baines and Evans 2012). Aerial surveys in Cardigan Bay show a clear preference to offshore areas of the bay during the winter. In addition, there appears to be a northward shift in distribution in the last quarter of the year

that may suggest dispersal into the Irish Sea during the winter, and this is the period when largest group sizes (50-150 individuals) have been recorded in North Wales and in Manx waters (Baines and Evans 2012). It is possible that bottlenose dolphin maybe present in low numbers around the marine cable corridor as they disperse to the offshore area and move northwards in the winter.

## 4.6 Otter

The Eurasian Otter population in Ireland has remained relatively consistent over recent decades, with the most recent country-wide survey recording approximately 7800 breeding females, a number which was consistent with the previous baseline (Reid et al. 2013). The species has remained strong in Ireland when compared to other populations in the UK and Europe, with a high level of genetic diversity due to multiple colonisation events and a stable demographic history being thought to have helped the species continue to thrive in Ireland (Finnegan & O'Neill 2009). The National Otter Survey of Ireland 2010/12 provides the most recent information on the Irish otter population and the range of their habitat. The results of this survey determined that the stretch of coastline where the Havhingsten cable will make landfall is out of the current range of otters. As such the species has been assessed to not be found within the footprint of the cable corridor and will not be considered any further in this report.



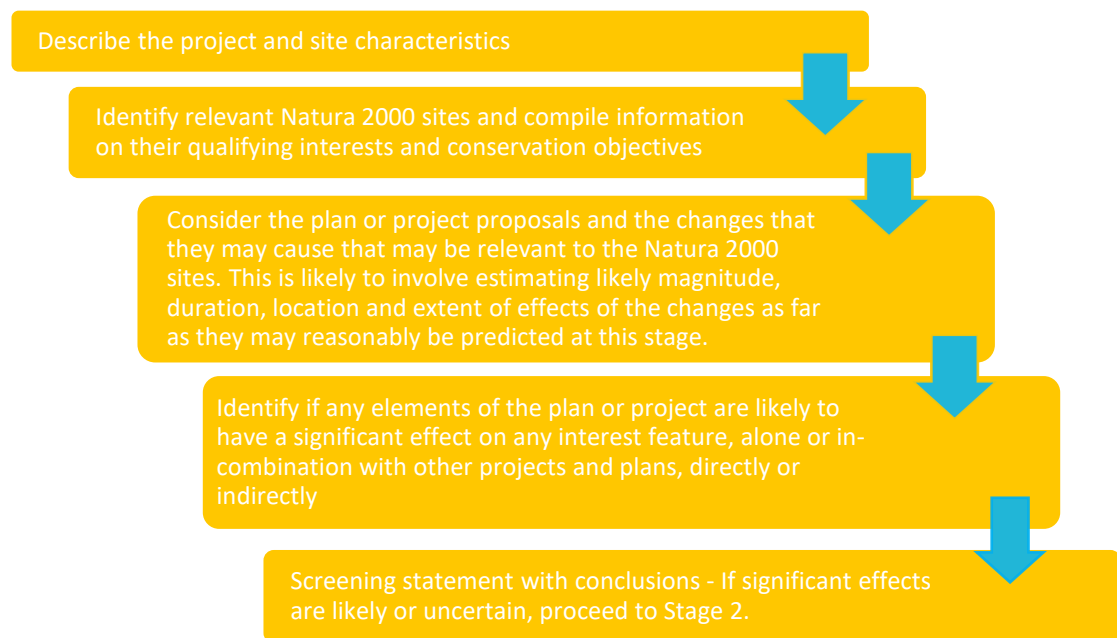
## 5. STAGE 1 – APPROPRIATE ASSESSMENT SCREENING

### 5.1 Assessment approach

This AA screening has been undertaken according to the process set out in the National Parks and Wildlife Service (NPWS) and DEHLG (2010) Guidance; following the process illustrated in Figure 5-1. It has taken into account all case law relevant to the Habitats Directive.

The structure for the remainder of this Section therefore reflects the key steps in this process.

**Figure 5-1 AA Screening**



### 5.2 Describe the project and site characteristics

A full description of the proposed installation and maintenance activities is provided in Section 2 of the Irish Planning Report. The site characteristics i.e. the baseline environment associated with this AA screening, is described in Section 4.

### 5.3 Identification of relevant Natura 2000 sites

The potential for a Natura 2000 site to be significantly affected depends on whether receptors which are Qualifying Interests of a Natura 2000 site:

- a. Can come into contact with the project; and
- b. Are sensitive to the project activities to the extent that the activity is likely to have an adverse effect on the conservation objectives for the features.

Identifying relevant Natura 2000 sites has therefore been achieved by applying the following steps:

1. Identify which receptors could be sensitive to the installation and maintenance activities (Section 5.3.1);
2. Identify the potential pressures the proposed installation and maintenance activities could have on these receptors and what the zone of influence for these receptors is, i.e. the spatial extent over which effects could extend (Section 5.3.2);
3. Using the zones of influence as a guide define a search area within which Natura 2000 sites are screened for the relevant qualifying interest feature (Section 5.3.2); and
4. Screen Natura 2000 sites within the defined search areas to identify designating features and assess whether Qualifying Interests of the site could be significantly affected by the proposed installation and maintenance activities (Section 5.3.3).

### 5.3.1 Identification of sensitive receptors

The receptors which could potentially be affected by the proposed installation and maintenance activities and could be the Qualifying Interests of Natura 2000 sites are:

- Intertidal and benthic habitats;
- Fish;
- Birds; and
- Marine mammals (cetacean, pinniped and otter).

A description of the existing baseline for these receptors is provided in Section 4 above.

### 5.3.2 Defining a search area (identification of potential pressures and zone of influence)

The OSPAR Intercessional Correspondence Group on Cumulative Effects (ICG-C) pressure list and descriptions (OSPAR Commission 2011) have been used to describe the potential pressures expected from the proposed installation and maintenance activities. Listed in Table 5-1, these potential pressures may be direct or indirect, temporary or permanent, beneficial or harmful to the site, or a combination of these. The zone of influence – spatial extent over which effects may be extend – has also been defined.

Repair and maintenance activities during the operational phase, where required, will result in similar pressures to those described in respect to installation activities, but on a smaller and more local scale. Therefore, they have been considered alongside installation pressures.

The zone of influence has been used to establish a search area within which Natura 2000 sites are screened for the relevant Qualifying Interests. Since mobile species from Natura 2000 sites further field may travel into the zone of influence, the zone of influence cannot be used alone as a distance to screen in relevant Natura 2000 sites. Therefore, search areas (distances from the project) for each receptor group have been applied taking into consideration other information such as marine mammal management units and expert judgement to use for the initial screening of sites. Justification for the spatial extent of the search area is provided in Table 5-1.

Table 5-2 identifies the pressures that have been scoped out of the Stage 1 Screening for AA and the reason for the exclusion. These pressures will not be discussed further.

**Table 5-1 Potential pressures, zones of influence and Natura 2000 search area**

Receptor	Phase	Potential Pressure	Aspect of the project	Zone of influence	Search area and justification
Habitats	Installation (including repair & maintenance)	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Seabed preparation, cable burial	10m wide	<b>100m from Application Area</b> Jetting and installation plough will result in a brief, localised sediment plume. Levels of suspended sediments will be within the range of natural variation experienced after winter storm events in the region. Sediments up to fine grain sand will be dispersed within 100m of the trenching activity, with the majority settling back within in the trench. While silt may be travel further distances, this will be highly dispersed and have a minimal settling depth and so will not significantly impact the receiving seabed.
			Anchor placement	0.78m (Worst case footprint of a 250kg mushroom anchor)	
		Siltation rate changes, including smothering (depth of vertical sediment overburden)	Seabed preparation, cable burial	30km (Worst case silt dispersion on a spring tide via jetting)	
Birds	Installation (including repair & maintenance)	Visual disturbance	Presence of installation/maintenance vessel	Radial distances: 10km – foraging distance for tern species where visual disturbance could occur. 4km divers and sea ducks+ 2km all other species+	<b>10km</b> Based on the mean foraging distance for tern species during the breeding season. Tern species may be visually disturbed within this zone during the breeding season (Thaxter et al. 2012)  It is recognised that some seabirds from other SPAs will forage and loaf in zone of influence. However, disturbance will be limited in extent and duration and there is sufficient space in the surrounding environment for birds to temporarily relocate. Therefore, only sites within 10km of the proposed installation and maintenance activities have been screened.
			Cable burial		
Fish	Installation (including repair & maintenance)	Underwater noise changes*	Continuous sound from cable installation and vessels	Temporary injury if within 50m radial distance	<b>10km</b> The highly conservative greatest zone of influence is 50m from the installation activities. There is limited potential that underwater noise changes could impede migration to and from rivers. Therefore, the search area has been extended to 10km.
Cetacean	Installation (including repair & maintenance)	Underwater noise changes*	Continuous sound from cable installation and vessels	Disturbance up to 130m radial distance	<b>Management Unit (MU)**</b> In recognition of the highly mobile nature of cetaceans the relevant species MU will define the search area.

Receptor	Phase	Potential Pressure	Aspect of the project	Zone of influence	Search area and justification
Pinniped	Installation (including repair & maintenance)	Underwater noise changes*	Continuous sound from cable installation and vessels	Disturbance up to 130m radial distance	<p><b>100km grey seal</b></p> <p>While the radial distance of the sound disturbance is to 130m from the installation and maintenance vessel, due to the possibility of seals from distant Natura 2000 sites foraging within the application area, these populations are included in the search area.</p> <p>It is estimated that grey seal forage up to 100km from their haul out sites (DECC 2016) and therefore animals within this distance could travel to the application area.</p> <p><b>50km harbour seal</b></p> <p>Harbour seal are not known to make trips greater than 50km from haul out sites (DECC 2016) and therefore animals within this distance could travel to the application area.</p>
		Visual disturbance	Presence of installation / maintenance vessel	900m (Brasseur & Reijnders,1994)	<p><b>900m from Application area</b></p> <p>Studies indicate human activities within this zone may cause seal to leave their haul out locations and return to the water. As haul out locations are static the zone of influence is the search area.</p>

\*Note: Zones of Influence for underwater noise changes have been taken from Irish Planning Report Technical Appendix G – Underwater Noise Assessment (Intertek 2019)

\*\* Most cetaceans are wide-ranging, and individuals encountered within Irish waters form part of a much larger biological population whose range extends into adjacent jurisdictions. As a result, MU’s have been outlined for seven of the common regularly occurring species following advice from the Sea Mammals Research Unit (DECC 2016) and the International Council for the Exploration of the Sea (ICES). These provide an indication of the spatial scales at which impacts of anthropogenic activities should be taken into consideration.

Based on the extent and potential consequences of seabird displacement from offshore wind farm developments published by the UK Joint Statutory Nature Conservation Bodies (JNCC 2017).

**Table 5-2 Pressures scoped out of the assessment and the reason for exclusion**

Pressure Screened Out of EIA	Receptor	Reason for Exclusion
Hydrocarbon and PAH contamination	All receptors	<p>Unplanned events (accidental oil or chemical spills) have been scoped out of the screening assessment for the following reasons:</p> <ul style="list-style-type: none"> <li>The likelihood of a large oil spill occurring from a project vessel is extremely low and the risk is no greater than that for any other vessel in the region.</li> <li>All project vessels will have control measures and shipboard oil pollution emergency plans (SOPEP) in place and will adhere to MARPOL Annex I requirements.</li> </ul> <p>A Construction Environmental Management Plan (CEMP) and an Emergency Spill Response Plan will be developed and implemented. Execution of these plans will ensure that the risks associated with an unplanned event will be effectively managed in line with relevant international and national statute.</p> <p>In addition, the cables have been routed to avoid disturbing historically contaminated sediments (e.g. domestic or industrial waste, munitions) in disposal sites. No contaminated sediments were identified by the benthic characterisation survey (Fugro 2019a). It is therefore unlikely that contaminated sediments will be re-suspended or disturbed during cable installation.</p>
Introduction or spread of non-indigenous species	Benthic habitats	<p>The introduction of invasive non-native species (e.g. through discharge of ballast water from project vessels) will be managed under the International Convention for the Control and Management of Ship's Ballast Water and Sediments. ASN as the installer will complete a biosecurity risk assessment. This would include factors such as origins of the vessels and ensuring that relevant equipment is cleaned before use. Implementation of this plan will reduce the pathways of effect and any effects will be Not Significant.</p>
Physical change (to another seabed type)	Benthic habitats	<p>No cable protection measures are required within any Natura 2000 sites within Irish waters, therefore no physical changes to the seabed will occur and this pressure has been screened out.</p>
Visual disturbance	Fish	<p>The pressure could occur during cable installation, as a result of the presence of the installation vessels and equipment (and associated noise) within the vicinity of operations. This could result in the displacement of fish within the water column. Fish will have reacted to underwater noise generated by project vessels before they react to the presence of the vessel. The disturbance from installation operations will be temporary, localised and not considered to be significant given existing background levels of noise and shipping in the Irish Sea.</p>
Siltation rate changes including smothering (depth of vertical sediment overburden)	Fish	<p>There are two pathways for species to be smothered as a result of siltation rate changes resulting from project activities: by displaced sediments during trenching and by the re-deposition of suspended sediment. The installation activities will increase the levels of suspended particular matter (SPM) in the water column. The magnitude of the increase will be dependent on the seabed conditions. Near the coast, where a major component of the sediment is silt, a plume of 4.3km could be briefly generated from the trench - similar to suspended sediment concentrations during a storm. This will cloud the water, but as sediments are not contaminated it will not have a detrimental effect on the environment, and water clarity will quickly return as the installation moves on and tidal currents dissipate the suspended sediments. Calculations indicate the concentrations will be within the range of natural variability expected for the region, will be limited in extent and brief in nature. A temporary reduction in the feeding capability of species relying on sight to locate their prey may occur. Most species are likely to be tolerant to any changes in turbidity levels (equivalent to those experienced during storm events) and the significance of the effect is Not Significant.</p>

Pressure Screened Out of EIA	Receptor	Reason for Exclusion
Changes in suspended solids (water clarity)	Fish	The suspension of sediments within the water column from cable installation may cause a brief, localised increase in turbidity before being re-deposited on the seabed. A temporary reduction in the feeding capability of species relying on sight to locate their prey may occur. The changes will be within natural levels of variation experienced after storm events in the region. Most species are likely to be tolerant to brief changes in turbidity levels and the significance of the effect will be negligible. Therefore, this pressure in relation to fish has been scoped out.
Death or injury by collision	Marine mammals Fish	Although shipping collision is a recognised cause of marine mammal and basking shark mortality worldwide, the key factor influencing the injury or mortality caused by collisions is ship size and speed. Ships travelling at 14 knots or faster are most likely to cause lethal or serious injuries. Although the presence of the cable lay vessels and support vessels will marginally increase the level of vessel activity within the area for the duration of the marine works, none of the project vessels will be travelling at speeds exceeding 14 knots. Cable lay vessels move along the cable route at the rate of cable installation, between 0.5 – 1.5 km /hr (approx. 0.27 – 0.81 knots) - depending on sediment conditions, resulting in a low likelihood of collision. Given that vessels will be operating at less than 14 knots, the pressure is not considered further.

### 5.3.3 Screening of Natura 2000 sites

A geographic information system (GIS) was used to map the boundaries of SACs and SPAs in relation to the proposed installation and maintenance activities. All Natura 2000 sites which are within the search areas outlined in Table 5-1 have been screened for relevant Qualifying Interests. There are no candidate SACs (cSACs) within the search area.

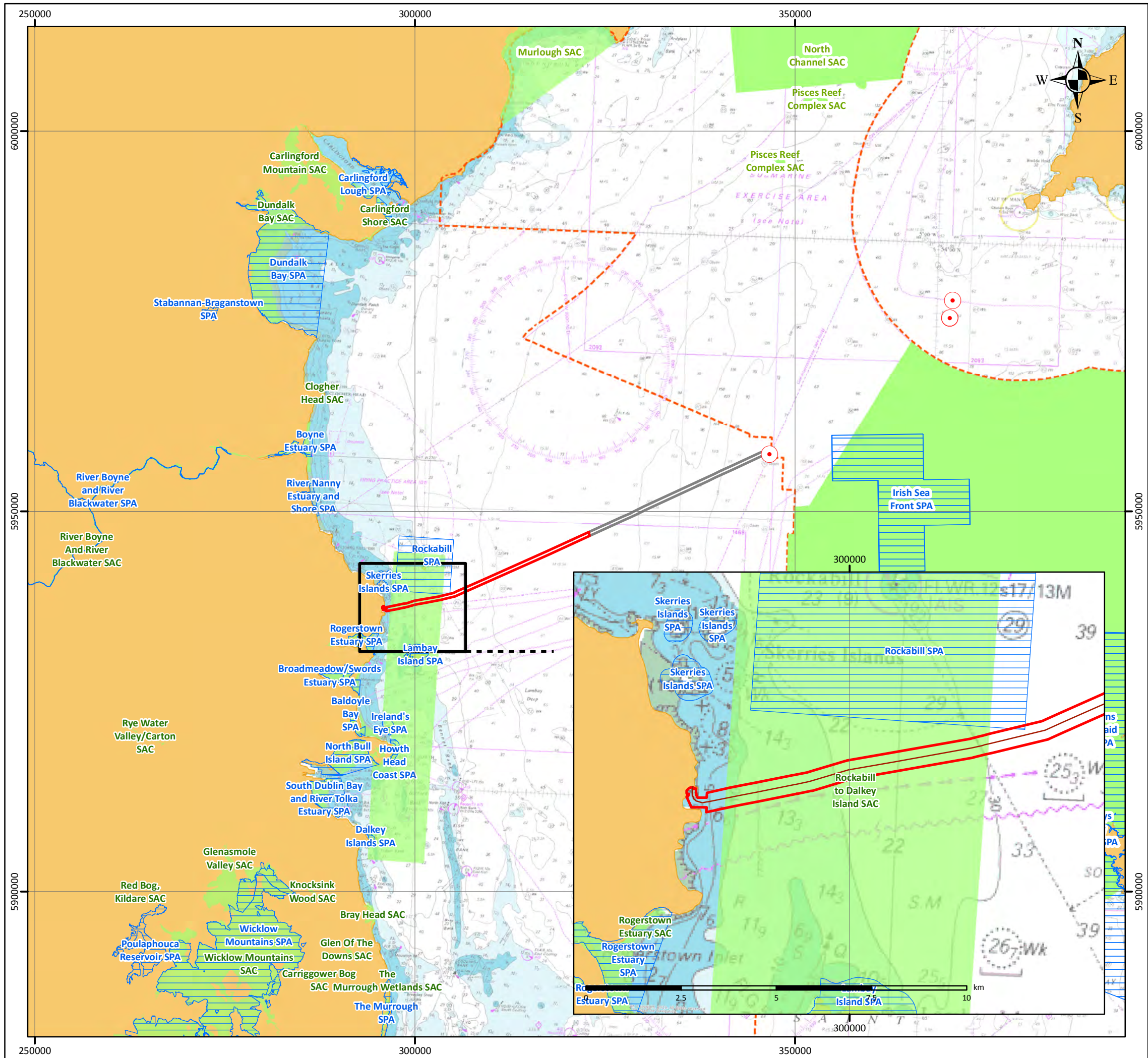
A total of 17 sites were screened in this assessment and are shown in Table 5-3 and Figure 5-2 (Drawing P2228-PROT-002).

For each site it was determined whether there is the potential for an interaction between the proposed installation and maintenance activities and the Qualifying Interest i.e. whether there is a pressure-receptor pathway. This is determined by comparing information such as the zone of influence with information regarding the Qualifying Interest e.g. species foraging distances, spatial extent of habitats etc. The interactions were defined as follows:

- Possible: A pathway between the proposed installation and maintenance activities and the qualifying interest feature can be identified that is likely to result in an effect; or
- Unlikely: Either a pathway between the proposed installation and maintenance activities and the Qualifying Interest cannot be identified; or a pathway exists but there is no physical overlap of the pressure and the Qualifying Interest ; or no pressure-receptor pathway can be established.

For all Qualifying Interests where it is determined that there is a possible interaction, the likely significance of the effect is assessed in light of the conservation objectives for the site in Section 6.

For all Qualifying Interests where it is determined that it is unlikely there is an interaction, the Qualifying Interest has been screened out from further assessment.



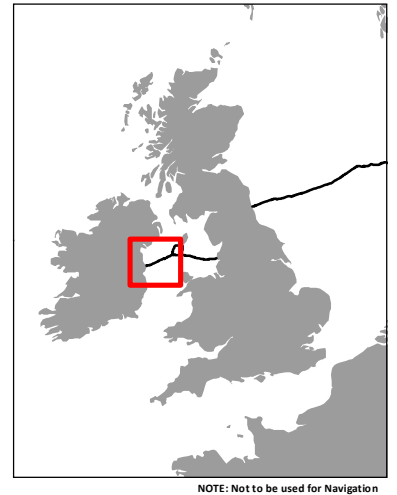
# HAVINGSTEN TELECOMMUNICATIONS CABLE PROTECTED SITES Republic of Ireland Route

Drawing No: P2228-PROT-002

A

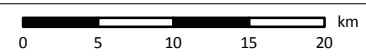
## Legend

- Crossing Location
- Proposed Development
- Irish Offshore
- Median Line
- Environmental Designations**
- SAC
- SPA



NOTE: Not to be used for Navigation

Date	Tuesday, August 13, 2019 15:22:19
Projection	WGS_1984_UTM_Zone_30N
Spheroid	WGS_1984
Datum	D_WGS_1984
Data Source	NPWS; DAERA; CDA; MarineFind; ASN
File Reference	J:\P2228\Mxd\07_PROT\ P2228-PROT-002.mxd
Created By	Chris Goode
Reviewed By	Emma Langley
Approved By	Paula Daghish



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 Contains data from UKOGG; Charts from MarineFind.co.uk © Crown Copyright, 2015. All rights reserved. Licence No: EK001-1001-WE8105. Not to be used for Navigation.



**Table 5-3 Initial screening of relevant Natura 2000 sites**

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
Rockabil to Dalkey Island SAC [IE003000]	<b>Annex I habitat:</b> Reefs <ul style="list-style-type: none"> <li>Intertidal reef complex</li> <li>Subtidal reef complex</li> </ul>	Within	Penetration and/or disturbance including abrasion	<b>Unlikely:</b> The location of reef habitat has not been identified within the installation corridor during marine survey or review of Conservation Objective site maps. Should reef subsequently be identified, the cable will be micro-routed within the corridor to avoid reef areas through this protected site.	Screened OUT
			Siltation rate changes	<b>Unlikely:</b> Seabed preparation and cable burial will cause a brief, localised increase in suspended sediment in the water column with subsequent re-deposition of sediment on surrounding habitats. Sessile and less mobile epifauna and infauna in surface sediments are most likely to be affected.  Coarser sediments from the cable installation and maintenance activities will be deposited close to the cable route (within 107m).  Low levels of fine sediments (up to 10.42mg/L) disturbed during cable installation will dispersed up to 30km from the installation corridor in a worst-case scenario and will be deposited as a fine veneer over a wide area. The depth of sediment deposits will be within background levels associated with water clarity changes during stormy conditions within the area and will not have any adverse effects to habitats.	Screened OUT
	<b>Annex II species:</b> <ul style="list-style-type: none"> <li>Harbour porpoise (<i>Phocoena phocoena</i>)</li> </ul>		Underwater noise changes	<b>Possible:</b> Harbour porpoise from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.	Screened IN
Rockabil SPA [IE004014]	<b>Annex I species (breeding):</b> <ul style="list-style-type: none"> <li>Roseate tern (<i>Sterna dougallii</i>)</li> <li>Common tern (<i>Sterna hirundo</i>)</li> <li>Arctic tern (<i>Sterna paradisaea</i>)</li> </ul>	Within	Visual disturbance	<b>Possible:</b> Breeding tern species are likely to be foraging within the marine cable corridor, particularly in the shallow areas at the landing site.	Screened IN

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
	<b>All-Ireland Importance overwinter:</b> <ul style="list-style-type: none"> <li>Purple Sandpiper (<i>Calidris maritima</i>)</li> </ul>			<b>Unlikely:</b> Purple sandpiper is a wader which use intertidal areas for foraging. They will not use the offshore marine cable corridor. Low tide bird count data for Loughshinny landing site indicate the intertidal area is not of high importance to overwintering wading birds (BirdWatch Ireland 2019). Combined with the limited time that installation activities will occur within the intertidal area (up to 7 days), it is unlikely that installation activities will have a significant effect on foraging purple sandpiper.	Screened OUT
Skerries Islands SPA [IE004122]	<b>Nationally important breeding colony:</b> <ul style="list-style-type: none"> <li>Great cormorant (<i>Phalacrocorax carbo</i>)</li> <li>European shag (<i>Phalacrocorax aristotelis</i>)</li> </ul>	2.28	Visual disturbance	<b>Possible:</b> It is likely that the proposed installation and maintenance area may provide foraging habitat for breeding birds close to their colonies.	Screened IN
	<b>Internationally important population overwinter:</b> <ul style="list-style-type: none"> <li>Light-bellied Brent goose (<i>Branta bernicla hrota</i>)</li> </ul> <b>All-Ireland Important populations overwinter:</b> <ul style="list-style-type: none"> <li>Purple sandpiper (<i>Calidris maritima</i>)</li> <li>Ruddy turnstone (<i>Arenaria interpres</i>)</li> <li>European herring gull (<i>Larus argentatus</i>)</li> </ul>		Visual disturbance	<b>Unlikely:</b> Overwintering migratory waterfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging). Low tide bird count data for Loughshinny landing site indicate the intertidal area is not of high importance to overwintering wading birds (I-WeBS 2019).  The zone of influence for herring gull is 2km. Given the distance to the site, herring gull within the site will not experience visual disturbance. Although some of birds may be observed feeding and loafing in the application area, they will be able to forage over the wider area and therefore will be unaffected.	Screened OUT
Rogerstown Estuary SPA [IE004015]	<b>Internationally important population:</b> <ul style="list-style-type: none"> <li>Light-bellied Brent goose (<i>Branta bernicla hrota</i>)</li> </ul> <b>All-Ireland Importance overwinter:</b> <ul style="list-style-type: none"> <li>Red knot (<i>Calidris canutus</i>)</li> <li>Common shelduck (<i>Tadorna tadorna</i>)</li> <li>Grey plover (<i>Pluvialis squatarola</i>)</li> <li>Greylag goose (<i>Anser anser</i>)</li> </ul>	2.74	Visual disturbance	<b>Unlikely:</b> Overwintering migratory waterfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging).  Low tide bird count data for Loughshinny landing site indicate the intertidal area is not of high importance to overwintering wading birds (I-WeBS 2019).	Screened OUT

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
	<ul style="list-style-type: none"> <li>▪ Northern shoveler (<i>Anas clypeata</i>)</li> <li>▪ Eurasian oystercatcher (<i>Haematopus ostralegus</i>)</li> <li>▪ Common ringed plover (<i>Charadrius hiaticula</i>)</li> <li>▪ Dunlin (<i>Calidris alpina</i>)</li> <li>▪ Black-tailed godwit (<i>Limosa limosa</i>)</li> <li>▪ Common redshank (<i>Tringa totanus</i>)</li> </ul> Wetland of importance Important waterbird assemblage				
Rogerstown Estuary SAC [IE000208]	<b>Annex I habitat:</b> <ul style="list-style-type: none"> <li>▪ Estuaries</li> <li>▪ Mudflats and sandflats not covered by seawater at low tide</li> </ul>	2.82	Siltation rate changes	<b>Unlikely:</b> Coarser sediments from the cable installation and maintenance activities will be deposited close to the cable route (within 107m).  Low levels of fine sediments (up to 10.42mg/L) disturbed during cable installation will dispersed up to 30km from the installation corridor in a worst-case scenario and will be deposited as a fine veneer over a wide area. The depth of sediment deposits will be within background levels associated with water clarity changes during stormy conditions within the area and will not have any adverse effects to habitats.	<b>Screened OUT</b>
	<ul style="list-style-type: none"> <li>▪ Salicornia and other annuals colonising mud and sand</li> <li>▪ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</li> <li>▪ Mediterranean salt meadows (<i>Juncetalia maritimi</i>)</li> <li>▪ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (European marram grass)</li> </ul> Fixed coastal dunes with herbaceous vegetation (grey dunes)		No pressure-receptor pathway identified	<b>Unlikely:</b> The proposed installation and maintenance activities will not interact with these features.	<b>Screened OUT</b>
Lambay Island SPA [IE004069]	<b>Internationally important breeding populations:</b> <ul style="list-style-type: none"> <li>▪ Great cormorant (<i>Phalacrocorax carbo</i>)</li> </ul>	4.9	Visual disturbance	<b>Unlikely:</b>	<b>Screened OUT</b>

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
	<ul style="list-style-type: none"> <li>European shag (<i>Phalacrocorax aristotelis</i>)</li> <li>Common guillemot (<i>Uria aalge</i>)</li> <li>Razorbill (<i>Alca torda</i>)</li> </ul> <p><b>All-Ireland Importance breeding populations:</b></p> <ul style="list-style-type: none"> <li>Northern fulmar (<i>Fulmarus glacialis</i>)</li> <li>European herring gull (<i>Larus argentatus</i>)</li> <li>Lesser black-backed gull (<i>Larus fuscus</i>)</li> <li>Black-legged kittiwake (<i>Rissa tridactyla</i>)</li> <li>Atlantic puffin (<i>Fratercula arctica</i>)</li> </ul>			<p>Diving birds (e.g. Great cormorant, European shag) are classed as sensitive if within 4km of the proposed installation and maintenance activities (JNCC 2017). Given the distance to the site birds may be observed feeding and loafing in the application area but they will be able to forage over the wider area and therefore will be unaffected.</p> <p>The proposed installation and maintenance activities are unlikely to significantly displace breeding seabirds that may be foraging in the area.</p>	
	<p><b>Nationally important wintering:</b></p> <ul style="list-style-type: none"> <li>Greylag goose (<i>Anser anser</i>)</li> </ul>		Visual disturbance	<p><b>Unlikely:</b></p> <p>Overwintering migratory wildfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging).</p> <p>Birds may pass by the installation activities if moving between SPA sites, however the installation activities will not create a barrier to movement and migration. Bird count data for Loughshinny landing site indicate the area is not of high importance for greylag goose, with no individuals being recorded at the site between the winter of 2011/12 and 2015/16 (I-WeBS 2019).</p>	Screened OUT
Lambay Island SAC [IE000204]	<p><b>Annex I habitat:</b></p> <p><b>Reef</b></p> <ul style="list-style-type: none"> <li>Intertidal reef community complex</li> <li><i>Laminaria</i>-dominated community complex</li> </ul>	5.33	No pressure-receptor pathway identified	<p><b>Unlikely:</b></p> <p>The proposed installation and maintenance activities will not interact with these features.</p>	Screened OUT
	<p><b>Annex II species:</b></p> <ul style="list-style-type: none"> <li>Grey seal (<i>Halichoerus grypus</i>)</li> <li>Harbour seal (<i>Phoca vitulina</i>)</li> </ul>		Underwater noise changes	<p><b>Possible:</b></p> <p>Seal species are likely to be foraging or travelling past the marine cable installation area.</p>	Screened IN
North Anglesey Marine SAC [UK0030398]	<p><b>Annex II species that are a primary reason for selection of this site:</b></p> <ul style="list-style-type: none"> <li>Harbour porpoise (<i>Phocoena phocoena</i>)</li> </ul>	7	Underwater noise changes	<p><b>Possible:</b></p> <p>Harbour porpoise from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.</p>	Screened IN

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
Malahide Estuary SPA [IE004025]	<p><b>Annex I species overwinter:</b></p> <ul style="list-style-type: none"> <li>European golden plover (<i>Pluvialis apricaria</i>)</li> <li>Bar-tailed godwit (<i>Limosa lapponica</i>)</li> </ul> <p><b>All-Ireland Importance overwintering species:</b></p> <ul style="list-style-type: none"> <li>Great crested grebe (<i>Podiceps cristatus</i>)</li> <li>Common shelduck (<i>Tadorna tadorna</i>)</li> <li>Northern pintail (<i>Anas acuta</i>)</li> <li>Common goldeneye (<i>Bucephala clangula</i>)</li> <li>Red-breasted merganser (<i>Mergus serrator</i>)</li> <li>Eurasian oystercatcher (<i>Haematopus ostralegus</i>)</li> <li>Grey plover (<i>Pluvialis squatarola</i>)</li> <li>Red knot (<i>Calidris canutus</i>)</li> <li>Dunlin (<i>Calidris alpina</i>)</li> <li>Black-tailed godwit (<i>Limosa limosa</i>)</li> <li>Redshank (<i>Tringa totanus</i>)</li> </ul> <p>Wetland of importance Important waterbird assemblage</p>	7.56	Visual disturbance	<p><b>Unlikely:</b></p> <p>Overwintering migratory waterfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging).</p> <p>Birds may pass by the installation activities if moving between SPA sites, however the installation activities will not create a barrier to movement and migration. Bird count data for Loughshinny landing site indicate the area is not of high importance to overwintering wading birds or most wildfowl (BirdWatch Ireland 2019).</p>	Screened OUT
	<p><b>Internationally important overwintering population:</b></p> <ul style="list-style-type: none"> <li>Light-bellied Brent goose (<i>Branta bernicla hrota</i>)</li> </ul>			<p><b>Possible:</b></p> <p>Light-bellied Brent goose have been recorded at the Loughshinny landfall site in previous winters in high numbers, with a mean of 86 individuals between the winters of 2011/12 to 2015/16 (BirdWatch Ireland 2019). As such, there is potential for installation works to have a disturbance effect on the species which may be foraging from this site</p>	Screened IN

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
Baldoyle Bay SPA [IE 004016]	<b>Annex I species overwinter:</b> <ul style="list-style-type: none"> <li>Bar-tailed godwit (<i>Limosa lapponica</i>)</li> <li>European golden plover (<i>Pluvialis apricaria</i>)</li> </ul> <b>All-Ireland Importance overwintering species:</b> <ul style="list-style-type: none"> <li>Common ringed plover (<i>Charadrius hiaticula</i>)</li> <li>Common shelduck (<i>Tadorna tadorna</i>)</li> <li>Grey plover (<i>Pluvialis squatarola</i>)</li> </ul> Wetland of importance Important waterbird assemblage	14.09	Visual disturbance	<b>Unlikely:</b> Overwintering migratory waterfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging).  Birds may pass by the installation activities if moving between SPA sites, however the installation activities will not create a barrier to movement and migration. Bird count data for Loughshinny landing site indicate the area is not of high importance to overwintering wading birds and most wildfowl (BirdWatch Ireland 2019).	Screened OUT
	<b>Biogeographic importance:</b> <ul style="list-style-type: none"> <li>Light-bellied Brent goose (<i>Branta bernicla hrota</i>)</li> </ul>			<b>Possible:</b> Light-bellied Brent goose have been recorded at the Loughshinny landfall site in previous winters in significant numbers, with a mean of 86 individuals between the winters of 2011/12 to 2015/16 (BirdWatch Ireland 2019). As such, there is potential for installation works to have a disturbance effect on the species which may be foraging from this site.	Screened IN
Ireland's Eye SPA [IE 004117]	<b>Species of all-Ireland importance during the breeding season:</b> <ul style="list-style-type: none"> <li>Great cormorant (<i>Phalacrocorax carbo</i>)</li> <li>European herring gull (<i>Larus argentatus</i>)</li> <li>Black-legged kittiwake (<i>Rissa tridactyla</i>)</li> <li>Common guillemot (<i>Uria aalge</i>)</li> <li>Razorbill (<i>Alca torda</i>)</li> </ul>	14.26	Visual disturbance	<b>Unlikely:</b> Diving birds (e.g. great cormorant) are classed as sensitive if within 4km of the proposed installation and maintenance activities. Given the distance to the site birds may be observed feeding and loafing in the application area but they will be able to forage over the wider area and therefore will be unaffected.  The proposed installation and maintenance activities are unlikely to significantly displace breeding seabirds that may be foraging in the area.	Screened OUT
River Nanny Estuary and Shore SPA [IE 004158]	<b>Annex II species overwinter:</b> <ul style="list-style-type: none"> <li>Eurasian oystercatcher (<i>Haematopus ostralegus</i>)</li> <li>Common ringed plover (<i>Charadrius hiaticula</i>)</li> <li>European golden plover (<i>Pluvialis apricaria</i>)</li> <li>Red knot (<i>Calidris canutus</i>)</li> </ul>	14.58	Visual disturbance	<b>Unlikely:</b> Overwintering migratory waterfowl are unlikely to be foraging within the offshore marine cable corridor (preferring intertidal areas for foraging).  Bird count data for Loughshinny landing site indicate the area is not of high importance to overwintering wading birds (BirdWatch Ireland 2019).	Screened OUT

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
	<ul style="list-style-type: none"> <li>Sanderling (<i>Calidris alba</i>)</li> <li>European herring gull (<i>Larus argentatus</i>)</li> <li>Wetland and Waterbirds</li> </ul>			<p>The zone of influence for herring gull is 2km. Given the distance to the site, herring gull within the site will not experience visual disturbance. Although some of birds may be observed feeding and loafing in the application area they will be able to forage over the wider area and therefore will be unaffected.</p> <p>Birds may pass by the installation activities if moving between SPA sites, however the installation activities will not create a barrier to movement and migration.</p>	
West Wales Marine SAC [UK0030397]	<p><b>Annex II species that are a primary reason for selection of this site:</b></p> <ul style="list-style-type: none"> <li>Harbour porpoise (<i>Phocoena phocoena</i>)</li> </ul>	99.3	Underwater noise changes	<p><b>Possible:</b></p> <p>Harbour porpoise from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.</p>	<b>Screened IN</b>
Llein Peninsula and the Sarnau SAC [UK0013117]	<ul style="list-style-type: none"> <li>Annex I habitats that are a primary reason for selection of this site:</li> <li>Sandbanks which are slightly covered by sea water all the time</li> <li>Estuaries</li> <li>Coastal lagoons</li> <li>Large shallow inlets and bays</li> <li>Reefs</li> <li>Mudflats and sandflats not covered by seawater at low tide</li> <li>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</li> <li>Submerged or partially submerged sea caves</li> <li>Salicornia and other annuals colonizing mud and sand.</li> </ul>	102.4	No pressure-receptor pathway identified	<p><b>Unlikely:</b></p> <p>The proposed installation and maintenance activities will not interact with these features.</p>	<b>Screened OUT</b>
	<p><b>Annex II species present as a qualifying feature, but not a primary reason for site selection:</b></p> <ul style="list-style-type: none"> <li>Bottlenose dolphin (<i>Tursiops truncatus</i>)</li> </ul>		Underwater noise changes	<p><b>Possible:</b></p> <p>The proposed installation and maintenance activities are within the MU for Bottlenose dolphin therefore it is possible that this species may be within the marine cable corridor.</p>	<b>Screened IN</b>

Site Name and code	Designating features	Distance (km)	Potential Pressure	Likelihood for interaction between installation and maintenance works and receptor	Conclusion
	<ul style="list-style-type: none"> <li>Eurasian otter (<i>Lutra lutra</i>)</li> </ul>		No pressure-receptor pathway identified	<b>Unlikely:</b> The proposed installation and maintenance activities will not interact with this feature.	Screened OUT
	<ul style="list-style-type: none"> <li>Grey seal (<i>Halichoerus grypus</i>)</li> </ul>		No pressure-receptor pathway identified	<b>Unlikely:</b> The proposed installation and maintenance activities will not interact with this feature as the application area is beyond the foraging range for grey seal from this site.	Screened OUT
North Channel SAC [UK0030399]	<b>Annex II species that are a primary reason for selection of this site:</b> <ul style="list-style-type: none"> <li>Harbour porpoise (<i>Phocoena phocoena</i>)</li> </ul>	60.9	Underwater noise changes	<b>Possible:</b> Harbour porpoise from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.	Screened IN
Cardigan Bay SAC [UK0012712]	<b>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</b> <ul style="list-style-type: none"> <li>Sandbanks which are slightly covered by sea water all the time</li> <li>Reefs</li> <li>Submerged or partially submerged sea caves</li> </ul>	160	No pressure-receptor pathway identified	<b>Unlikely:</b> The proposed installation and maintenance activities will not interact with these features.	Screened OUT
	<b>Annex II species that are a primary reason for selection of this site:</b> <ul style="list-style-type: none"> <li>Bottlenose dolphin (<i>Tursiops truncatus</i>)</li> </ul>		Underwater noise changes	<b>Possible:</b> Bottlenose dolphin from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.	Screened IN
	<b>Annex II species present as a qualifying feature, but not a primary reason for site selection:</b> <ul style="list-style-type: none"> <li>Sea lamprey (<i>Petromyzon marinus</i>)</li> <li>River lamprey (<i>Lampetra fluviatilis</i>)</li> <li>Grey seal (<i>Halichoerus grypus</i>)</li> </ul>		No pressure-receptor pathway identified	<b>Unlikely:</b> The proposed installation and maintenance activities will not interact with these features. The application area is beyond the foraging range for grey seal from this site.	Screened OUT
Bristol Channel SAC [UK0030396]	<b>Annex II species that are a primary reason for selection of this site:</b> <ul style="list-style-type: none"> <li>Harbour porpoise (<i>Phocoena phocoena</i>)</li> </ul>	222	Underwater noise changes	<b>Possible:</b> Harbour porpoise from this SAC are likely to range across the Celtic and Irish Seas MU and be within the marine cable route corridor.	Screened IN



## 5.4 Assessment of likely significant effects (LSE)

A likely significant effect is defined as one that cannot be ruled out on the basis of objective information. The test is a ‘likelihood’ of effects rather than a ‘certainty’ of effects. Where the proposed installation and maintenance activities are likely to undermine the site’s conservation objectives, it must be considered likely to have a significant effect on the site. The assessment of that risk must be made in the light, amongst other things, of the characteristics and specific environmental conditions of the site concerned. If Table 5-3 identified that an interaction between the proposed installation and maintenance activities and the Qualifying Interest is possible, the potential for a likely significant effect on the conservation objectives has been considered in the sections below.

Table 5-4 provides a summary of the pressure-receptor pathways that have been identified in Table 5-3 for further assessment.

**Table 5-4 Summary of sites screened for possible likely significant effects**

Site Name	Distance to Site (km)	Designating Feature effected	Potential Pressure on site from proposed activities
Rockabill to Dalkey Island SAC	Within corridor	Harbour porpoise	Underwater noise changes
Rockabill SPA	Within corridor	Breeding tern species	Visual disturbance
Skerries Islands SPA	2.28	Breeding seabird species	Visual disturbance
Baldoyle Bay SPA	14.09	Light-bellied Brent goose	Visual disturbance
Malahide Estuary SPA	14.09	Light-bellied Brent goose	Visual disturbance
Lambay Island SAC	5.33	Pinniped species	Underwater noise changes
North Anglesey Marine SAC	7	Harbour porpoise	Underwater noise changes
West Wales Marine SAC	99.3	Harbour porpoise	Underwater noise changes
Llein Peninsula and the Sarnau SAC	102.4	Bottlenose dolphin	Underwater noise changes
North Channel SAC	60.9	Harbour porpoise	Underwater noise changes
Cardigan Bay SAC	160	Bottlenose dolphin	Underwater noise changes
Bristol Channel SAC	222	Harbour porpoise	Underwater noise changes

Table 5-4 identifies that there are two pressures from the proposed installation and maintenance activities that could impact the Qualifying Interests of Natura 2000 sites. These are:

- Visual disturbance; and
- Underwater sound changes.

This section describes these pressures and potential effects and assesses the likely significant effect of the proposed installation and maintenance activities on the conservation objectives of the Natura 2000 sites.

### 5.4.2 Visual Disturbance

The sites identified during the screening process as having Qualifying Interests which may be sensitive to visual disturbance from the proposed activities are: Rockabill SPA, Skerries Islands SPA, Baldoyle Bay SPA and Malahide Estuary SPA.

The most vulnerable birds to disturbance are those within the zone of influence of the installation or maintenance operations. Birds may take evasive action, but a single disturbance event does not have any immediate effect on the survival or productivity of an individual bird. Repeated disturbance, or disturbance over an extended period of time, can affect survival and productivity (Valente and Fischer 2011).

The extent to which a seabird responds to disturbance is dependent upon factors including period of breeding cycle during which disturbance occurs; duration, type and intensity of the disturbance; presence of opportunistic predators; and the degree of habituation with the disturbance (Showler et al. 2010). Some seabirds are more resilient to disturbance than others.

Prolonged disturbance at the nest site could result in impaired breeding, disruption to incubation, increased nest failures due to predation and nest abandonment (Valente et al. 2011). These factors could affect the demographic characteristics of the population.

Repeated or prolonged disturbance within breeding bird foraging zones may result in reduced opportunities for catching prey items, nesting success and chick production.

The cable installation operations are planned to commence from November 2019, however if significant weather occurs it is possible that the works could be postponed until spring 2020 in the worst case; therefore, it is possible that breeding and nesting birds, as well as loafing birds offshore, may be present and disturbed by the presence of the installation or maintenance vessels close to the coast. The cable installation within Irish territorial waters (landfall to 12nm) measures approximately 29.8km. The duration of cable installation within Irish territorial waters will be up to 4 days (depending on weather conditions).

#### 5.4.2.1 Rockabill SPA

##### **Conservation objectives**

To maintain the favourable conservation condition of purple sandpiper in Rockabill SPA, which is defined by the following list of attributes and targets (NPWS 2013a):

- Population trend – Percentage change – stable or increasing.
- Distribution – no significant decrease to range, timing and intensity of use of areas by purple sandpiper.

To maintain the favourable conservation condition of Roseate tern, common tern and Arctic tern in Rockabill SPA, which is defined by the following list of attributes and targets:

- No significant decline to breeding population abundance (number of apparently occupied nests (AON)).
- No significant decline to fledged young per breeding pair.
- No significant decline to the number, location and area of breeding colonies.
- No significant decline to prey biomass available.
- No significant increase in the number, location, shape or area of barriers to connectivity.
- No adverse effects to population from human activities during the breeding season.

##### **Assessment against conservation objectives**

The Rockabill SPA has been designated for purple sandpiper (approximately 48 individuals) and its nesting and breeding populations of internationally important Roseate tern (554 pairs), nationally important common tern (351 pairs) and Arctic tern (49 pairs) on Rockabill Island. The island is located 3.8km from the proposed installation and maintenance activities at the closest point.

Purple sandpiper is highly faithful to their overwintering site and at high tide show a strong preference for tidal rocky shores. As a wading bird is unlikely to be foraging within the marine cable corridor. The low tide count data (BirdWatch Ireland 2019) confirms that the cable landing site at Loughshinny is not of primary importance to this species. As such, there will be no adverse effect on the purple sandpiper population trends for the site or any significant decrease to the range, timing or intensity of the areas utilised by the species, ensuring the conservation objectives of the species are not affected.

The seas surrounding the islands, to a distance of 3.5km, is included within the SPA boundary to protect the foraging resource of the internationally important roseate tern population (NPWS 2014b). The application area crosses approximately 694m of this site at the south eastern boundary. Tern species may forage up to 10km from their nest site at Rockabill Island, therefore the installation area is within the zone of influence for visual effects to foraging seabirds from Rockabill SPA.

The installation and maintenance activities will be a slow-moving, temporary activity progressing across the territorial waters between 0.5–1.0km/hour, subject to seabed type, burial depth and weather. Based on the installation speeds it is anticipated that the works will be within 10km of the tern breeding locations for approximately 24 hours. This disturbance is therefore not prolonged or repetitive. Additionally, EMODNnet data for the seas within the site indicate that vessel density is on average 5 hours per month at points, with peaks of 20 hours per month during the summer months coinciding with the breeding season (EMODnet 2019). As such it is likely that the breeding terns will already be habituated to a low level of shipping activity.

These factors, combined with the fact that the tern species have a foraging range within a radius surrounding Rockabill island as opposed to coastal nest sites with a restricted seaward range, means that the terns will only be briefly disturbed for a small area of their total foraging range. This will ensure that no significant declines in the breeding population abundance, fledged young per breeding pairs or available prey biomass will occur. The limited spatial and temporal extent of the installation and maintenance activities will also ensure that there will not be a significant increase in the number, location, shape or area of barriers to connectivity for the resident tern species, or any adverse effects on the breeding terns during their breeding season. Birds will be able to utilise the waters again once the installation and maintenance activities have moved on ensuring no change in the range of the birds available foraging area will occur.

Due to the distance from the breeding colony itself (3.8km), installation and maintenance activities will not disturb the breeding birds in their nests, ensuring there will not be a significant decline in the number, location and area of breeding colonies.

As such, installation and maintenance activities are not expected to significantly affect breeding and nesting tern populations of the Rockabill Island SPA and the conservation objectives of the site will be unaffected.

**Screening Conclusion: No likely significant effects. AA is not required**

#### 5.4.2.2 Skerries Islands SPA

##### **Conservation objectives**

To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and

- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

#### **Assessment against conservation objectives**

The Skerries Islands SPA has been designated for internationally important population of breeding cormorant (558 pairs) and a nationally important populations of shag (100 pairs) on St Patrick's Island.

The SPA is located approximately 2.26km from the proposed installation and maintenance activities and therefore is within the zone of influence for visual disturbance to diving birds. Great cormorant and European shag may forage up to 5.2km and 5.9km respectively from their nesting sites (Thaxter et al. 2012) indicating that the proposed installation is within a zone that may provide foraging habitat for breeding birds close to their colonies. As the SPA is centred on an island there is a radius of foraging habitat surrounding the nesting sites. The installation vessels will be within great cormorant and European shag foraging zones of influence (5.2km and 5.9km respectively (Thaxter et al 2012)) for up to 12 hours. As the installation vessel is slow moving and continually progressing for a short duration, the presence of the installation vessels will not be significant within an area which has existing levels of moderate shipping activity, with an average of 5 hours per month of vessel activity at points within the site (EMODnet 2019). The installation and maintenance activities are a temporary event and will not significantly reduce the feeding opportunities or natural range of great cormorant and European shag both during the installation and maintenance activities and for the foreseeable future.

The proposed installation activities will restore the intertidal area and beach profile following installation. No loss of seabed sediment or foraging habitat will occur, with installation activities within the intertidal being short term (up to 10 days). Therefore, there will be no reduction in available habitat for both species on a long-term basis.

As such, installation and maintenance activities are not expected to reduce the range or effect the population dynamics of either cormorant or shag breeding pairs located on and surrounding Patrick's Island, ensuring the conservation objectives for the site are maintained.

**Screening Conclusion: No likely significant effects. AA is not required.**

#### 5.4.2.3 Baldoyle Bay SPA and Malahide Estuary SPA

These sites are being assessed together as they share the same Qualifying Interest.

#### **Conservation Objectives**

To maintain the favourable conservation condition of Light-bellied Brent Goose in Baldoyle Bay SPA and Malahide Estuary SPA, which are defined by the following list of attributes and targets:

- Population trend – Percentage change – long term population trend stable or increasing
- Distribution – Range, timing and intensity if use of areas - No significant decrease in the range, timing and intensity of use of areas by light-bellied Brent goose, other than that occurring from natural patterns of variation.

#### **Assessment against conservation objectives**

Both of these sites support internationally important populations of light-bellied Brent goose, with Baldoyle Bay SPA being home to 726 individuals and Malahide Estuary SPA featuring 1104 individuals (5% of the all-Ireland total) (NPWS 2013c, 2014a). While these sites fall outside the 2km range of direct visual disturbance of the installation activities, they lie within 10km of the cable corridor, with individuals from these sites potentially utilising the intertidal area at Loughshinny beach.

Between the winters of 2011/12 to 2015/16 a mean of 86 individuals were recorded at Loughshinny – Rush North Beach, making the species on average the 7<sup>th</sup> most abundant at the site during the winter months (BirdWatch Ireland 2019). There is therefore the potential for cable landing installation activities to disturb visiting light-bellied Brent goose. The peak count of light bellied Brent goose

during the winter is during January when their numbers appear to more than double counts for the remainder of the winter however, birds are present in low (non qualifying) numbers and at the January peak reach 0.32% of the national population. For the remainder of the time numbers are well below this. Loughshinny may provide some alternative functional feeding habitat during January for this species, however numbers are not significant. The installation at the shore end will take up to 3 days to complete. If installation were to fall within January, there would be some minor temporary disturbance to low numbers of light bellied Brent goose however this will not affect their population. If 0.32% of the national population is displaced from the feeding site for up to 3 days, this may temporarily disperse these birds to feeding within other surrounding areas, temporarily increasing the intensity of feeding at these locations. However, as numbers are low, and birds will be dispersed to alternative feeding locations, it is unlikely that the temporary disturbance will significantly affect the distribution and intensity of feeding in alternative areas.

As such, installation and maintenance activities from disturbance to the potential feeding location for up to 3 days are not expected to significantly affect the population dynamics or distribution of Light-bellied Brent Goose, ensuring the conservation objectives for the site are maintained.

**Screening Conclusion: No likely significant effects. AA is not required.**

### 5.4.3 Underwater sound changes

The screening of Natura 2000 sites identified a 'possible' pressure-receptor pathway between the proposed installation and maintenance activities and the Qualifying Interests of seven sites for the pressure underwater sound changes (Table 5-3). Two of these sites are within Irish territorial waters, Rockabill to Dalkey Island SAC and the Lambay Island SAC, designated for Annex II harbour porpoise and pinniped species respectively. The other five sites are within UK waters: North Anglesey Marine SAC, Llyn Peninsular and Sarnau SAC, West Wales Marine SAC, North Channel SAC and Bristol Channel SAC. As cetaceans are highly mobile species and the pressure-receptor pathway is the same for all sites they have been grouped together for discussion below.

#### **Disturbance / injury from underwater sound during cable installation and maintenance activities**

Marine cable installation and maintenance activities will generate underwater sound from a number of sources:

- Cable laying;
- Vessel movement; and
- Rock placement (if used).

Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication and hunting (Richardson et al. 1995). It is generally accepted that exposure to anthropogenic sound can induce a range of behaviour effects to permanent injury in marine mammals. Loud and prolonged sound above background levels is considered to be noise and may have an effect on marine life. This may mask communicative or hunting vocalisations, preventing social interactions and effective hunting.

High intensity noises such as from seismic survey, explosions and pile driving can cause temporary or permanent changes to animals' hearing if the animal is exposed to the sound in close proximity and, in some circumstances, can lead to the death of the animal (Richardson et al. 1995). Where the threshold of hearing is temporarily damaged, it is considered a temporary threshold shift (TTS), and the animal is expected to recover. If there is permanent damage (permanent threshold shift (PTS)) where the animal does not recover, social isolation and a restricted ability to locate food may occur, potentially leading to the death of the animal (Southall et al. 2019).

Behavioural disturbance from underwater sound sources is more difficult to assess than injury and is dependent upon many factors related to the circumstances of the exposure (Southall et al. 2019; NFMS 2018). An animal's ability to detect sounds produced by anthropogenic activities depends on its hearing sensitivity and the magnitude of the noise compared to the amount of natural ambient and background anthropogenic sound. In simple terms for a sound to be detected it must be louder than background and above the animal's hearing sensitivity at the relevant sound frequency.

Behavioural responses caused by disturbance may include animals changing or masking their communication signals, which may affect foraging and reproductive opportunities or restrict foraging, migratory or breeding behaviours; and factors that significantly affect the local distribution or abundance of the species. An animal may swim away from the zone of disturbance and remain at a distance until the activities have passed. Behavioural disturbance to a marine mammal is hereafter considered as the disruption of behavioural patterns, for example: migration, breeding and nursing.

To calculate the zone of influence for both levels of effect (injury and disturbance), an assessment has been conducted which combines literature review with underwater sound modelling (Irish Planning Report Appendix G). Sound propagation modelling, using a geometric spreading calculation, was used to determine the range at which the received sound attenuates to levels below defined thresholds for injury and disturbance. The assessment has used both the recently published American National Marine Fisheries Service (NMFS) (2018) thresholds for the onset of PTS and TTS and the thresholds defined by Southall *et al.* (2019). These reflect the current peer-reviewed published state of scientific knowledge.

The sound levels, injury and disturbance thresholds, the calculations and the resulting zones of influence are described and provided in full in the Irish Planning Report - Appendix G and key information relevant to the assessment is summarised below.

#### **Injury from continuous sound – cable installation**

The Irish Planning Report - Technical Appendix G concludes that sound resulting from cable installation activities (DP vessel, trenching, rock placement etc.) does not exceed the thresholds for permanent (PTS) or temporary (TTS) injury. Annex II and Annex IV cetaceans and pinnipeds are therefore not at risk of injury from the cable installation.

#### **Disturbance from continuous sound – cable installation**

The highly precautionary modelling presented in the Irish Planning Report - Technical Appendix G concluded that all marine mammals have the potential to be disturbed if within 130m of the installation vessel (based on ship utilising dynamic positioning). This value is highly precautionary and the ZOI is likely to much reduced due to the effect of ambient noise in the marine environment (Appendix G). Noise produced from cable installation will be extremely low level and localised and limited to the footprint of the vessel and immediate surrounding area. The current level of shipping and ambient sound within the Irish Sea will not increase significantly from the presence of the project vessels during the cable installation.

### 5.4.3.1 Rockabill to Dalkey Island SAC

#### **Conservation objectives**

The conservation objectives for harbour porpoise are:

To maintain the favourable conservation condition of harbour porpoise within the SAC, which is defined by the following lists of attributes and targets:

- Access to suitable habitat - Species range within the site should not be restricted by artificial barriers to site use.

- Disturbance - Human activities should occur at levels that do not adversely affect the harbour porpoise population at the site (including activities that kill, injure or significantly disturb).

#### **Assessment against conservation objectives**

The proposed marine cable corridor crosses the Rockabill to Dalkey island SAC for approximately 7km. The SAC provides a wide variety of habitats believed to be important for harbour porpoise including inshore shallow sand and mud banks and rocky reefs scoured by strong current flow. Harbour porpoise occur year-round within the site and high group sizes (>5 individuals) have been recorded (NPWS 2013d). The peak period for harbour porpoise sightings in Irish waters is August. Harbour porpoise from the site are expected to be present within the installation and maintenance area, with 6.93 animals per km<sup>2</sup> being identified within the northern half of the site (NPWS 2013d).

The simple ZOI of disturbance calculation from cable installation and maintenance activities identified in Appendix G is highly precautionary and does not account for background noise levels from shipping, fishing activities and pleasure craft which would effectively reduce the ZOI further if included in modelling. Existing levels of shipping within the site are moderate (reaching 20 hours of vessel activity per month at points (EMODnet 2019)), The ZOI for assessment purposes is up to 130m from the installation vessel affecting up to 0.053km<sup>2</sup> (approximately 0.019% of the SAC) around the vessel at one time.

The ZOI surrounding the installation will progress slowly through the SAC and will be within the site for up to 14 hours (worst case). The short duration and extent of the potential disturbance will not produce a barrier to the species range within the site and will not in any way effect the species population through disturbance. Animals will be able to use the area throughout installation and / or maintenance activities. Animals range widely across their Management Unit and therefore effects to harbour porpoise from installation and maintenance activities will not adversely affect the harbour porpoise population within the site or other Annex II or Annex IV animals from other more distant sites and within their management unit. Animals within the area are unlikely to be affected by the vessel noise and cable installation and no potential for significant effect to harbour porpoise population within the Rockabill to Dalkey Island SAC has been identified from the proposed activities.

**Screening Conclusion: No potential for significant effects/AA is not required**

#### 5.4.3.2 North Anglesey Marine SAC, West Wales Marine SAC, North Channel SAC and Bristol Channel SAC

##### **Conservation objectives**

The conservation objectives of the four UK sites designated for harbour porpoise are the same:

To avoid deterioration of the habitats of the harbour porpoise or significant disturbance to the harbour porpoise, thus ensuring that the integrity of the site is maintained, and that the site makes an appropriate contribution to maintaining Favourable Conservation Status (FCS) for the UK harbour porpoise.

To ensure for harbour porpoise that, subject to natural change, the following attributes are maintained or restored in the long term:

1. The species is a viable component of the site.
2. There is no significant disturbance of the species.
3. The supporting habitats and processes relevant to harbour porpoises and their prey are maintained.

### Assessment against conservation objectives

It is possible that harbour porpoise from these sites may be observed in the proposed installation and maintenance area given that the proposed activities are located in the same MU as these sites (Celtic and Irish Sea MU), and there is known to be an interchange of animals across the MU.

The four sites are located between 7km and 222km from the installation and lie within UK waters. As highly mobile species it is possible that harbour porpoise from these sites will be present within the installation and maintenance corridor. The simple ZOI of disturbance calculation from cable installation and maintenance activities identified in Appendix G is highly precautionary and does not account for background noise levels from shipping, fishing activities and pleasure craft which would effectively reduce the ZOI further if included in modelling. Existing levels of shipping within the site are moderate (reaching 20 hours of vessel activity per month at points (EMODnet 2019)), The ZOI for assessment purposes is up to 130m from the installation vessel affecting up to 0.053km<sup>2</sup> at any one time surrounding the vessel. If animals from these sites are within the installation area it is expected that disturbance effects will be the same as for animals from the Rockabill to Dalkey Island SAC i.e. brief, with no restriction to animal range, prey availability or which would have effects to their population will occur. Some disturbance to the seabed will occur during cable installation, however no significant disturbance to the supporting habitat for harbour porpoise is expected.

**Screening Conclusion: No potential for significant effects/AA is not required**

#### 5.4.3.3 Cardigan Bay SAC and Llyn Peninsula and the Sarnau SAC

##### Conservation objectives – bottlenose dolphin

The conservation objectives for these two sites are the same.

- Populations: The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include:
  - Population size;
  - Structure, production; and
  - Condition of the species within the site
- Range: The species 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.
- Supporting habitat: The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include;
  - Distribution;
  - Extent;
  - Structure;
  - Function and quality of habitat; and
  - Prey availability and quality.
- Restoration and recovery: bottlenose dolphin populations should be increasing.

##### Assessment against conservation objectives

It is possible that bottlenose dolphin from these sites are observed in the marine cable corridor given that the proposed installation and maintenance activities are located in the same MU (i.e. the Offshore Channel and SW England MU). However, the baseline description concluded the densities of animals in the region are low.



The zone of disturbance from cable installation is small (130m). Llyn Peninsula and the Sarnau SAC and Cardigan Bay SAC are located 102.4km and 160km from the proposed installation and maintenance activities. As highly mobile species it is possible that bottle nose dolphin from these sites could be present within the installation and maintenance corridor in low numbers.

The simple ZOI of disturbance calculation from cable installation and maintenance activities identified in Appendix G is highly precautionary and does not account for background noise levels from shipping, fishing activities and pleasure craft which would effectively reduce the ZOI further if included in modelling. Existing levels of shipping within Irish Sea are moderate. The ZOI for assessment purposes is up to 130m from the installation vessel affecting up to 0.053km<sup>2</sup> at any one time surrounding the vessel. If animals from these sites are within the installation area it is expected that disturbance effects will be the same as for animals from the Rockabill to Dalkey Island SAC i.e. brief, with no restriction to animal range, prey availability and no effect to population or condition of the species will occur from the proposed activities. Therefore, noise generated from cable installation and maintenance activities will not result in significant disturbance to bottlenose dolphin from these sites.

**Screening Conclusion: No potential for significant effects/AA is not required**

#### 5.4.3.4 Lambay Island SAC

##### **Conservation objectives**

To maintain the favourable conservation condition of Grey and Harbour Seal in Lambay Island SAC by:

- Species range within the site should not be restricted by artificial barriers to site use.
- Breeding sites should be maintained in a natural condition.
- Moulting haul out sites should be maintained in a natural condition.
- Resting haul out sites should be maintained in a natural condition.
- Human activities should occur at levels that do not adversely affect the grey/harbour seal population at the site.

##### **Assessment against conservation objectives**

The Lambay Island SAC lies 4.9km from the marine cable corridor and therefore it is possible that grey and harbour seal from the site will be present in the water around the installation vessel. From August through to December animals are likely to be hauled up on beaches for pupping. Seals are likely to flee if vessels approach within 900m (Brasseur & Reijnders 1994), suggesting that they will avoid the area before they encounter sound levels that will harm them. Given the large foraging ranges of pinniped species and given the distance to breeding, moulting and resting sites is greater than 900m from the corridor then the presence of the installation vessels will not cause animals to flee when engaged in their lifecycle activities. Therefore breeding, moulting and resting sites will be maintained in a natural condition. The simple ZOI of disturbance calculation from cable installation and maintenance activities identified in Appendix G is highly precautionary and does not account for background noise levels from shipping, fishing activities and pleasure craft which would effectively reduce the ZOI further if included in modelling. Existing levels of shipping within Irish Sea are moderate. The ZOI for assessment purposes is up to 130m from the installation vessel affecting up to 0.053km<sup>2</sup> at any one time surrounding the vessel. Underwater noise will not act as an artificial barrier as noise changes will be brief as the vessels pass through the area.

Therefore, installation and maintenance activities are not expected to adversely affect both harbour and grey seal populations at this site.

**Screening Conclusion: No potential for significant effects/AA is not required**

## 5.5 Possible in-combination effects

The Habitats Directive requires that plans or projects are assessed alone and in-combination with other plans or projects to determine whether a likely significant effect to Natura 2000 sites could occur. Only plans or projects that would increase the likelihood of significant effects should be considered.

The nature of a linear interconnector cable project mean that the majority of potential pressures result in short term and localised effects. All effects, as a result of the proposed installation and maintenance activities, will be restricted to the zones of influence either side of the proposed installation and maintenance activities. An initial area of search of 10km has therefore been applied either side of the installation area to identify plans and projects for inclusion within this assessment.

Known types of projects, plans and licensed activities considered include:

- Renewable energy projects i.e. offshore wind farms;
- Sites for marine aggregate dredging and disposal;
- Cables and pipelines;
- Oil and gas exploration and development;
- Carbon Capture and Storage; and
- Military Practice Areas.

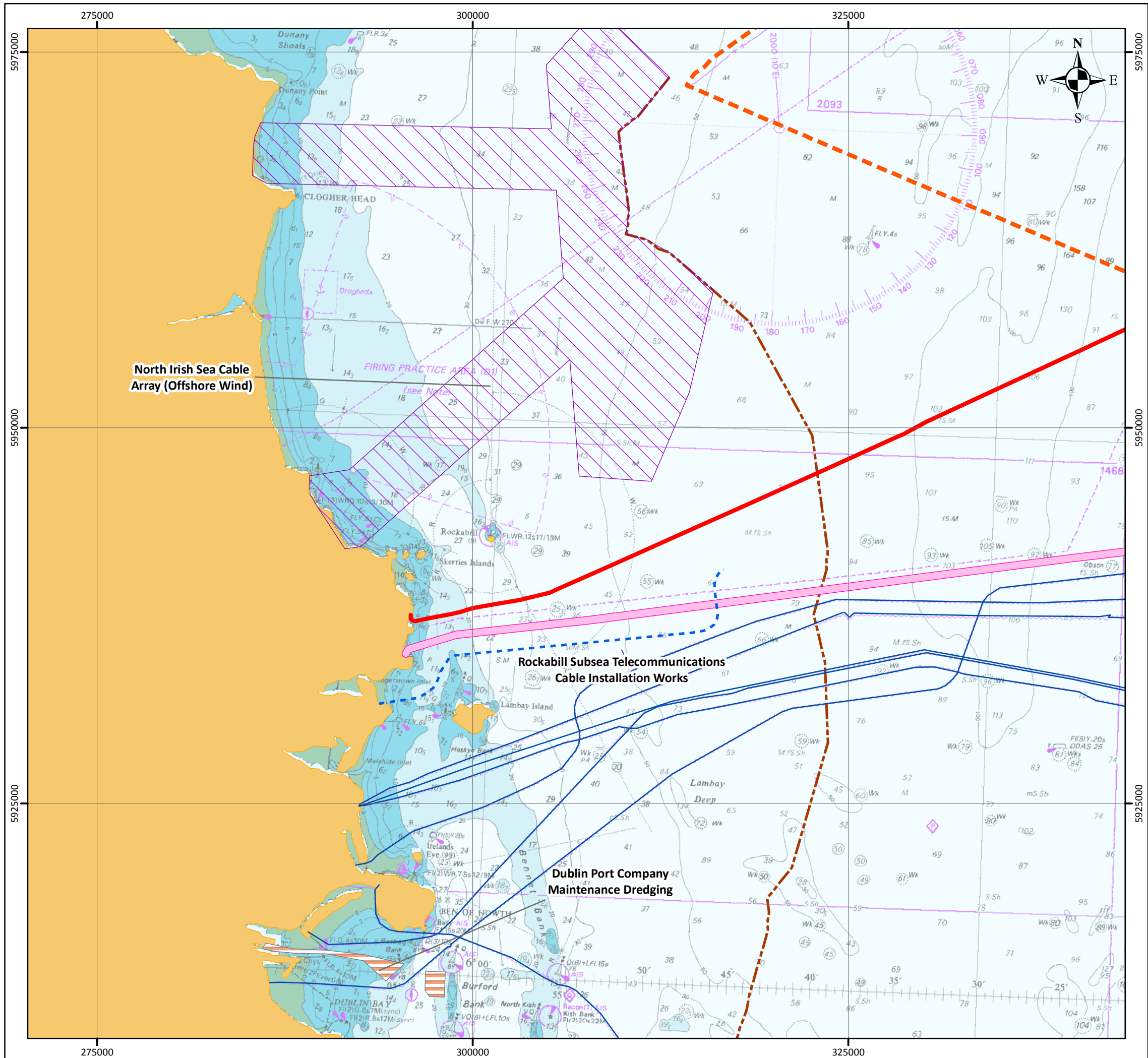
Projects, plans and licensed activities have been identified through search of the Department of Housing, Planning and Local Government (DHPLG) website, the Department of Transport Tourism and Sport website (DTTAS), and a desk-top review of published literature and websites (Figure 5-1).

No commercial fishing, shipping or recreational plans have been identified in the area. Commercial fisheries, shipping interests and recreational use has been scoped out of the list of projects as they are considered to represent baseline conditions, and are not considered as projects, plans or licensed activities. No known military practise areas or marine aggregate dredging sites are currently located within the vicinity of the proposed installation and maintenance activities. Table 5-5 presents known projects, plans and licences situated within 10km of the proposed installation and maintenance activities.

**Table 5-5 Projects within 10km of the proposed installation and maintenance activities**

Project Category	Name / Type of Project	Status	Operator/Owner/ Other Details	Closest Distance to the Project (km)
Cable	Telecommunication cable installation	Determined - under installation	Deep Sea Fibre Networks Limited	2.8km
Renewable Energy	Survey Works	Applied - under consultation	SSE Renewables Braymore Point	4km
Cable	Survey Works	Applied – on hold	Greenwire	5.2km
Cable	Survey Works	Notice to mariners 6 <sup>th</sup> July – 11 <sup>th</sup> July	East West Interconnector	1.4km

Source: DTTAS 2019; and DHPLG 2019

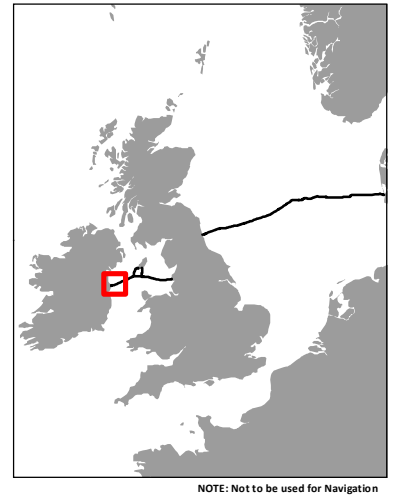


# HAVINGSTEN TELECOMMUNICATIONS CABLE CUMULATIVE ASSESSMENT

## Additional Foreshore Projects - ROI Waters

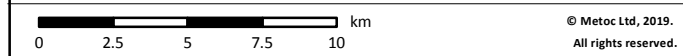
Drawing No: P2228-CUMU-002 A

- Legend**
- Havingsten Cable Route
  - - - 12nm Territorial Sea Limit
  - - - Rockabill Subsea Telecommunications Cable Installation Works
  - ▨ Dublin Port Company Maintenance Dredging
  - ▨ SSE Renewables Braymore Point
  - ▨ EirGrid East West Interconnector Survey (250m)



NOTE: Not to be used for Navigation

<b>Date</b>	Thursday, June 27, 2019 15:00:32
<b>Projection</b>	WGS_1984_UTM_Zone_30N
<b>Spheroid</b>	WGS_1984
<b>Datum</b>	D_WGS_1984
<b>Data Source</b>	DCCA; GEBCO; MarineFind; ASN
<b>File Reference</b>	J:\P2228\Mxd\17_CUMU\ P2228-CUMU-002.mxd
<b>Created By</b>	Chris Goode
<b>Reviewed By</b>	Chris Carroll
<b>Approved By</b>	Paula Daghish



For there to be a potential cumulative effect (PCE) between the proposed installation and maintenance activities and another project, plan or licensed activity there must be a common pressure-receptor pathway which overlaps spatially and temporally. A screening exercise was undertaken, presented below, to determine if any of the projects, plans and activities identified have:

- A common-pressure receptor pathway with the project;
- Activities, the effects of which overlap spatially with the project; and
- Activities, the effects of which overlap temporally with the project.

### 5.5.2 Common Pressure- receptor pathway assessment

Of the projects listed in Table 5-5, the Deep Sea Fibre Networks installation and survey of the Rockabill Cable System has been screened out from further consideration due to being completed prior to the Havhingsten installation commencing. No further activities that could affect the environment will be associated with them.

The remaining projects fall into two categories: maintenance dredging and survey activities. An activity / pressure/ receptor matrix for these four categories has been developed (Table 5-6) to define the common pressures associated with the project types, and which receptors can be affected. If there is no common pressure-receptor pathway the project is screened out.

**Table 5-6 Projects within 10km of the proposed installation and maintenance activities**

Category	Pressure	Distance (km)	Receptors			
			Habitat	Fish	Birds	Marine Mammals
Maintenance dredging	Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	2.8	X			
	Siltation rate changes, including smothering (depth of vertical sediment overburden)	2.8	X			
	Visual disturbance	2.8			X	
	Underwater noise changes	2.8				X
Survey	Underwater noise changes	4				X
Survey	Underwater noise changes	5.2				X
Survey	Underwater noise changes	1.4				X

### 5.5.3 Spatial overlap assessment

For there to be a potential cumulative effect (PCE) the effects from the Project and other plans and projects must overlap spatially. If there is no spatial overlap between the pressures within a Natura 2000 site, the pressure from the plan or project can be screened out at this stage. Table 5-7 presents an assessment of the projects to determine if spatial overlaps exist with the proposed installation and maintenance activities.

**Table 5-7 Spatial overlap assessment**

Key	<b>Screened out</b> – No common pressure-receptor pathway	<b>Screened out</b> – Common pressure receptor pathway but outside Project zone of influence	<b>Screened in</b> - Common pressure receptor pathway and within Project zone of influence
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Project	Distance (km)*	Havhingsten pressures and zone of influence (km)			
		Penetration and/or disturbance including abrasion	Siltation rate changes	Visual Disturbance to Birds	Underwater noise changes)
				10km	0.13
Deep Sea Fibre Networks Limited	2.8				
SSE Renewables Braymore Point	4				
Greenwire	5.2				
East West Interconnector	-				

#### 5.5.4 Temporal overlap assessment

Although Table 5-7 has determined that there is a spatial overlap between three projects and the proposed installation and maintenance activities, the effects must overlap temporally as well as spatially for there to be a PCE.

The SSE Renewables Braymore Point surveys are scheduled for between April and October within the five years following award of the Foreshore licence. SSE have requested this to commence from 1<sup>st</sup> August 2019. The geophysical survey will take up to 2 months followed by geotechnical survey for up to 3 months duration. It is possible that the surveys may be undertaken at a similar time to the Havhingsten installation. The pressure-receptor pathways identified for the SSE project relate to potential effects to marine mammals caused by underwater noise changes and visual disturbance to birds.

The Deep-Sea Fibre Networks cable installation and the East-West Interconnector surveys will be complete by 10<sup>th</sup> July and 11<sup>th</sup> July respectively 2019 (DTTAS 2019). This will be more than 4 months before the Havhingsten cable installation will commence, therefore there is no temporal overlap the project and these projects have been screened out of the assessment.

The Greenwire project is an application to undertake geophysical and geotechnical survey within five years of licence determination. The Foreshore licence application was submitted to the DHPLG – Foreshore Unit in September 2013 but at the time of NIS preparation (June 2019) had not been issued for public consultation and had not been determined. It is assumed that this survey is on hold or abandoned as no Notice to mariners has been produced for the project (DTTAS 2019). There is therefore no likely potential for spatial or temporal overlap of the project and has been screened out of the assessment.

### 5.5.5 PCE assessment

The proposed installation and maintenance activities and the SSE Renewables Braymore Point surveys have one common pressure-receptor pathway. This is discussed below.

#### 5.5.5.1 Visual Disturbance

There is potential that vessels for the proposed installation and maintenance operations and those for the SSE Renewables Braymore Point surveys could be in the same area for a short period of time (up to 24 hours) (temporal and spatial overlap). Visual disturbance is characterised by birds taking evasive action. Repeated disturbance over an extended period of time can affect survival and productivity.

Due to the distance from the tern breeding colony itself (3.8km) from the installation and maintenance activities, it is unlikely that breeding birds will be disturbed at their nest site from either project. As both projects are transient with vessels that are slow moving, disturbance is unlikely to be felt beyond existing background disturbance from vessels in the area.

The sensitivity of the receptor has been assessed as medium due to their high susceptibility for disturbance. However, the project is located 4.5km from the breeding colonies and therefore outside the zone of influence for disturbance (2km), therefore the magnitude of this effect has been assessed as low. The significance of the potential cumulative effect is assessed as Not Significant.

### 5.5.6 Conclusion

Of the four projects identified within 10km of the proposed installation and maintenance operations, screening for potential cumulative effects concluded that three projects have common pressure-receptor pathways and do have the potential to overlap spatially. However, the licensed activities will be completed prior to the start of the proposed installation and maintenance activities. Therefore, there is no potential for cumulative effects from these projects.

It has been identified that there is potential for the SSE Renewables Braymore Point survey to overlap spatially and temporally with the proposed installation and maintenance activities. However due to the short term, temporary and transient nature of both activities by slow moving vessels the PCE is concluded to be Not significant.

**Table 5-8 SSE Renewables Braymore Point Survey**

Receptor	Qualifying Interest	Natura 2000 site(s)	PCE?
Habitats	None – no spatial overlap		No PCE
Fish	None – no spatial overlap		No PCE
Birds	Breeding tern	Rockabill SPA	PCE – Not Significant
	Overwintering purple sandpiper		PCE – Not Significant
Marine mammals	None – no spatial overlap		No PCE

## 6. SCREENING STATEMENT AND CONCLUSIONS

To determine whether the proposed cable installation and maintenance is likely to have a significant effect on any Natura 2000 sites, either individually or in-combination with other plans or projects, AA screening was carried out.

The screening for AA was completed in compliance with the relevant European Commission and National guidelines. The potential effects during the installation and maintenance activities have been considered in the context of the Natura 2000 sites potentially affected, their Qualifying Interests and conservation objectives.

The screening assessed 17 Natura 2000 sites that were either within the direct zone of influence of the proposed activities or contain mobile Annex II species which could potentially travel into the area.

A review of the proposed installation and maintenance activities identified four pressures that could be exerted on Qualifying Interest during installation and maintenance. These were:

- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion;
- Siltation rate changes, including smothering (depth of vertical sediment overburden);
- Visual Disturbance; and
- Underwater noise changes.

Sites were assessed to determine if there was a potential pressure-receptor pathway between the proposed activities and the Qualifying Interest(s).

Initial screening concluded, that it is considered possible that there exists a pressure-receptor pathway between the proposed installation and maintenance activities and the Qualifying Interests of 12 of the 17 sites reviewed (Table 5-3). Further analysis of the likely significant effects taking into consideration the sites conservation objectives concluded that the proposed installation and maintenance activities will not have a likely significant effect on any of the Natura 2000 sites screened. Table 6-1 summarises the conclusions of the assessment of likely significant effects.

**Table 6-1 Summary of the assessment of likely significant effects**

Site Name & Code	Applicable Qualifying Interest	Potential Pressure on site from proposed activities	Conclusion
Rockabill to Dalkey Island SAC [IE003000]	Harbour porpoise	Underwater noise changes	No potential for significant effects / AA is not required
Rockabill SPA [IE004014]	Breeding tern species	Visual disturbance to foraging seabirds	No potential for significant effects / AA is not required
Skerries Islands SPA [IE004122]	Breeding seabird species	Visual disturbance to foraging seabirds	No potential for significant effects / AA is not required
Baldoyle Bay SPA [IE 004016]	Overwintering seabird species	Visual disturbance	No potential for significant effects / AA is not required
Malahide Estuary SPA [IE004025]	Overwintering seabird species	Visual disturbance	No potential for significant effects / AA is not required

Lambay Island SAC [IE000204]	Pinniped species	Underwater noise changes	No potential for significant effects / AA is not required
North Anglesey Marine SAC [UK0030398]	Harbour porpoise	Underwater noise changes	No potential for significant effects / AA is not required
West Wales Marine SAC [UK0030397]	Harbour porpoise	Underwater noise changes	No potential for significant effects / AA is not required
Llyn Peninsula and the Sarnau SAC [UK0013117]	Bottlenose dolphin	Underwater noise changes	No potential for significant effects / AA is not required
North Channel SAC [UK0030399]	Harbour porpoise	Underwater noise changes	No potential for significant effects / AA is not required
Cardigan Bay SAC [UK0012712]	Bottlenose dolphin	Underwater noise changes	No potential for significant effects / AA is not required
Bristol Channel SAC [UK0030396]	Harbour porpoise	Underwater noise changes	No potential for significant effects / AA is not required

Overall there is no evidence to indicate that the works in combination with any plan or project will produce a significant adverse effect on the habitats of the qualifying species and on species of special conservation interest, ensuring the integrity of the sites are maintained. No significant cumulative effect is envisaged.

The proposed project does not have the potential to give rise to significant adverse effects on the overall integrity of the Natura 2000 sites considered. Therefore, this assessment has stopped at Stage 1 screening and there should be no further requirement for Stage 2 Appropriate Assessment.



## REFERENCES

- 1** Baines, M.E. and Evans, P.G.H. (2012). Atlas of the Marine Mammals of Wales. CCW Monitoring Report No. 68. 2nd edition. 139pp.
- 2** BirdWatch Ireland. (2019). Roseate Tern. [Online]. Available at: <https://birdwatchireland.ie/birds/roseate-tern/> [Accessed 1 July 2019].
- 3** Brasseur, S. and Reijnders, P. (1994). Invloed van diverse verstoringsbronnen op het gedrag en habitatgebruik van gewone zeehonden: consequenties voor de inrichting van het gebied. - IBN-Rapp. 113, 62 pp.
- 4** BOEM (2017). BOEM: Best Management Practices Workshop for Atlantic Offshore Wind Facilities. Overview of NMFS 2016 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing. [online] Available at: <https://www.boem.gov/Day-1-Scholik-Overview-Guidance/> (Accessed February 2019)
- 5** Coull, K.A., Johnstone, R., and Rogers, S.I. (1998). Fisheries Sensitivity Maps for British Waters. Published and distributed by UK Oil and Gas.
- 6** Crowe, O. 2005. Ireland's Wetlands and their Waterbirds: Status and Distribution. BirdWatch Ireland. Newcastle.
- 7** DAHG (2014) Guidance to manage the risk to marine mammals from man-made sound sources in Irish Waters. [online] [https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance\\_Jan%202014.pdf](https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf) (Accessed January 2019)
- 8** DEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities p.84.
- 9** DHPLG (2019), Foreshore Applications and Determinations. Available at: [https://www.housing.gov.ie/planning/foreshore/applications/overview?title\\_1=&field\\_date\\_received\\_value%5Bvalue%5D%5Byear%5D=&field\\_application\\_status\\_tid=All&field\\_fa\\_county\\_tid=All&items\\_per\\_page=20&=Apply](https://www.housing.gov.ie/planning/foreshore/applications/overview?title_1=&field_date_received_value%5Bvalue%5D%5Byear%5D=&field_application_status_tid=All&field_fa_county_tid=All&items_per_page=20&=Apply) (Accessed June 2019).
- 10** DCCAE (2015). Irish Offshore Strategic Environmental Assessment (IOSEA) 5 Environmental Report. [online] Available at: <https://www.dccae.gov.ie/en-ie/natural-resources/publications/Documents/6/IOSEA5EnvironmentalReport.pdf> (Accessed February 2019)
- 11** DCCAE. (2019). ObSERVE Programme. [Online]. Available at: <https://www.dccae.gov.ie/en-ie/natural-resources/topics/Oil-Gas-Exploration-Production/observe-programme/Pages/ObSERVE-Programme.aspx> [Accessed 20 June 2019].
- 12** Department of Energy and Climate Change (DECC) (2016). Offshore Energy Strategic Environmental Assessment. Department of Energy and Climate Change. March 2016.
- 13** DTTAS (2019), Notice to Mariners. Available at: [http://www.dttas.ie/maritime/maritimesafetydirector/ate/marinenotices/marine-notices?field\\_category\\_tid=All&keys=&items\\_per\\_page=60&=Apply](http://www.dttas.ie/maritime/maritimesafetydirector/ate/marinenotices/marine-notices?field_category_tid=All&keys=&items_per_page=60&=Apply). Accessed June 2019
- 14** EC and Environment Directorate-General (2002) Assessment of plans and projects significantly affecting Natura 2000 sites: methodological guidance on the provisions of article 6(3) and (4) of the Habitats Directive 92/43/EEC. Oxford: European Communities.
- 15** EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. [Online]. Available at: [http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance\\_art6\\_4\\_en.pdf](http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/guidance_art6_4_en.pdf) [Accessed 27 June 2019].
- 16** EC (2014) Article 6 of the Habitats Directive: Rulings of the European Court of Justice: Final Draft. [Online]. Available at: [http://ec.europa.eu/environment/nature/info/pubs/docs/others/ECJ\\_rulings%20Art\\_%206%20-%20Final%20Sept%202014-2.pdf](http://ec.europa.eu/environment/nature/info/pubs/docs/others/ECJ_rulings%20Art_%206%20-%20Final%20Sept%202014-2.pdf) [Accessed 27 June 2019].
- 17** EC (2018) Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. [Online]. Available at: <http://ec.europa.eu/environment/nature/natura2000>

/management/docs/art6/Provisions\_Art\_6\_nov\_2018\_en.pdf [Accessed 27 June 2019].

**18** Ellis, J., Milligan, S. Readdy, L., Taylor, N and Brown, M. (2012). Spawning and Nursery Grounds of Selected Fish Species in UK Waters. Science Series Technical Report No. 147. CEFAS, Lowestoft.

**19** EMODnet (2019). Human Activities [online] Available at: <http://www.emodnet-humanactivities.eu/view-data.php> (Accessed June 2019)

**20** Fingal County Council. (2004). Ecological Study of the Coastal Habitats in County Fingal - Phase II: Birds. p.70.

**21** Finnegan, L. and Ó. Néill, L. (2010). Mitochondrial DNA diversity of the Irish otter, *Lutra*, population. Conservation Genetics, 11, pp.1573–1577. [Online]. Available at: doi:10.1007/s10592-009-9955-4.

**22** Fugro. (2019a). Benthic Characterisation Report: Havhingsten Cable Route - Ireland. p.130.

**23** Fugro (2019b), Field Report, Havhingsten Cable Route Survey- Irish Sea - Fugro Document No.: 181275-R-002(02) 28 June 2019

**24** Hammond, P.S., Lacey, C., Gilles, A., Viquerat, S., Börjesson, P., Herr, H., Macleod, K., Ridoux, V., Santos, M.B., Scheidat, M., Teilmann, J., Vingada, J. and N Øien (2017). Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys.

**25** Intertek. (2019). Underwater Sound Modelling.

**26** I-WeBS (2019), Low Tide Count data 2011 – 2016 (most recent available).

**27** IWDG (2019). Sightings. [online] Available at: <http://www.iwdg.ie/> (Accessed February 2019).

**28** JNCC. (2015). Management Units for cetaceans in UK waters. JNCC Report No: 547, p.42.

**29** JNCC (2017). Joint SNCB Interim Displacement Advice Note (2017). [online] Available at: [http://jncc.defra.gov.uk/pdf/Joint\\_SNCB\\_Interim\\_Displacement\\_AdviceNote\\_2017.pdf](http://jncc.defra.gov.uk/pdf/Joint_SNCB_Interim_Displacement_AdviceNote_2017.pdf) (Accessed January 2019)

**30** Mackey, M., Ó Cadhla, O., Kelly, T.C., Aguilar, A., de Soto, N. and Connolly, N. (2004). Cetaceans and

Seabirds of Ireland's Atlantic Margin. Volume I - Seabird distribution, density & abundance.

**31** Marine Institute (2019). Ireland's Marine Atlas. Marine Institute.

**32** NFMS (2018) Revisions to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-59, 167 p. [online] Available at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance> (Accessed February 2019)

**33** NPWS. (2009). Skerries Island SPA Site Synopsis. [Online]. Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004122.pdf> [Accessed 4 July 2019].

**34** NPWS. (2011). Irelands Eye SPA Site Synopsis. [Online]. Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004117.pdf> [Accessed 4 July 2019].

**35** NPWS (2012). River Nanny Estuary & Shore Special Protection Area. Site Code 4158. Conservation Objectives Supporting Document. Version 1. [online] Available at: [https://www.npws.ie/sites/default/files/publications/pdf/004158\\_River%20Nanny%20Estuary%20and%20Shore%20SPA\\_Supporting%20Doc\\_V1.pdf](https://www.npws.ie/sites/default/files/publications/pdf/004158_River%20Nanny%20Estuary%20and%20Shore%20SPA_Supporting%20Doc_V1.pdf) (Accessed February 2019)

**36** NPWS (2013a). Rockabill SPA 004014. Conservation Objectives Series. [online] Available at: [https://www.npws.ie/sites/default/files/protected-sites/conservation\\_objectives/CO004014.pdf](https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004014.pdf) (Accessed February 2019)

**37** NPWS (2013b). Lambay Island SAC (site code: 0204). Conservation objectives supporting document - Marine Habitats and Species. Version 1. May 2013. [online] Available at: [https://www.npws.ie/sites/default/files/publications/pdf/000204\\_Lambay%20Island%20SAC%20Marine%20Supporting%20Doc\\_V1.pdf](https://www.npws.ie/sites/default/files/publications/pdf/000204_Lambay%20Island%20SAC%20Marine%20Supporting%20Doc_V1.pdf) (Accessed February 2019)

**38** NPWS. (2013c). Malahide Estuary SPA Site Synopsis. [Online]. Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004025.pdf> [Accessed 1 July 2019].

- 39** NPWS (2013d). Rockabill to Dalkey Island SAC (site code: 3000). Conservation objectives supporting document - Marine Habitats and Species. Version 1. May 2013. [online] Available at: [https://www.npws.ie/sites/default/files/publications/pdf/003000\\_Rockabill%20to%20Dalkey%20Island%20SAC%20Marine%20Supporting%20Doc\\_V1.pdf](https://www.npws.ie/sites/default/files/publications/pdf/003000_Rockabill%20to%20Dalkey%20Island%20SAC%20Marine%20Supporting%20Doc_V1.pdf) (Accessed February 2019)
- 40** NPWS (2014a). Baldoye Bay SPA Site Synopsis. [Online]. Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004016.pdf> [Accessed 1 July 2019].
- 41** NPWS (2014b). Rockabill to Dalkey Island SAC site synopsis. [online] Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004014.pdf> (Accessed January 2019)
- 42** NPWS. (2014c). Rogerstown Estuary SPA Site Synopsis. [Online]. Available at: <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004015.pdf> [Accessed 4 July 2019].
- 43** OSPAR Commission (2011). Intersessional Correspondence Group on Cumulative Effects - Amended 25th March 2011. Pressure lists and descriptions. [online] Available at: [http://jncc.defra.gov.uk/PDF/20110328\\_ICG-C\\_Pressures\\_list\\_v4.pdf](http://jncc.defra.gov.uk/PDF/20110328_ICG-C_Pressures_list_v4.pdf) (Accessed February 2019).
- 44** Pollock, C. and Barton, C. (2008). A Gap Analysis of Irish Waters using the European Seabirds at Sea (ESAS) database. Irish Wildlife Manuals. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- 45** Reid, J.B., Evans, P.G.H. and Northridge, S.P. (2003). Atlas of Cetacean distribution in north-west European waters. Joint Nature Conservation Committee, Peterborough, UK.
- 46** Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. Irish Wildlife Manuals No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- 47** Richardson, W.J., Greene, C.R. Jr., Malme, C.I., and Thomson, D.H. (1995). Marine Mammals and Noise. Academic Press, San Diego, CA, USA.576p.
- 48** Rogan, E., Breen, P., Mackey, M., Cañadas, A., Scheidat, M., Geelhoed, S. and Jessopp, M. (2018). Aerial Surveys of Cetaceans and Seabirds in Irish waters: Occurrence, distribution and abundance in 2015-2017. Department of Communications, Climate Action & Environment and National Parks and Wildlife Service (NPWS), Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland, p.297pp.
- 49** Showler, D.A., Stewart, G.B., Sutherland, W.J., and Pullin, A.S. (2010). What is the impact of public access on the breeding success of ground-nesting and cliff-nesting birds? CEE review 05-010 (SR16).
- 50** Southall B L, Finneran J J, Reichmuth C, Nachtigall P E, Ketten D R, Bowles A E, Ellison W T, Nowacek D P, Tyack P L (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals 2019, 45(2), 125-232, DOI 10.1578/AM.45.2.2019.125. (Accessed Nov 2019)
- 51** (Thaxter, C. B., Lascelles, B., Sugar, K., Cook, A. S. C. P., Roos, S., Bolton, M., Langston, R. H. W., and Burton, N. H. K., (2012). Seabird foraging ranges as a preliminary tool for identifying candidate Marine Protected Areas, Biological Conservation, 156: 52-61.
- 52** Tierney, N., Whelan, R. and Valentín, A. (2016). Post-breeding aggregations of roosting terns in south Dublin Bay in late summer. BirdWatch Ireland, 6pp.
- 53** Valente, J.J. and Fischer, R.A (2011). Reducing human disturbance to waterbird communities near corps of engineers projects. Report reference ERDC TN-DOER-E29. [online] Available at: <http://el.erd.usace.army.mil/elpubs/pdf/doere29.pdf> (Accessed February 2019)
- 54** National Research Council (2003). 3. Effect of Noise on Marine Mammals. Washington, D.C.: National Academies Press.