Foreshore Licence Application for Site Investigation Work – NISA Cable Assessment Area

Natura Impact Statement

31st March 2021

Document Control

Revision	Date	Authored:	Checked:	Approved:
Rev 00	28/02/2021	[redacted]		

Revision	Date	Authored:	Checked:	Approved:
Rev 01	23/03/2021	[redacted]		
	Client comments incorporated			
Revision	**Date**	**Authored:**	**Checked:**	**Approved:**
Rev 02	31/03/2021	[redacted]		
	Client comments incorporated			

Guidelines of use of report:

This report is produced in support of an application for a site investigation licence under Section 3 of the Foreshore Act 1933, as amended, and should not be used for any other purpose apart from that expressly stated in this document.

Table of Contents

1 INTRODUCTION 1

1.1 AIM OF THIS REPORT 1
1.2 STRUCTURE OF THE REPORT 1
1.3 FORESHORE LICENSE APPLICATION AREA 2
1.4 MARINE SITE INVESTIGATION ACTIVITIES 4
1.4.1 Geophysical survey 4
1.4.2 Geotechnical survey 4
1.4.3 Benthic ecology survey 5
1.5 SURVEY SCHEDULE 11

2 HABITATS DIRECTIVE (92/43/EEC) 12

2.1 LEGISLATIVE BACKGROUND 12
2.2 THE APPROPRIATE ASSESSMENT PROCESS 13

3 RECEIVING ENVIRONMENT 15

3.1 MARINE BENTHOS 15
3.2 NATURA 2000 SITES 16
3.2.1 Special Conservation Interests (SCI) (Birds) 16
3.2.2 Annex I Habitats and Associated SACs 22
3.2.3 Annex II Species and Associated SACs 27
3.2.4 Annex V Species 32
3.3 MARINE MAMMALS 32
3.4 FISHERIES 34
3.4.1 Data Availability 34
3.4.2 Fishing Activity 35
3.4.3 Fish Ecology 37
3.5 MARINE TRAFFIC 40
3.6 SUBSEA INFRASTRUCTURE AND SHIPWRECKS 41
3.7 OTHER PROPOSED ACTIVITIES IN THE AREA 42
3.8 DUMPING AT SEA 45

4 POTENTIAL ENVIRONMENTAL IMPACTS 47

4.1 PHYSICAL DISTURBANCE TO MARINE BENTHIC COMMUNITIES 47
4.2 DISTURBANCE FROM VIBRATION AND UNDERWATER NOISE ASSOCIATED WITH SURVEYS 49
4.3 VISUAL AND NOISE DISTURBANCE TO BIRD SPECIES 52
4.4 INDIRECT EFFECTS TO BIRDS DUE TO EFFECTS ON PREY SPECIES 52
4.5 INJURY DUE TO COLLISION (SURVEY VESSELS/SAMPLING EQUIPMENT) 53
4.6 POLLUTION EVENT 53

5 APPROPRIATE ASSESSMENT STAGE 1 SCREENING 54

5.1 CRITERIA FOR NATURA 2000 SITE SELECTION FOR SCREENING 54
5.2 IDENTIFICATION OF RELEVANT NATURA 2000 SITES AND QUALIFYING INTERESTS/SPECIAL CONSERVATION INTERESTS 55
5.3 SCREENING ASSESSMENT OF LIKELY SIGNIFICANT EFFECT 72
5.3.1 Direct Effects – Physical Disturbance to Marine Benthic Communitities; Habitat Loss 72
5.3.2 Disturbance from vibration and underwater noise associated with surveys 90
5.3.3 Visual and Noise Disturbance to Birds and Indirect Effects on Bird Species due to Effects on Prey Species 91

5.3.4 Pollution Event *96*
5.4 IN-COMBINATION EFFECTS 96
5.5 SCREENING STATEMENT 100
5.6 SCREENING STATEMENT SUMMARY 101

6 STAGE 2 APPROPRIATE ASSESSMENT (NATURA IMPACT STATEMENT) 103

6.1 CONSERVATION OBJECTIVES FOR QUALIFYING INTRESTS 103
6.1.1 Rockabill SPA (004014) (NPWS, 2013d) *103*
6.1.2 Rockabill to Dalkey Island SAC (003000) (NPWS, 2013e) *103*
6.1.3 Lambay Island SAC (000204) (NPWS, 2013f) *104*
6.1.4 River Boyne and River Blackwater SAC (002299) *104*
6.1.5 North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398) (NRW, 2016a) *105*
6.1.6 Murlough SAC (UK0016612) (DAERA-NI, 2015b) *105*
6.1.7 Strangford Lough SAC (UK0016618) (DAERA-NI, 2015c) *105*
6.1.8 North Channel SAC (UK0030399) (JNCC, 2019) *106*
6.2 IMPACT ASSESSMENT 106
6.2.1 Harbour Porpoise (Phocoena phocoena) [1351] *106*
6.2.2 Grey Seal (Halichoerus grypus) [1364] *107*
6.2.3 Common Seal (Phoca vitulina [1365]) *108*
6.2.4 Otter (Lutra Lutra) [1355] *108*
6.2.5 Breeding seabirds *109*
6.2.6 Benthic Habitats (Annex I Habitats) *110*
6.3 CUMULATIVE IMPACTS 111
6.3.1 Assessment of in-combination Effects from other Plans and Projects *111*
6.4 SUMMARY OF MITIGATION MEASURES 111
6.5 APPROPRIATE ASSESSMENT CONCLUSION 113

7 MARINE MAMMAL RISK ASSESSMENT FOR NON-QUALIFYING MAMMALS 114

7.1 IDENTIFICATION OF RELEVANT NON-QUALIFYING MARINE MAMMALS 114
7.2 IMPACT ASSESSMENT AND PROTECTIVE MEASURES UNDER ARTICLE 12 114
7.3 CONCLUSIONS 115

REFERENCES 116

Index of Figures

Figure 1-1: Foreshore Licence Site Investigation Area presenting three landfall and cable route options which will be narrowed down following the site investigations - cable assessment area and NISA array site boundary (NISA array site inside the 12nm boundary is subject to a separate Foreshore Licence Application - FS007031). 2
Figure 1-2: Foreshore Licence Site Investigation Area presenting three landfall and cable route options which will be narrowed down following the site investigations. 3
Figure 1-3: Indicative Geotechnical and Ecological Site Investigation locations presenting three landfall and cable route options which will be narrowed down following the site investigations. 9
Figure 1-4: Northern Landfall Area 9
Figure 1-5: Central Landfall Area 10
Figure 1-6: Southern Landfall Area 10
Figure 2-1: Stages in the AA process (Source: DEHLG, 2009) 13
Figure 3-1: Predominant Sediment Type (EMODnet, 2019) 16
Figure 3-2: Special Protection Areas within 15 km of the Foreshore Licence Site Investigation Area designated under the Bird Directive 17
Figure 3-3: Special Areas of Conservation located within 15km of the Foreshore Licence Site Investigation Area designated under the Habitats Directive 23
Figure 3-4: Ireland and UK Special Areas of Conservation located within 100km of the Foreshore Licence Site Investigation Area (NPWS, 2020), (JNCC, Natural Resources Wales) 28
Figure 3-5: Commercial Fishing (Ireland Marine Atlas, 2019b) 36
Figure 3-6: Shellfish Waters (DHLGH, 2014) 37
Figure 3-7: Herring Nursery Ground, Whiting Spawning and Nursing Ground (Ireland Marine Atlas, 2019b) 38
Figure 3-8: Mackerel Nursery Ground, Haddock Spawning and Nursing Ground (Ireland Marine Atlas, 2019b) 38
Figure 3-9: Cod Nursery and Spawning Grounds (Ireland Marine Atlas, 2019b) 39
Figure 3-10: Wild Atlantic Salmon (Ireland Marine Atlas, 2019b) 39
Figure 3-11: Coastguard AIS Traffic Frequency (DTTAS, 2018] 40
Figure 3-12: Plan of buried services adjacent and within the Foreshore Licence Site Investigation Area (Ref: Admiralty Chart) 41
Figure 3-13: National Monument Service (NMS) and INFOMAR shipwreck data (NMS and INFOMAR, 2021) 42
Figure 3-14: Proposed projects in close proximity to the Foreshore Licence Site Investigation Area 45
Figure 3-15: Dumping at Sea sites 46

Index of Tables

Table 1-1: Foreshore Licence Site Investigation Area Coordinates 3
Table 1-2: Summary of site investigation activities methodologies 5
Table 3-1: Special Protection Areas within 15 km of the Foreshore Licence Site Investigation Area designated under the Bird Directive 17
Table 3-2: Special Areas of Conservation located within 15km of the Foreshore Licence Site Investigation Area designated under the Habitats Directive 24
Table 3-3: Marine and Marine/Freshwater Species for which Special Areas of Conservation have been designated in Ireland 27
Table 3-4: Special Areas of Conservation within 100km of the Foreshore Licence Site Investigation Area with mobile species listed in Annex II of the EU Habitats Directive that may be present in the site investigation area at least part of the year 28
Table 3-5: Overview of sites designated for Annex II mobile species 30
Table 3-6: Designated migratory species which may be present within the Foreshore Licence Site Investigation Area 32
Table 4-1: Sound Pressure Level (SPL) injury criteria proposed by Southall et al. (2007), for individual marine mammals exposed to discrete noise events 49
Table 4-2: Auditory Bandwidth for Marine Mammal Species 50
Table 4-3: Potential noise sources generated by the geotechnical marine site investigation activities 50
Table 4-4: Marine Mammal Auditory Band Width and relevant surveys, marine mammals known in the area are also listed. 51
Table 5-1: Identification of relevant Natura 2000 sites within the Zone of Influence of the Foreshore Licence Site Investigation Area. 56

TABLE 5-2: ADAPTED FROM GENERAL CONSERVATION OBJECTIVES FOR SPECIAL AREAS OF CONSERVATION (NPWS (2019) THE STATUS OF EU PROTECTED HABITATS AND SPECIES IN IRELAND). 72
TABLE 5-3: CONSIDERATION OF IN-COMBINATION EFFECTS 98
TABLE 5-4: SUMMARY OF LIKELY SIGNIFICANT IMPACTS 101
TABLE 6-1: SUMMARY OF MITIGATION MEASURES 111

List of Abbreviations

AA	Appropriate Assessment
ADCP	Acoustic Doppler Current Profiler
API	American Petroleum Institute
BH	Borehole
CE	CE Atlantic
CPOD	Cetacean Passive Acoustic Network
CPT	Cone Penetration Tests
DAHG	Department of Culture, Heritage and the Gaeltacht
DEHLG	Department of Housing, Local Government and Heritage
DTTAS	Department of Transport, Tourism and Sport
EC	European Commission
EMODnet	The European Marine Observation and Data Network
EPS	European Protected Species
EU	European Union
FCS	Favourable Conservation Status
INFOMAR	Integrated Mapping for the Sustainable Development of Ireland's Marine Resource
INNS	Invasive Non-Native Species
IROPI	Imperative Reasons of Overriding Public Interest
ISO	International Organization for Standardization
IWDG	Irish Whale and Dolphin Group
JNCC	Joint Nature Conservation Committee
LiDAR	Light Detection and Ranging
MAP	Maritime Area Planning Bill 2021
MARPOL	The International Convention for the Prevention of Pollution from Ships
MBES	Multibeam Echosounder
MI	Marine Institute
MM	Magnetometer
MMO	Marine Mammal Observer
MU	Management Unit
NIS	Natura Impact Statement
NM	Nautical Mile
NPWS	National Parks and Wildlife Service
NRW	Natural Resources Wales
OSPAR	Oslo and Paris Conventions
PTS	Permanent Threshold Shift
QI	Qualifying Interests
SAC	Special Areas of Conservation
SBP	Sub-Bottom Profiling
SPA	Special Protection Areas
SPL	Sound Pressure Level
SSS	Side Scan Sonar
TTS	Temporary Threshold Shift
UK	United Kingdom
VC	Vibrocore

Glossary of Terms

Acoustic Doppler Current Profiler (ADCP)	An acoustic doppler current profiler is a hydroacoustic current meter similar to a sonar, used to measure water current velocities over a depth range using the Doppler effect of sound waves scattered back from particles within the water column.
Alkaline Fens	Alkaline fens are groundwater-fed, generally peat-forming systems with extensive areas of species-rich small sedge and brown moss communities. They occur in areas where there is a high-water table and a base-rich, often calcareous water supply.
Alluvial Forests	A number of variants of alluvial woodland habitat exist, of which riparian forests of ash (Fraxinus excelsior) and alder (Alnus glutinosa) (Alno-Padion) of temperate and Boreal Europe lowland and hill watercourses are the most common in Ireland. All types occur on heavy soils which are periodically inundated by the annual rise of river levels but otherwise well-drained and aerated during low water.
Appropriate Assessment (AA)	An appropriate assessment (AA) is an assessment of the potential adverse effects of a plan or project (in combination with other plans or projects) on Special Areas of Conservation and Special Protection Areas. These sites are protected by National and European Law.
Atlantic Salt Meadows	Atlantic salt meadows generally occupy the widest part of the saltmarsh gradient. They also contain a distinctive topography with an intricate network of creeks and salt pans occurring on medium and large-sized saltmarshes.
Blanket Bogs	Blanket bogs occur in areas of consistently high rainfall (>1,250mm and >225 rain days per annum) where the ground surface is waterlogged for much of the time, resulting in the development of deep peats.
Boreholes	A borehole is a narrow shaft bored in the ground, either vertically or horizontally.
Calcareous Rocky Slopes	Calcareous rocky slopes habitat consists of vertical or near-vertical exposures of calcareous bedrock with cracks, fissures and overhangs that support chasmophytic vegetation (i.e. vegetation in crevices).
Coastal Lagoons	Lagoons are expanses of coastal salt water, of varying salinity, which are wholly or partially separated from the sea by sand banks or shingle, or less frequently by rocks.
Cone Penetration Test (CPT)	The cone penetration or cone penetrometer test (CPT) is a method used to determine the geotechnical engineering properties of soils and delineating soil stratigraphy.
Ecology	Ecology is a branch of biology concerning the spatial and temporal patterns of the distribution and abundance of organisms, including the causes and consequences.
Embryonic Shifting Dunes	Embryonic shifting dunes are low sand mounds, generally less than a metre high, occurring between the high tide mark and the partially stabilised marram (white) dunes. Embryonic shifting dunes are unstable habitats where wind-blown sand is common, and they are still vulnerable to saltwater intrusion.
Environmental Receptors	Environmental receptors are any organism, habitat or natural resource which could be adversely affected by an activity.
Estuaries	Estuaries are coastal inlets with a significant freshwater influence. They are diverse, dynamic habitats that help maintain the health of coastal ecosystems. They are a significant resource for bird and mammal species for feeding, breeding and resting, and depending on their geomorphology and hydrology support a mosaic of other habitats, including Annex I habitats such as mudflats.
European Dry Heaths	Dry heath comprises vegetation dominated by ericaceous dwarf shrubs and usually occurs on well-drained, nutrient-poor and acidic mineral soils or shallow peats (typically <50cm deep) on sloping ground.
Favourable Conservation Status	The Habitats Directive requires EU Member States to achieve FCS of natural habitats and species, defined with respect to species by Article 1 (i) of the Directive as below: "conservation status will be taken as 'favourable' 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."

Foreshore	The foreshore of Ireland is classed as the land and seabed between the high water of ordinary or medium tides (shown HWM on Ordnance Survey maps) and the twelve-mile limit (12nm = 22.224km). The foreshore also covers the tidal reaches of rivers.
Foreshore License Application Area	An area within the 12nm boundary of the Irish coastline where a Foreshore License Application is submitted to the Department of Housing, Local Government and Heritage for a licence to undertake activities within that area.
Geophysical Activities	Geophysical surveys are ground-based physical sensing techniques that produce a detail image or map of an area.
Geotechnical Activities	Geotechnical investigation and evaluation methods to acquire and evaluate subsurface information, including drilling and sampling, laboratory testing, cone penetration testing, and pressure meter testing.
Grab Samples	A grab sample is a sample of sediment taken from the seabed.
Large Shallow Inlets and Bays	Large shallow inlets and bays are indentations of the coast with limited freshwater influence. They vary widely in habitat and species diversity depending on their location, exposure, geology, and sediment composition, which determine their constituent habitat communities.
LiDAR	LiDAR is a method for measuring distances by illuminating the target with laser light and measuring the reflection with a sensor. Differences in laser return times and wavelengths can then be used to make digital 3-D representations of the target. It has terrestrial, airborne, and mobile applications.
Magnetometer	A magnetometer is a device that measures magnetism—the direction, strength, or relative change of a magnetic field at a particular location.
MARPOL	MARPOL is the main international convention aimed at the prevention of pollution from ships caused by operational or accidental causes. It was adopted at the International Maritime Organization (IMO) in 1973. The Protocol of 1978 was adopted in response to a number of tanker accidents in 1976–1977.
Mediterranean Salt Meadows	Mediterranean salt meadows occupy the upper zone of saltmarshes and usually occur adjacent to the boundary with terrestrial habitats. They are widespread on the Irish coastline; however, they are not as extensive as Atlantic salt meadows.
Metocean	Metocean conditions refer to the combined wind, wave and climate conditions as found on a certain location. They are most often presented as statistics, including seasonal variations, scatter tables, wind roses and probability of exceedance.
Molinia Meadows	Molinia meadows are represented in Ireland by both fen and grassland communities on nutrient-poor soils.
Mudflats and Sandflats	Tidal mudflats and sandflats habitat is comprised of the intertidal section of the coastline where sands and muds dominate.
Multibeam Echosounder (MBES)	An echosounder uses sound waves to measure water depth. A transducer mounted under a vessel emits a pulse which travels through the water to the seafloor and bounces back to a receiver. The time it takes for the signal to return is measured, and because the speed of sound through water) is known, the water depth under the boat is measured. This is the basic principle of hydrography and seafloor mapping. A multibeam echosounder (MBES) measures multiple echoes at a time.
Natura Impact Statement	NIS: Natura Impact Statement; the statement prepared following Appropriate Assessment of Natura 2000 sites as required under the Habitats Directive which presents information on the assessment and the process of collating data on a project and its potential significant impacts on Natura 2000 site(s).
Natural Eutrophic Lakes	Lakes and ponds with mostly dirty grey to blue-green, more or less turbid, waters, particularly rich in dissolved bases (pH usually > 7), with free-floating surface communities of the Hydrocharition or, in deep, open waters, with associations of large pondweeds (Magnopotamion).
Oligotrophic to Mesotrophic Standing Waters	Typified by habitats with *Najas flexilis*, this is a more species rich habitat than 3110. It also contains *Isoetes lacustris, Isoetes echinospora*, and *Littorella uniflora*, but combined with some broad-leaved pondweeds such as *Potamogeton perfoliatus*. While frequently associated with peatland, this habitat type is found in catchments with more mixed geology, including at least some base-rich influence and pH closer to neutral (pH 7).

Perennial Vegetation	Vegetated shingle occurs along the coast where shingle (cobbles, pebbles, and gravel ≥2mm wide) has accumulated to form elevated ridges or banks above the high tide mark.
Petrifying Springs	Petrifying springs are lime-rich water sources where tufa is actively deposited and where characteristic species of bryophytes are dominant or abundant. The emerging spring water is rich in carbon dioxide and dissolved calcium carbonate.
Pollution Event	A 'pollution incident' includes a leak, spill or escape of a substance, or circumstances in which this is likely to occur.
Foreshore Licence Application Site Investigation Area	Proposed area for Foreshore License to undertake site investigations to develop offshore windfarm and cable routes.
Receiving Environment	The receiving environment is the environment upon which a proposed activity might have effects.
Reefs	Reefs are marine features with hard substrate available for colonisation by plants and animals. In Irish waters they range from the intertidal to depths of 4,500m and more than 400km from the coast.
Sandbanks	Sandbanks are distinct banks that arise from horizontal or sloping plains of sediment that ranges from gravel to fine sand. They are primarily composed of sandy sediments permanently covered by water, at depths of less than 20m below chart datum.
Side Scan Sonar (SSS)	Side-scan uses a sonar device that emits conical or fan-shaped pulses down toward the seafloor across a wide-angle perpendicular to the path of the sensor through the water, which may be towed from a surface vessel or submarine or mounted on the ship's hull.
Siliceous Rocky Slopes	Siliceous rocky slope habitat consists of vertical or near-vertical exposures of siliceous bedrock with clefts, crevices, fissures, and overhangs that support chasmophytic vegetation (i.e. vegetation in crevices).
Siliceous Scree	Siliceous scree habitat consists of accumulations of siliceous rock fragments on slopes below upland cliffs or on exposed / frost-shattered mountain summits or ridges.
Special Areas of Conservation	These are prime wildlife conservation areas in the country, considered to be important on a European as well as Irish level. The EU Habitats Directive lists certain habitats and species that must be protected within SACs.
Special Protection Areas	Ireland is required under the terms of the EU Birds Directive (2009/147/EC) to designate Special Protection Areas (SPAs) for the protection of: Listed rare and vulnerable species, regularly occurring migratory species and wetlands especially those of international importance.
Sub-Bottom Profiler	A sub-bottom profiler is a type of sonar system that produces a 2-dimensional stratigraphic cross section by using acoustic energy to image sub-surface features in an aquatic environment.
Vegetated Sea Cliffs	A sea cliff is a steep or vertical slope located on the coast, the base of which is in either the intertidal or subtidal zone. Hard cliffs, composed of hard rock such as basalt, are at least 5m high, while soft cliffs, composed of softer substrates such as shale or boulder clay, are at least 3m high.
Vibrocore	Vibrocoring is a sediment sampling methodology for retrieving continuous, undisturbed cores. Vibrocorers can work in a variety of water depths and can retrieve core samples at different lengths depending on sediment lithology and project objectives.
Water Courses	Natural or artificial channels through which water flows.
Wave Buoy	Wave buoys are used to measure the movement of the water surface as a wave train. The wave train is analysed to determine statistics like the significant wave height and period, and wave direction.

1 Introduction

North Irish Sea Array Windfarm Limited, which is a wholly owned subsidiary of Statkraft Ireland Ltd. (Statkraft) provides this report in support of an application for a Licence under Section 3 of the Foreshore Act, as amended, to carry out site investigation works to determine the suitability of the application area as a cable corridor area for the North Irish Sea Array (NISA) offshore wind farm.

Statkraft is currently investigating the feasibility of developing the NISA wind farm located off the coast of Co. Dublin, Meath and Louth and previously submitted a foreshore licence application (FS007031) for the site investigations on the array site (shown in red outline in Figure 1-1). Statkraft intends to undertake further site investigations activities at the proposed Foreshore Licence Application Area for export cable route (shown in red outline in Figure 1-1) in order to inform the location and design of the export cable route to facilitate the export cable between the array site and the landfall. The site investigation activities will include geophysical, geotechnical, ecological and archaeological surveys.

1.1 Aim of this report

This report is part of the Foreshore Licence Application to the Foreshore Unit of the Department of Housing, Local Government and Heritage and includes the Appropriate Assessment process as required under the Habitats Directive (92/43/EEC).

This report aims to support the application process and provide the necessary information to the competent authorities to assist them in making an informed decision on the likely impact of this project on the receiving environment.

1.2 Structure of the Report

This report is structured into the following chapters to include information relating to the receiving environment, Special Areas of Conservation (SAC), Special Protection Areas (SPA), qualifying interests (QIs), the potential impacts and Appropriate Assessment (AA) process and other environmental receptors. Specifically, the chapters of this report are as follows:

- Chapter 2: Habitats Directive (92/43/EEC) (outlines key aspects of the process)
- Chapter 3: Description of Receiving Environment
- Chapter 4: Potential Environmental Impacts
- Chapter 5: Appropriate Assessment Screening (Stage 1 Screening)
- Chapter 6: Appropriate Assessment (Stage 2 Natura Impact Statement)
- Chapter 7: Marine Mammals Risk Assessment for those marine mammals not listed as Qualifying Interests of Special Areas of Conservation within the zone of influence of the project

1.3 Foreshore License Application Area

This Foreshore Licence Application seeks consent to conduct site investigation activities in order to inform the location and design of the export cable route off the coasts of Co. Dublin and Co. Meath. This is not an application for a windfarm development. The Foreshore Licence Site Investigation Area is all within 12 nautical miles of the coast, in keeping with the current foreshore legislation which does not provide for licences beyond that distance. The site is defined as an irregular polygon which extends out from the High-Water Mark to approximately 16km offshore to the array site, with the depths ranging between 0 m and 41.3 m. The Foreshore Licence Site Investigation Area for the cable assessment area has a total area of 106.2 km^2.

Statkraft will investigate three landfalls and cable routes options but not all routes will be used for the wind farm cabling. The purpose of this site investigation is to investigate the feasibility of the different routes to allow Statkraft to determine the most preferred option. If the site investigation activities indicates that the area is suitable for the export cable from the array site to shore, the design of the cable, cable route and landing points etc. will be incorporated into the overall project design. The overall project will then be progressed in accordance with the National Marine Planning Framework and other relevant legislation in due course including the new consenting regime for offshore renewable energy being legislated for through the Maritime Area Planning Bill 2021.

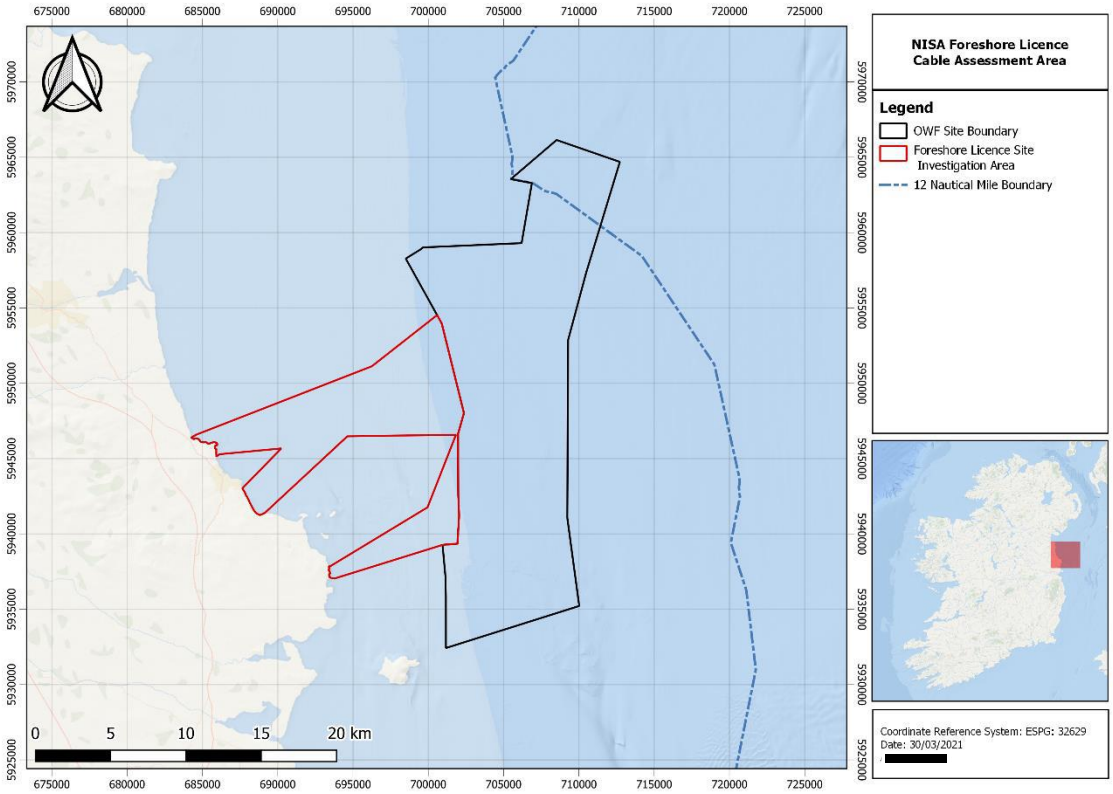

Figure 1-1: Foreshore Licence Site Investigation Area presenting three landfall and cable route options which will be narrowed down following the site investigations - cable assessment area and NISA array site boundary (NISA array site inside the 12nm boundary is subject to a separate Foreshore Licence Application - FS007031).

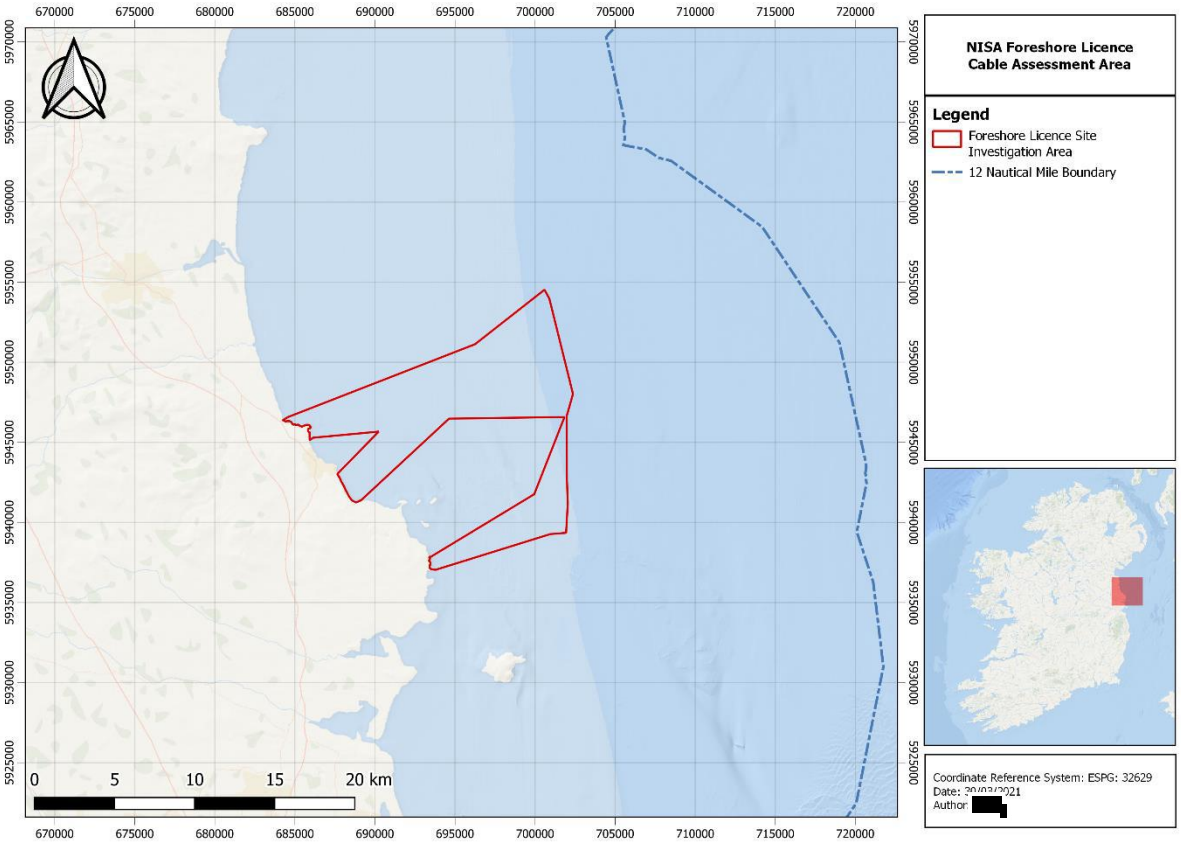

Figure 1-2: Foreshore Licence Site Investigation Area presenting three landfall and cable route options which will be narrowed down following the site investigations.

Table 1-1: Foreshore Licence Site Investigation Area Coordinates

System: IRENET95 ITM			WGS 84 / UTM zone 30N	
ID	Easting	Northing	Easting	Northing
1	734619.1	774283.2	304531.1	5954313.9
2	734914.2	773720.0	304785.9	5953731.3
3	736305.0	767750.8	305753.9	5947679.0
4	735893.8	766379.9	305247.4	5946340.4
5	735852.6	762367.7	304924.6	5942340.8
6	735884.9	760941.0	304856.7	5940915.4
7	735752.6	759088.9	304594.8	5939077.1
8	734760.4	759022.8	303600.4	5939080.8
9	727568.8	756893.2	296276.5	5937460.9
10	727332.9	756934.2	296044.2	5937518.4
11	727206.8	757704.5	295972.3	5938295.7
12	727295.8	757718.8	296062.2	5938303.7
13	733798.3	761528.6	302816.4	5941648.0
14	735754.5	766318.6	305104.1	5946289.0
15	728541.3	766318.6	297908.4	5946795.6
16	722966.4	761290.8	291993.6	5942171.1

17	721529.9	762972.0	290678.5	5943949.2
18	724142.3	765573.2	293467.4	5946360.9
19	720033.1	765246.7	289345.0	5946323.7
20	719817.1	765094.9	289118.8	5946187.5
21	718193.6	766390.2	287590.1	5947593.9
22	718494.1	766561.4	287901.9	5947743.5
23	730235.3	770944.7	299923.3	5951291.6

1.4 Marine Site Investigation Activities

The objective of this proposed site investigation activities is to determine detailed site conditions including seafloor geology and environmental characteristics. This includes detailed mapping of geology, seabed features (i.e. archaeology) and baseline environmental conditions within the site. This will provide confirmation of seabed character and all geotechnical design data for the proposed windfarm export cable corridor. The data will also allow impacts to be predicted, and subsequently appropriate mitigation measures to be developed. It may also be used at a later stage to provide a baseline for the purpose of post construction and operational stage monitoring as well as decommissioning studies. The exact technical specifications of equipment to be used will not be known until the survey contract has been awarded.

For the purposes of the assessment, typical acoustic properties of equipment are provided. The acoustic frequencies given below are indicative. These may change on site if dictated by the ground conditions.

1.4.1 Geophysical survey

The proposed geophysical survey programme involves a multi-disciplinary approach that is designed to acquire a full suite of data which includes a multibeam echosounder, side scan sonar, magnetometer, sub-bottom profiler and higher energy sound source surveys. The collected data will be used to better understand the existing geophysical, geotechnical and environmental conditions within the site.

The process is not physically intrusive and at no point will the equipment interact with the foreshore3. The exact equipment to be used will be confirmed following a tender process to procure the site investigation contractor.

1.4.2 Geotechnical survey

The geotechnical survey will be undertaken in order to establish the nature and mechanical properties of the superficial seabed sediments within the site investigation area. The exact location and spacing of the geotechnical sampling, will be determined following interpretation of geophysical data (either existing available data if it is of sufficient coverage and quality or newly acquired data if necessary).

1.4.3 Benthic ecology survey

The aim of the survey is to determine the distribution and extent of marine benthic habitats to include subtidal and intertidal zones (with attention to Annex I habitats) within and adjacent to the site investigation area. The exact sampling locations for subtidal benthic survey will be determined following interpretation of geophysical data and selected to sample different habitats. The intertidal walkover survey will inform on the intertidal sampling locations. Seafloor sampling will be undertaken for physio-chemical analysis (sediment grain size and a suite of chemical determinants) and biological analysis (benthic infauna), in order to determine the occurrence and distribution of species/habitats within the site investigation area.

Geophysical data (existing or newly acquired if necessary) will be examined prior to any intrusive site investigation activities to identify any potential areas of biogenic or stony reef so that they may be avoided.

The proposed programme of site investigation activities to be undertaken within the site investigation area is summarised in Table 1-2 below.

Table 1-2: Summary of site investigation activities methodologies

Survey	Methods /Techniques	Purpose
Hydrographical and Geophysical	Multibeam Echosounder (MBES)	MBES is a system for collecting detailed topographical data of the seabed. The R2Sonic 2024 may be taken as an indicative example of a MBES system to be used in the completion of these works. For these surveys the equipment will operate at a typical central frequency of 400kHz (700kHz optional) with sound pressure levels in the range of 200-228dB re1µPa @1m.
	Side Scan Sonar (SSS)	SSS surveys are used to determine sediment characteristics and seabed features. The Edgetech 4200 may be taken as an indicate example of an SSS device and for these surveys will have a potential operating frequency range of approximately 300 to 900 kHz with sound pressure levels of 228dB re1µPa @1m.
	Magnetometer	A magnetometer is used to identify magnetic anomalies and hazard mapping for metal obstructions, shipwrecks and unexploded ordnance on the surface and in the shallow sub-surface. The Geometrics G-882 can be taken as an indicative equipment example, it is a passive device (i.e. it does not emit any sound waves into the marine environment).
	Sub-bottom Profiling (SBP)	SBP is used to develop an image of the subsurface, identifying different strata encountered in the shallow sediments. The Innomar SES-2000 Medium is an indicative example of a parametric system with a primary and secondary frequency range of 85-115kHz and 2-22kHz, respectively, and sound pressure levels of up to 247 dB (typically operated at <200dB) re1µPa

		@ 1m. The Seatronics Edgetech 3300 is an indicative example of a hull-mounted pinger system with an operating frequency range of approximately 2-16 kHz with sound pressure levels of 200dB re1µPa @1m. The Applied Acoustics AA301 is an indicative example of a boomer, with sound pressure levels in the range of 208-215dB re1µPa @ 1m. The Geo-Source 200 lightweight or the Applied Acoustics Squid 500 are indicative examples of sparker systems used in sub-bottom profiling, with sound pressures in the range of 204-216dB re1µPa @1m.
	Higher Energy Sub-surface Acoustic Sources (for example: Sparker systems, eSource)	Sub-surface acoustic surveys are used to image the subsurface and categorise sediment strata. These surveys can create 2D or 3D images of the subsurface. The intensity of the source varies depending on the requirements of the survey. Higher energy sub-surface sources used in multi-channel surveys will only be used if sufficient depth data is not achieved with the use of the Sub-bottom profiling methods.
Geotechnical	Downhole Sampling	A total of 6 sampling boreholes to 40m at each landfall for cable landfall assessment. Both bedrock and gravel tills may occur at depths from mudline to >40mbsf, both materials, particular gravel tills can be problematic for HDD. A variety of sampling methods including large diameter Geobor S coring to be utilised. Samples and cores to be retained for onshore laboratory testing. Water depths for nearshore restrict SI to be conducted from jack-up units. Each sampling borehole shall be paired with a CPT borehole. There may be recommendations for sampling boreholes along export cable route in locations where bedrock outcrops at shallow depths and CPT or seabed sampling penetration is limited. These may replace some vibrocore locations. The final number and location of SI points may be informed by the geophysical survey results or existing information.
	Cone Penetration Tests (CPTs)	CPTs are a method for testing in situ soil parameters. CPT can be performed as either Seabed CPTs or downhole in boreholes. A total of 6 CPT boreholes with target depth of 40m at each landfall, co-located with each sampling borehole. Up to 70 CPT seabed CPT locations to a depth of 6 to 10m bsf (approx. 1 every 500m co-located with seabed sampling points along the export cable route until

		water depths become prohibitive). The spacing interval will be determined by the variability and level of understanding of the shallow geology. The final number and location of SI points will be informed by the geophysical survey results.
	Seabed Sampling	Up to 70 vibrocore samples with a target depth of 6m bsf (approx. 1 every 500m co-located with seabed CPT points along the export cable route until water depths become prohibitive). Up to 70 grab samples shall be completed through the export cable route areas as part of benthic studies and for ground truthing.
Ecological	Bird Survey	Identify bird species distribution and behaviour within the Foreshore Licence Site Investigation Area. This does not require a licence under the Foreshore Act 1933, as amended and is included for information only.
	Fisheries Survey	Identify fish species distribution within the Foreshore Licence Site Investigation Area. Exact details of monitoring required will be determined through engagement with the relevant authorities such as SFPA, the Marine Institute and through local knowledge where appropriate.
	Subtidal benthic survey, intertidal habitat walkover survey and sampling	This survey is designed to identify the benthic communities and habitats within the Foreshore Licence Site Investigation Area. This may consist of an intertidal walkover survey of the proposed landfall locations with identification of the main habitats present (in the form of biotope mapping). Features of conservation importance will be identified by means of intertidal habitat mapping with core/quadrat sampling and hard substrate quadrat sampling where appropriate. Subtidal sample locations may be subject to drop down video or ROV inspection in advance of sampling. Up to 70 no. subtidal and 20 intertidal locations (at each landfall) will be sampled. Multiple samples will be taken at each location.
	Marine Mammal Survey	Identify marine mammal species distribution within the Foreshore Licence Site Investigation Area. This does not require a licence under the Foreshore Act 1933, as amended and is included for information only. The marine mammal observational studies will be run concurrently with bird surveys.
	Marine Mammal Acoustic Monitoring	Marine mammal acoustic monitoring using CPODs deployed on the seabed. SoundTrap hydrophones may be deployed alongside the CPODs for periods

		throughout the monitoring campaign. Either 2 permanent sites will be selected, or the 2 sites will be relocated every 3 months during battery change. The CPOD locations are subject to archaeological survey results.
Archaeological	Underwater Archaeology	Identification and assessment of metallic and other targets recorded if required during the marine geophysical surveys.

The geophysical and geotechnical scope of works outlined in Table 1-2 and Figure 1-3 refer to the preliminary stage of site investigation activities.

The Preliminary Campaign is intended to inform the developer of the baseline ground conditions and to facilitate early-stage concept development. It generally includes a geophysical campaign and the preliminary geotechnical campaign. The information obtained will also be used for the design of future site investigations including the selection of appropriate drilling equipment and testing techniques to match the ground conditions.

Figure 1-3 below shows the indicative geotechnical and benthic ecology site investigation locations across the Foreshore Licence Site Investigation Area. Figure 1-4, Figure 1-5 and Figure 1-6 shows the indicative geotechnical investigation locations along the northern, central and southern landfall areas respectively.

Offshore site investigation activities including the benthic ecology survey and deployment of ecological devices (CPODs) aren't necessarily tied to any campaign phase, rather they are planned to take advantage of suitable weather windows and availability of vessels.

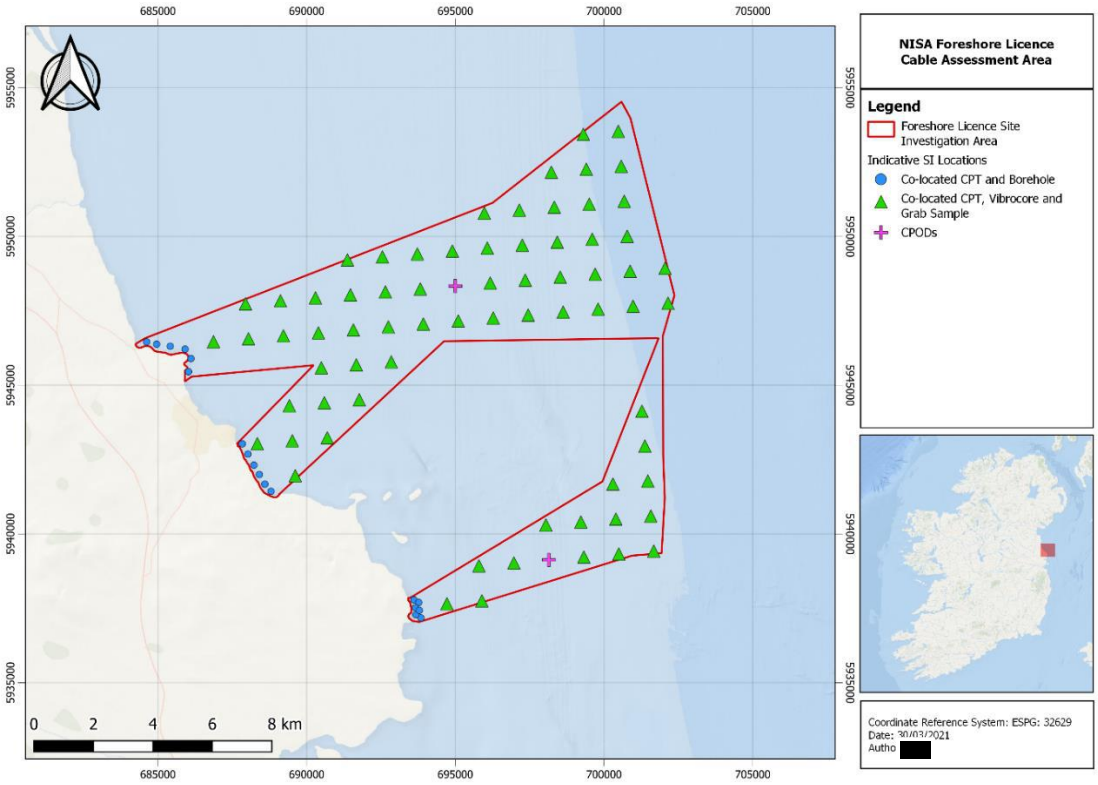

Figure 1-3: Indicative Geotechnical and Ecological Site Investigation locations presenting three landfall and cable route options which will be narrowed down following the site investigations.

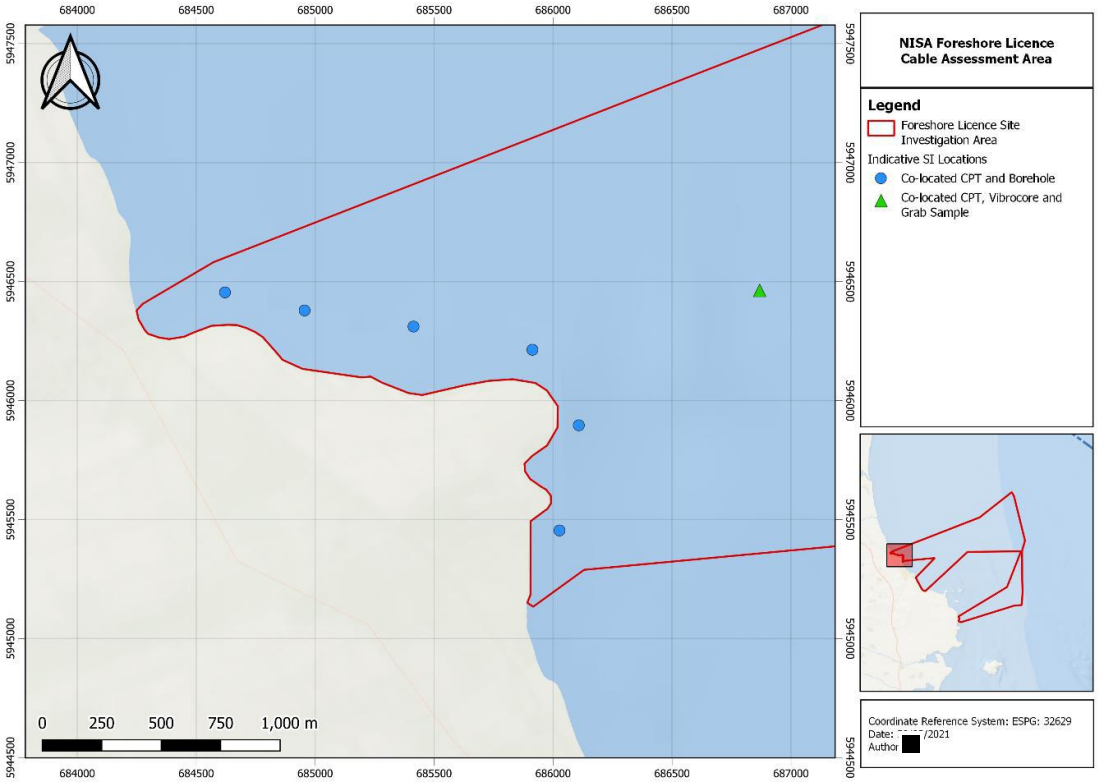

Figure 1-4: Northern Landfall Area

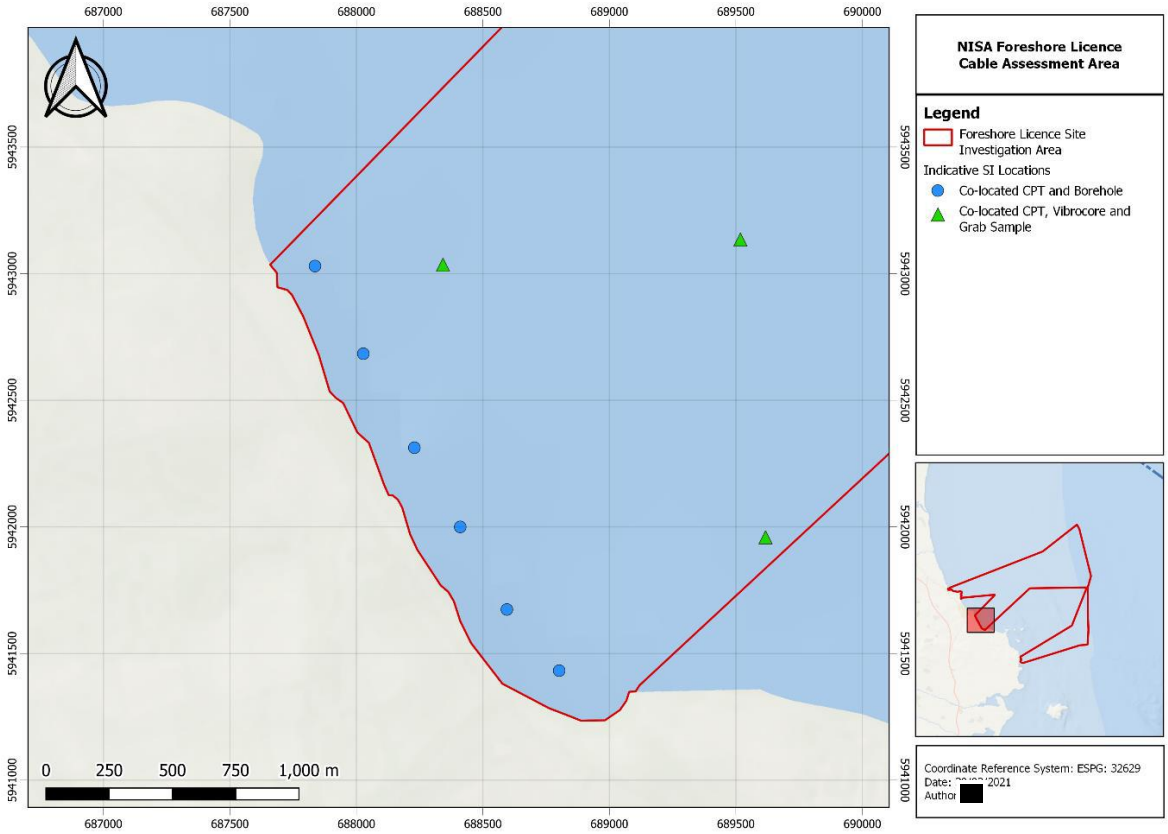

Figure 1-5: Central Landfall Area

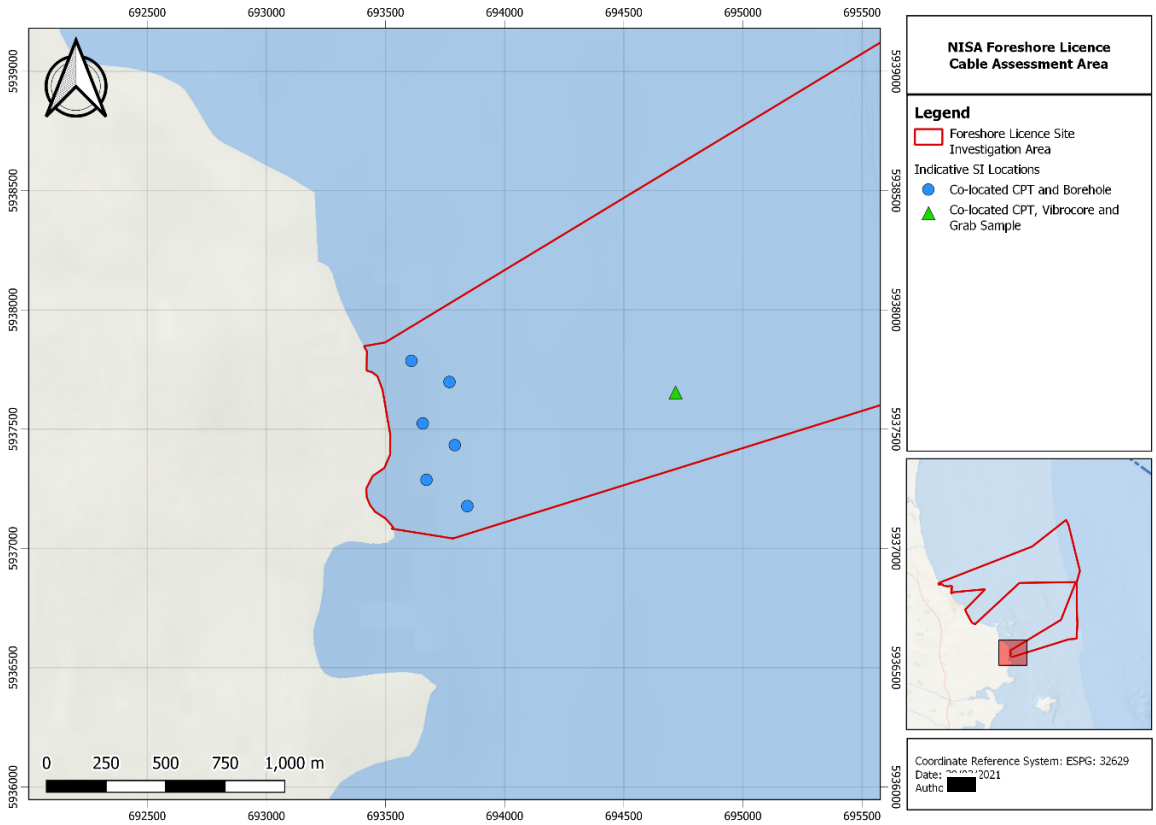

Figure 1-6: Southern Landfall Area

1.5 Survey Schedule

This Foreshore Licence application is for site investigations necessary to establish the optimum location for and design of the export cable(s) to shore and to establish the most appropriate landfall location for the export cable(s) for the North Irish Sea Array (NISA), located off the coasts of Dublin, Meath and Louth. The NISA project was granted "Relevant Status" under the transitional protocol published as an Appendix to the Frequently Asked Questions for the General Scheme of the Marine Planning and Development Management Bill in early 2020 (now the Maritime Area Planning Bill (MAP)). The transitional protocol is a means by which projects that were sufficiently advanced under the Foreshore Act or those projects that had an agreed grid connection could move from the Foreshore Act to the new marine consent system being legislated for under MAP.

As a "Relevant Project" NISA aims to apply for a Conditional Marine Area Consent (CMAC) before the end of 2021 once the process opens for relevant projects following enactment of MAP. To feed into the CMAC process and the subsequent planning application which NISA intends to submit in 2022 NISA intends to undertake site investigations as soon as possible following execution of the licence.

2 Habitats Directive (92/43/EEC)

The purpose of this report is to inform the Appropriate Assessment process as required under the Habitats Directive (92/43/EEC). The Appropriate Assessment Screening contained in Section 5 of this report will determine whether the site investigation activities, either alone or in combination with other planned activities under this application and other relevant applications identified in this report, are likely to have a significant effect on any Natura 2000 or its qualifying interests within the zone of influence of the project. This document includes Stages 1 and 2 (Screening and Natura Impact Statement) of the Appropriate Assessment Process.

This report has been prepared in accordance with the following guidance:

1. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010 revision)
2. Appropriate Assessment under Article 6 of the Habitats Directive; Guidance for Planning Authorities. Circular NPWS 1/10 and PSSP 2/10
3. Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission Environment Directorate General, 2001);
4. Guidance Document on Article 6(4) of the Habitats Directive 92/43/EEC (European Commission, 2007);
5. Guidance to Manage the Risk to Marine Mammals from Manmade Sound Sources in Irish Waters. Prepared by National Parks and Wildlife Service, DAHG (2014).
6. Guidelines for Good Practice: Appropriate Assessment of Plans under Article 6(3) Habitats Directive (International Workshop on Assessment of Plans under the Habitats Directive, 2011);
7. Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000).
8. Marine Natura Impact Statements in Irish Special Areas of Conservation: A working document. Prepared by National Parks and Wildlife Service, DAHG (2012).
9. Managing Natura 2000 Sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (European Commission - 21 November 2018)

2.1 Legislative Background

The Habitats Directive (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) adopted in 1992, transposed into Irish Law in 1997 and as subsequently amended and consolidated aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It provides a framework for legal protection to ensure the conservation of a wide range of rare, threatened, or endemic animal and plant species throughout the European Union.

The Birds Directive (Conservation of Wild Birds Directive (79/409/EEC)) aims to protect all of the 500 wild bird species naturally occurring in the European Union. The Habitats Directive, along with the Birds Directive forms the cornerstone of the European Union's nature conservation policy. Together

they form a coherent network of protected areas (Special Areas of Conservation and Special Protection Areas), called Natura 2000, safeguarded against potentially damaging developments.

The requirement for "Appropriate Assessment" is set out in Articles 6(3) and 6(4) of the Habitats Directive (92/43/EEC). If a project is likely to have a significant effect on a Natura 2000 site, either alone or in combination with other plans or projects, it must undergo an appropriate assessment (AA). According to Article 6(3) of the Habitats Directive:

“Any plan or project not directly connected with or necessary to the management of the site (Natura 2000 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 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.

Article 6(4) states: “If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of

2.2 The Appropriate Assessment Process

The European Commission’s methodological guidance (EC, 2001) promotes a four-stage process to complete the AA and outlines the issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required. The four stages are summarised diagrammatically below, and the steps and procedures involved in completing each stage follows. Stages 1-2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

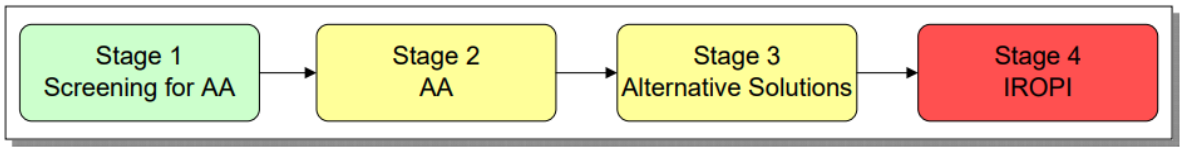

Figure 2-1: Stages in the AA process (Source: DEHLG, 2009)

Stage 1. Screening for Appropriate Assessment

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i. whether a plan or project is directly connected to or necessary for the management of the site, and

ii. whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the process must proceed to Stage 2 (AA). Screening should be undertaken without the inclusion of mitigation, unless potential impacts clearly can be avoided through the modification or redesign of the plan or project, in which case the screening process is repeated on the altered plan. The greatest level of evidence and justification will be needed in circumstances when the process ends at screening stage on grounds of no impact.

Stage 2. Appropriate Assessment

This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project will be required to submit a Natura Impact Statement, i.e. the report of a targeted professional scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, taking account of in combination effects. This should provide information to enable the competent authority to carry out the appropriate assessment. If the assessment is negative, i.e. adverse effects on the integrity of a site cannot be excluded, then the process must proceed to Stage 4, or the plan or project should be abandoned. The AA is carried out by the competent authority and is supported by the NIS.

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. The process must return to Stage 2 as alternatives will require appropriate assessment in order to proceed. 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.

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. Compensatory measures must be proposed and assessed. The 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, Local Government and Heritage.

3 Receiving Environment

The Foreshore Licence Site Investigation Area is located in the Irish Sea off the Co. Dublin and Meath coasts. The total Foreshore Licence Site Investigation Area is approximately 115.7 km^2 (11570 ha). All site investigation activities under the Foreshore License Application will be confined to the Foreshore Licence Site Investigation Area within the foreshore 12 nautical mile limit. The full description of planned site investigation activities is contained within the NISA Cable Corridor Foreshore Licence Application: Schedule of Works document accompanying this application.

To understand the potential impacts on the receiving environment it is important to outline the present state of the environmental baseline data of the Foreshore Licence Site Investigation Area. In this section, the receiving environment is described, paying particular attention to Natura 2000 (SACs and SPAs) which have the potential to be impacted, highlighting environmental receptors which could be affected by the proposed site investigation activities. Figure 1-3 shows the indicative locations of where site investigation activities will interact with the seafloor.

3.1 Marine Benthos

The benthic macroinfaunal invertebrates are considered a useful group to study in species assemblage mapping and environmental monitoring studies. This is because the majority of species are essentially sedentary, and their natural distributions usually show good relationships with their sedimentary habitat and depth. Their responses to environmental change can be easily measured. They are an integral part of marine food webs and can be an important source of food for certain commercially exploited fish and invertebrates. More practically, the taxonomic literature on the worms, crustaceans, molluscs and echinoderms that are the main components of the macrofauna is generally good. Soft-bottom benthos can be readily sampled by grabs, dredges and trawls.

Available data (EMODnet – 2019) indicates that water depths in the area range from 0 m to 41.3 m in the Foreshore Licence Site Investigation Area. The sediments underlying the application area are comprised predominantly of sand sediment and areas of sandy mud and occasional rock. Figure 3-1 illustrates the predominant substrate type surrounding the Foreshore Licence Site Investigation Area.

Taking into consideration the substrate type within the Foreshore Licence Site Investigation Area as well as exposure to strong tidal streams, there is a possibility that habitats listed in Annex I of the Habitats Directive (92/43/EEC) are present in the Foreshore Licence Site Investigation Area including but not limited to biogenic reefs and bedrock reefs.

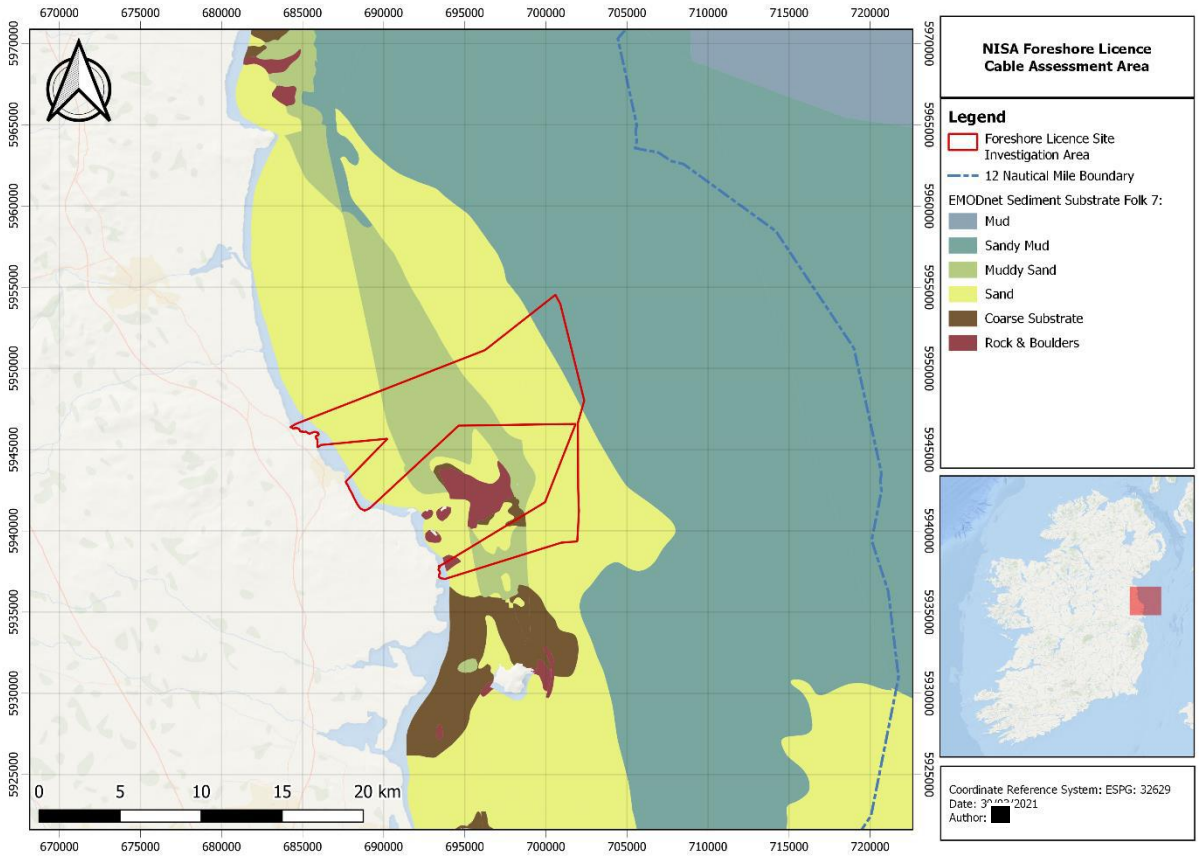

Figure 3-1: Predominant Sediment Type (EMODnet, 2019)

3.2 Natura 2000 Sites

3.2.1 Special Conservation Interests (SCI) (Birds)

Note: Guidance from the National Parks and Wildlife Service (Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities) (DEHLG, 2010) recommends that the distance chosen for appropriate assessment screening should be evaluated on a case-by-case basis and should be proportionate to the proposed activities. The activities proposed under this foreshore licence application are of a temporary nature and expected to have only localised effects (Refer to Section 4 and Section 5 for further detail). While birds from SPAs further away than 15km may enter the survey area, any effects would be to individual birds only and not likely to effect bird species on a population basis. Therefore, considering the nature of the surveys, consideration of SPAs within 15km is considered sufficient for the purposes of this assessment.

Ireland is host to several nationally and internationally important bird species which inhabit areas with coastal sea cliffs, estuaries, and offshore islands. Many of these areas have therefore been designated as Special Protection Areas (SPA). Coastal habitats provide important breeding sites for many species of seabirds, many of 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 (Mackey *et al*., 2004). In addition, a further 59 species of waterfowl and wader regularly occur at coastal sites such as estuaries around

Ireland including five grebe species, two 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. Several SPAs are designated along the Co. Dublin and Meath Coasts (Figure 3-2). There is one designated SPA within the Foreshore Licence Site Investigation Area and eight other SPAs within 15 km of the Foreshore Licence Site Investigation Area (Table 3-1). A description of each site is included in this chapter. This information is taken directly from the NPWS site synopses at www.npws.ie with additional more recent data included where available.

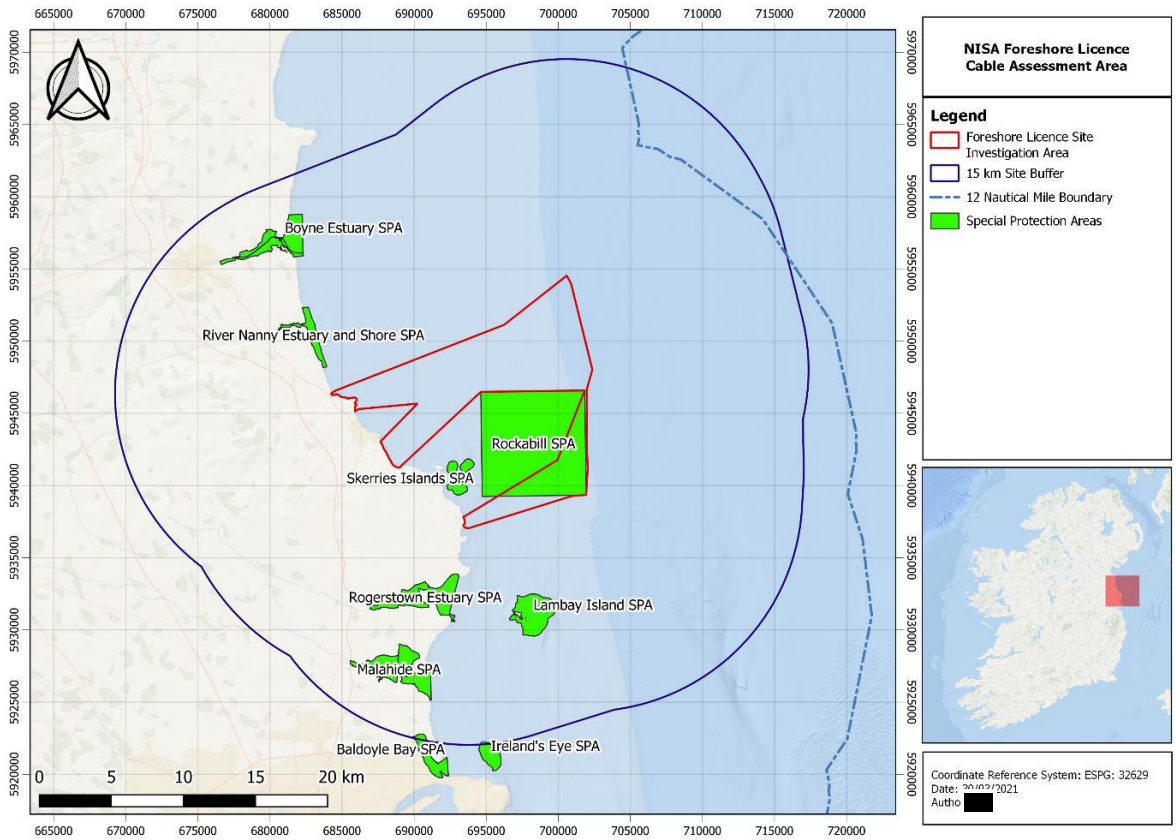

Figure 3-2: Special Protection Areas within 15 km of the Foreshore Licence Site Investigation Area designated under the Bird Directive

Table 3-1: Special Protection Areas within 15 km of the Foreshore Licence Site Investigation Area designated under the Bird Directive

Special Protection Area Name (SPA code)	Distance from FLA Area (km)
Rockabill SPA (004014)	0.0
Skerries Islands SPA (004122)	1.40
River Nanny Estuary and Shore SPA (00415)	1.77
Rogerstown Estuary SPA (004015)	3.25
Lambay Island SPA (004069)	5.45
Malahide Estuary SPA (004025)	9.31
Boyne Estuary SPA (004080)	9.51
Baldoyle Bay SPA (004016)	14.60
Ireland's Eye SPA (004117)	14.83

Rockabill SPA (004014) (NPWS, 2015a)

Rockabill SPA (004014) overlaps the Foreshore Licence Site Investigation Area (Figure 3-2). Rockabill consists of two small, low-lying, granitic islets situated c. 7 km off the Co. Dublin coast. The islands are separated by a narrow channel, though are connected at low spring tides. The main island, known as the Lighthouse Island, is vegetated by a scrubby sward of Tree Mallow (*Lavatera arborea*), with a range of other maritime species occurring, such as Sea Mayweed (*Matricaria maritima*), Sea Campion (*Silene maritima*), Sorrel (*Rumex spp.*), Common Scurvy-grass (*Cochlearia officinalis*), Orache (*Atriplex spp.*) and Rock Sea-spurrey (*Spergularia rupicola*). The smaller island, known as the Bill, is very exposed and is sparsely vegetated. A lighthouse, manned until 1989, is situated on the main island. The site includes the two islands and the surrounding seas to a distance of 3.5 km from the islands.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Purple Sandpiper, Roseate Tern, Common Tern and Arctic Tern.

Skerries Island SPA (004122) (NPWS, 2009b)

Skerries Island SPA (004122) at its closest point lies 1.40 km from the Foreshore Licence Site Investigation Area (Figure 3-2). The Skerries Islands are a group of three small uninhabited islands, Shenick's Island, St Patrick's Island and Colt Island, situated between 0.5 km and 1.5 km off the north Co. Dublin coast. Skerries Islands SPA comprises the three islands and the seas surrounding them, to a distance of 200 m from the shore. The three islands are all low-lying with maximum heights ranging from 8 m to 13 m above sea level. St Patrick's Island and Colt Island have low cliffs, while Shenick's Island has more extensive expanses of intertidal rocky shore and sand flats. Shenick's Island also has a shingle bar and is connected to the mainland at low tides; it became a BirdWatch Ireland Reserve in 1987. The vegetation of the islands is dominated by rank grasses, with Brambles (*Rubus spp.)* and other species such as Hogweed (*Heracleum sphondylium*) occurring commonly.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Cormorant, Shag, Light-bellied Brent Goose, Purple Sandpiper, Turnstone and Herring Gull. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

River Nanny Estuary and Shore SPA (004158) (NPWS, 2015b)

River Nanny Estuary and Shore SPA (004158) at its closest point lies 1.77 km to the west/northwest of the Foreshore Licence Site Investigation Area (Figure 3-2). The site comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (c. 3 km in length), in Co. Meath. The estuarine channel, which extends inland for almost 2 km, is narrow and well sheltered. Sediments are muddy in character and edged by saltmarsh and freshwater marsh/wet grassland.

The saltmarsh is best developed in the eastern portion of the estuarine channel, with species such as Sea Plantain (*Plantago maritima*), Sea Aster (*Aster tripolium*), Red Fescue (*Festuca rubra*) and Sea Purslane (*Halimione portulacoides*) occurring. Further up the estuary, the marsh habitats support

species such as Bulrush (*Typha latifolia*) and Yellow Flag (*Iris pseudacorus*). The shoreline, which is approximately 500 m in width to the low tide mark, comprises beach and intertidal habitats. It is a well-exposed shore, with coarse sand sediments. The well developed beaches, which are backed in places by clay cliffs, provide high tide roosts for the birds. The village of Laytown occurs in the northern side of the River Nanny estuary.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling and Herring Gull. The EU Birds Directive pays particular attention to wetlands, and as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Rogerstown Estuary SPA (004015) (NPWS, 2014a)

Rogerstown Estuary SPA (004015) at its closest point lies 3.25 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-2). Rogerstown Estuary is situated about 2 km north of Donabate in north County Dublin. It is a relatively small, funnel shaped estuary separated from the sea by a sand and shingle peninsula; the site extends eastwards to include an area of shallow marine water. The estuary receives the waters of the Ballyboghil and Ballough rivers and has a wide salinity range, from near full seawater to near full freshwater.

The estuary is divided by a causeway and narrow bridge, built in the 1840s to carry the DublinBelfast railway line. At low tide extensive intertidal sand and mud flats are exposed and these provide the main food resource for the wintering waterfowl that use the site. The intertidal flats of the estuary are mainly of sands, with soft muds in the northwest sector and along the southern shore. Associated with these muds are stands of Common Cord-grass (*Spartina anglica*). Green algae (*mainly Ulva spp*.) are widespread and form dense mats in the more sheltered areas.

The intertidal vascular plant Beaked Tasselweed (*Ruppia maritima*) grows profusely in places beneath the algal mats and is grazed by herbivorous waterfowl (notably Light-bellied Brent Goose and Wigeon). Salt marsh fringes parts of the estuary, especially its southern shores. Common plant species of the saltmarsh include Sea Rush (*Juncus maritimus*), Sea Purslane (*Halimione portulacoides*) and Common Saltmarsh-grass (*Puccinellia maritima*).

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Greylag Goose, Light-bellied Brent Goose, Shelduck, Shoveler, Oystercatcher, Ringed Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit and Redshank. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Lambay Island SPA (004069) (NPWS, 2011a)

Lambay Island SPA (004069) at its closest point lies 5.45 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-2). Lambay Island lies approximately 4 km off the north Co. Dublin coastline and is separated from it by a channel of 10-13 m in depth. East of Lambay Island the water

deepens rapidly into the Irish Sea basin. The island, which rises to 127 m, has an area of 250 ha above high tide mark.

The underlying geology is very varied but is dominated by volcanic igneous rocks (of andesitic type) and ash; also present are shales, limestones and limestone conglomerates. The soils are generally shallow and are derived from glacial tills of Irish Sea origin. The shallow soils are peaty on high exposed ground and above the cliffs. On the western side of the island the land rises gently from a bedrock shoreline. Cobble storm beaches are associated with this shore and at low tide sandflats are exposed within the harbour and below a section of the rocky shore. The northern, eastern and most of the southern shorelines consist of steep cliffs varying from about 15 m to 50 m high. These are backed by vegetated slopes along most of their length. The cliff slopes have a typical maritime vegetation, including such species as Thrift (*Armeria maritima*), Sea Campion (*Silene maritima*), Rock Sea-spurrey (*Spergularia rupicola*) and Spring Squill (*Scilla verna*). Some sheltered gullies have small areas of scrub woodland dominated by Elder (*Sambucus nigra*).

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Fulmar, Cormorant, Shag, Greylag Goose, Lesser Black-backed Gull, Herring Gull, Kittiwake, Guillemot, Razorbill and Puffin. The site is also of special conservation interest for holding and assemblage of over 20,000 breeding seabirds.

Malahide Estuary SPA (004025) (NPWS, 2013a)

Malahide Estuary SPA (004025) at its closest point lies 9.31 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-2). Malahide Estuary is situated in north Co. Dublin, between the towns of Malahide and Swords. The site encompasses the estuary, saltmarsh habitats and shallow subtidal areas at the mouth of the estuary. A railway viaduct, built in the 1800s, crosses the site and has led to the inner estuary becoming lagoonal in character and only partly tidal. Much of the outer part of the estuary is well-sheltered from the sea by a large sand spit, known as “The Island”. This spit is now mostly converted to golf-course. The outer part empties almost completely at low tide and there are extensive intertidal flats exposed.

Substantial stands of eelgrass (both *Zostera noltii* and *Z. angustifolia*) occur in the sheltered part of the outer estuary, along with Tasselweed (*Ruppia maritima*). Green algae, mostly Ulva spp., are frequent on the sheltered flats. Common Cord-grass (*Spartina anglica*) is well established in the outer estuary and also in the innermost part of the site. The intertidal flats support a typical macroinvertebrate fauna, with polychaete worms (*Arenicola marina* and *Hediste diversicolor*), bivalves such as *Cerastoderma edule, Macoma balthica* and *Scrobicularia plana*, the small gastropod *Hydrobia ulvae* and the crustacean *Corophium volutator*. Salt marshes, which provide important roosts during high tide, occur in parts of the outer estuary and in the extreme inner part of the inner estuary. These are characterised by such species as Sea Purslane (*Halimione portulacoides*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea Arrowgrass (*Triglochin maritima*) and Common Saltmarsh-grass (*Puccinellia maritima*).

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Great Crested Grebe, Light-bellied Brent Goose, Shelduck, Pintail, Goldeneye, Red-breasted Merganser, Oystercatcher, Golden Plover, Grey Plover, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit and Redshank. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Boyne Estuary SPA (004080) (NPWS, 2015c)

Boyne Estuary SPA (004080) at its closest point lies 9.51 km to the northwest of the Foreshore Licence Site Investigation Area (Figure 3-2). This moderately-sized coastal site is situated west of Drogheda on the border of Counties Louth and Meath. The site comprises most of the estuary of the Boyne River, a substantial river which drains a large catchment. Apart from one section which is over 1 km wide, its width is mostly less than 500 m. The river channel, which is navigable and dredged, is defined by training walls, these being breached in places.

Intertidal flats occur along the sides of the channelled river. The sediments vary from fine muds in the sheltered areas to sandy muds or sands towards the river mouth. The linear stretches of intertidal flats to the north and south of the river mouth are mainly composed of sand. One or more species of Eelgrass (*Zostera spp.*) occur in the estuary. Parts of the intertidal areas are fringed by salt marshes, most of which are of the Atlantic type, and dominated by Sea-purslane (*Halimione portulacoides*). Other species present include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Plantain (*Plantago maritima*), Lax-flowered Sea-lavender (*Limonium humile*) and Glasswort (*Salicornia spp.*). Common Cord-grass (*Spartina anglica*) occurs frequently on the flats and salt marshes.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone and Little Tern. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Baldoyle Bay SPA (004016) (NPWS, 2014b)

Baldoyle Bay SPA (004016) at its closest point lies 14.60 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-2). Baldoyle Bay, located to the north and east of Baldoyle and to the south of Portmarnock, Co. Dublin, is a relatively small, narrow estuary separated from the open sea by a large sand dune system. Two small rivers, the Mayne River and the Sluice River, flow into the inner part of the estuary.

Large areas of intertidal flats are exposed at low tide. These are mostly sands, but grade to muds in the inner sheltered parts of the estuary. Extensive areas of Common Cord-grass (*Spartina anglica*) occur in the inner estuary. Both the Narrow-leaved Eelgrass (*Zostera angustifolia)* and the Dwarf Eelgrass (*Z. noltii*) are also found here. During summer, the sandflats of the sheltered areas are covered by mats of green algae (*Ulva* spp.). The sediments have a typical macrofauna, with Lugworm

(*Arenicola marina*) dominating the sandy flats. Areas of saltmarsh occur near Portmarnock Bridge and at Portmarnock Point, with narrow strips found along other parts of the estuary. Species such as Glasswort (*Salicornia* spp.), Sea-purslane (*Halimione portulacoides*), Sea Plantain (*Plantago maritima*) and Sea Rush (*Juncus maritimus*) are found here.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Light-bellied Brent Goose, Shelduck, Ringed Plover, Golden Plover, Grey Plover and Bar-tailed Godwit. The EU Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Ireland's Eye SPA (004117) (NPWS, 2011b)

Ireland's Eye SPA (004117) at its closest point lies 14.83 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-2). Ireland's Eye is an uninhabited island located about 1.5 km north of Howth in Co. Dublin. The site encompasses Ireland's Eye, Rowan Rocks, Thulla, Thulla Rocks, Carrageen Bay and a seaward extension of 200m in the west and 500m to the north and east. The island has an area of c. 24 ha above the high tide mark. The underlying geology is Cambrian greywackes and quartzites. These rocks form impressive near vertical cliffs, reaching 69 m, along the northern and eastern sides of the island, with scattered exposures elsewhere on the island and especially in the high northern half.

A tall stack, which is completely cut off from the main island at mid to high tide, occurs at the eastern side of the cliffs. A sandy beach, backed by low sand hills, occurs at Carrigeen Bay on the western shore, while a shingle beach extends from Carrigeen to Thulla Rocks. Elsewhere the island is covered by glacial drift. A low-lying, sparsely vegetated islet, known as Thulla, occurs a little to the south of the island, and an extensive area of bedrock shore (heavily covered by brown seaweeds) is exposed at low tide between Thulla and the main island. There are no watercourses or springs on the island, though two small rainwater ponds form during winter in the north-west and north-east sectors.

The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Cormorant, Herring Gull, Kittiwake, Guillemot and Razorbill.

3.2.2 Annex I Habitats and Associated SACs

Note: Guidance from the National Parks and Wildlife Service (Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities) (DEHLG, 2010) recommends that the distance chosen for appropriate assessment screening should be evaluated on a case-by-case basis and should be proportionate to the proposed activities. The activities proposed under this foreshore licence application are of a temporary nature and expected to have only localised effects (Refer to Section 4 and Section 5 for further detail). In terms of protected habitats within SACs 15km is considered an appropriate distance for inclusion in this screening assessment and subsequent NIS if required for individual sites.

There is one designated Special Areas of Conservation (SAC) within the Foreshore Licence Site Investigation Area (Figure 3-3). There are five Special Areas of Conservation (SAC) located within 15km of the site investigation activities which have a marine element (Figure 3-3). In addition, there is one site (River Boyne And River Blackwater SAC) that does not have a marine element but has a possible connection to the Statkraft Foreshore Licence Site Investigation Area via rivers that discharges within zone of influence of the proposed cable corridor area. These SACs, listed below, are designated for the presence of Annex I habitats listed on the EU Habitats Directive. The descriptions are taken directly from the NPWS site synopses at www.npws.ie with more up to date information included where available.

- Rockabill to Dalkey Island SAC (003000)
- Rogerstown Estuary SAC (000208)
- Lambay Island SAC (000204)
- Malahide Estuary SAC (000205)
- Boyne Coast And Estuary SAC (001957)
- River Boyne And River Blackwater SAC (002299)
- Baldoyle Bay SAC (000199)

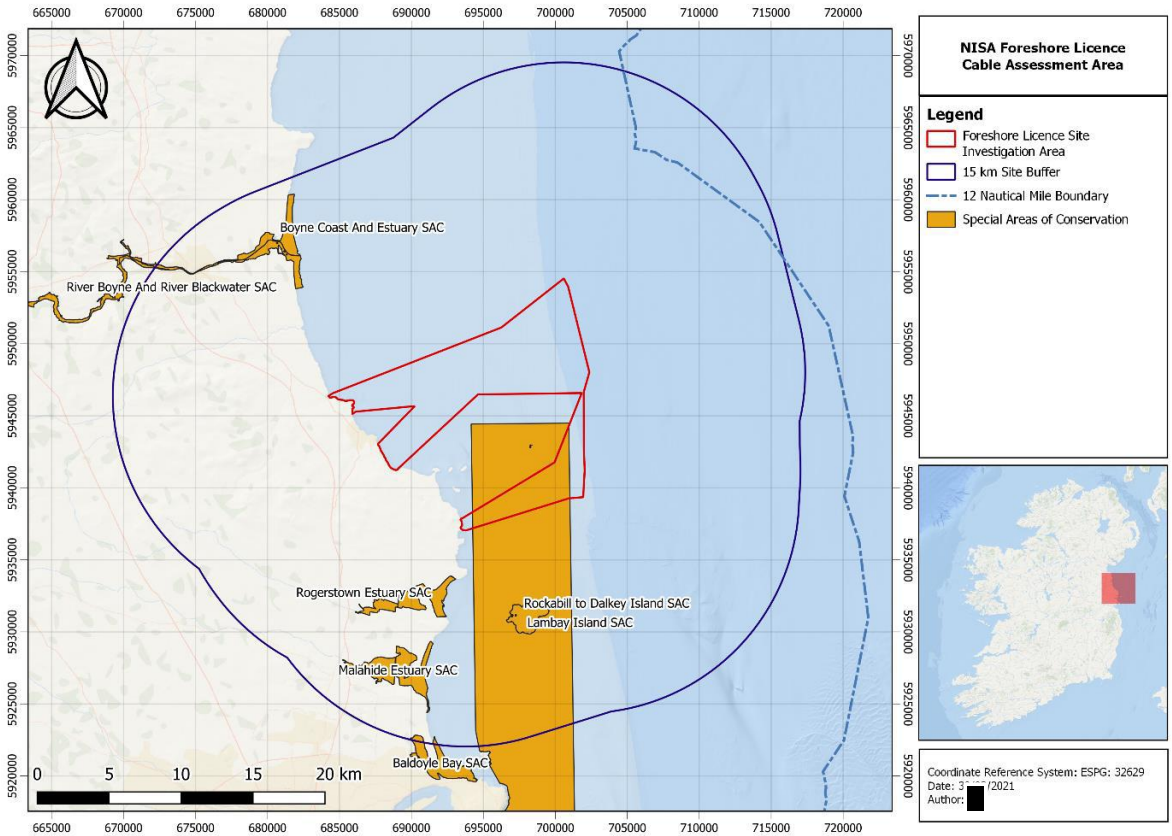

Figure 3-3: Special Areas of Conservation located within 15km of the Foreshore Licence Site Investigation Area designated under the Habitats Directive

Table 3-2: Special Areas of Conservation located within 15km of the Foreshore Licence Site Investigation Area designated under the Habitats Directive

Special Area of Conservation Name (SAC code)	Distance from FLA Area (km)
Rockabill to Dalkey Island SAC (003000)	0.0
Rogerstown Estuary SAC (000208)	4.02
Lambay Island SAC (000204)	5.91
Boyne Coast And Estuary SAC (001957)	7.60
Malahide Estuary SAC (000205)	8.57
Baldoyle Bay SAC (000199)	14.63
River Boyne And River Blackwater SAC (002299)	14.70

Rockabill to Dalkey Island SAC (003000) (NPWS, 2014c)

Rockabill to Dalkey Island SAC overlaps the Foreshore Licence Site Investigation Area (Figure 3-3). This site includes a range of dynamic inshore and coastal waters in the western Irish Sea. These include sandy and muddy seabed, reefs, sandbanks and islands. This site extends southwards, in a strip approximately 7 km wide and 40 km in length, from Rockabill, running adjacent to Howth Head, and crosses Dublin Bay to Frazer Bank in south Co. Dublin. The site encompasses Dalkey, Muglins and Rockabill islands.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1170] Reefs

This site is of conservation importance for reefs, listed on Annex I of the EU Habitats Directive.

Rogerstown Estuary SAC (000208) (NPWS, 2013b)

Rogerstown Estuary SAC at its closest point lies 4.02 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-3). Rogerstown Estuary is situated about 2 km north of Donabate in Co. Dublin. It is a relatively small, narrow estuary separated from the sea by a sand and shingle bar. The estuary is divided by a causeway and narrow bridge, built in the 1840s to carry the Dublin-Belfast railway line.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1130] Estuaries, [1140] Tidal Mudflats and Sandflats, [1310] Salicornia Mud, [1330] Atlantic Salt Meadows, [1410] Mediterranean Salt Meadows, [2120] Marram Dunes (White Dunes), [2130] Fixed Dunes (Grey Dunes)*.

The outer part of the estuary has been designated a Statutory Nature Reserve and a Special Protection Area under the EU Birds Directive. The inner estuary has been damaged by the refuse tip which covers 40 ha of mudflat.

This site is a good example of an estuarine system, with all typical habitats represented, including several listed on Annex I of the EU Habitats Directive. Rogerstown is an internationally important

waterfowl site and has been a breeding site for Little Terns. The presence within the site of three rare plant species adds to its importance.

Lambay Island SAC (000204) (NPWS, 2014d)

Lambay Island SAC at its closest point lies 5.91 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-3). Lambay Island is a large (250 ha) inhabited island lying 4 km off Portrane on the north Co. Dublin coast. It is privately owned. The island rises to 127 m and is surrounded by steep cliffs on the north, east and south slopes. These cliffs contain good diversity in height, slope and aspect. The west shore is low-lying and the land slopes gently eastwards to the summit in the centre of the island. The underlying geology is varied but is dominated by igneous rocks (of andesitic type) and ash. Also present are shales and limestones of Silurian origin, limestone conglomerates, and shales from the Old Red Sandstone era. The bedrock is exposed on the fringing cliffs and in rocky outcrops; elsewhere it is overlain by varying depths of glacial drift.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1170] Reefs, [1230] Vegetated Sea Cliffs, [1364] Lambay Island has good examples of vegetated sea cliffs, a habitat listed on Annex I of the EU Habitats Directive, and these cliffs hold internationally important populations of seabirds.

Boyne Coast and Estuary SAC (001957) (NPWS, 2016a)

Boyne Coast and Estuary SAC at its closest point lies 7.60 km to the northwest of the Foreshore Licence Site Investigation Area (Figure 3-3). Boyne Coast and Estuary SAC is a coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1130] Estuaries, [1140] Tidal Mudflats and Sandflats, [1210] Annual vegetation of drift lines, [1310] *Salicornia* Mud, [1330] Atlantic Salt Meadows, [2110] Embryonic Shifting Dunes, [2120] Marram Dunes (White Dunes), [2130] Fixed Dunes (Grey Dunes)*.

This site has been somewhat modified by human activities. The river is regularly dredged to accommodate cargo ships, which causes disturbance to the bird, fish and invertebrate communities in the estuary. Several factories operate upstream from the estuary and pollution and disturbance associated with them has had an impact on the ecology of the area. There is a proposal to create a deep water facility at the north end of Mornington Dunes on the mouth of the Boyne estuary.

The site is of considerable conservation interest as a coastal complex that supports good examples of eight habitats that are listed on Annex I of the EU Habitats Directive, including one which is listed with priority status, and for the important bird populations that it supports.

Malahide Estuary SAC (000205) (NPWS, 2017a)

Malahide Estuary SAC at its closest point lies 8.57 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-3). Malahide Estuary is situated immediately north of Malahide and east of Swords in Co. Dublin. It is the estuary of the River Broadmeadow. The site is divided by a railway viaduct which was built in the 1800s.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1140] Tidal Mudflats and Sandflats, [1310] Salicornia Mud, [1330] Atlantic Salt Meadows, [1410] Mediterranean Salt Meadows, [2120] Marram Dunes (White Dunes), [2130] Fixed Dunes (Grey Dunes)*. The site includes a fine area of rocky shore south-east of Malahide and extending towards Portmarnock. This represents the only continuous section through the fossiliferous Lower Carboniferous rocks in the Dublin Basin, and is the type locality for several species of fossil coral.

The inner part of the estuary is heavily used for water sports. A section of the outer estuary has recently been infilled for a marina and housing development. This site is a fine example of an estuarine system with all the main habitats represented. The site is important ornithologically, with a population of Brent Goose of international significance.

Baldoyle Bay SAC (000199) (NPWS, 2013c)

Baldoyle Bay SAC at its closest point lies 14.63 km to the south of the Foreshore Licence Site Investigation Area (Figure 3-3). Baldoyle Bay SAC extends from just below Portmarnock village to the west pier at Howth in Co. Dublin. It is a tidal estuarine bay protected from the open sea by a large sand-dune system. Two small rivers, the Mayne and the Sluice, flow into the bay.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [1140] Tidal Mudflats and Sandflats, [1310] Salicornia Mud, [1330] Atlantic Salt Meadows, [1410] Mediterranean Salt Meadows.The area surrounding Baldoyle Bay is densely populated and so the main threats to the site include visitor pressure, disturbance to wildfowl and dumping. In particular, the dumping of spoil onto the foreshore presents a threat to the value of the site.

Baldoyle Bay is a fine example of an estuarine system. It contains four habitats listed on Annex I of the EU Habitats Directive and supports two legally protected plant species. The site is also an important bird area and part of it is a Special Protection Area under the EU Birds Directive, as well as being a Statutory Nature Reserve. It supports internationally important numbers of Brent Goose and nationally important numbers of six other bird species, including two Annex I Birds Directive species.

River Boyne and River Blackwater SAC (002299) (NPWS, 2014e)

River Boyne and River Blackwater SAC at its closest point lies 14.70 km to the west of the Foreshore Licence Site Investigation Area (Figure 3-3). This site comprises the freshwater element of the River

Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath, and smaller areas of Cavan and Louth. The underlying geology is Carboniferous Limestone for the most part, with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. There are many large towns adjacent to but not within the site, including Slane, Navan, Kells, Trim, Athboy and Ballivor.

The site is a SAC, selected for the following habitats and/or species listed on Annex I of the EU Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes): [7230] Alkaline Fens, [91E0] Alluvial Forests*

The site supports populations of several species listed on Annex II of the EU Habitats Directive, and habitats listed on Annex I of this Directive, as well as examples of other important habitat types. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country, particularly in the north-east. The semi-natural habitats, particularly the strips of woodland which extend along the river-banks, and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site, as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.

3.2.3 Annex II Species and Associated SACs

Annex II of the Habitats Directive lists animal and plant species whose conservation requires the designation of Special Areas of Conservation. In Ireland's marine and coastal zones, SACs have been designated under Annex II of the Habitats Directive for four purely marine species and six species that occur in both marine and freshwater habitats (See Table 3-3).

Table 3-3: Marine and Marine/Freshwater Species for which Special Areas of Conservation have been designated in Ireland

Marine Species		
1349	Bottlenose dolphin	*Tursiops truncatus*
1351	Harbour porpoise	*Phocoena phocoena*
1364	Grey seal	*Halichoerus grypus*
1365	Harbour seal	*Phoca vitulina*
Marine/freshwater Species		
1095	Sea lamprey	*Petromyzon marinus*
1099	River lamprey	*Lampetra fluviatilis*
1102	Allis shad	*Alosa alosa*
1103	Twaite shad	*Alosa fallax fallax*
1106	Salmon	*Salmo salar*
1355	Otter	*Lutra lutra*

Natura 2000 sites (Ireland and the UK) within a 100km distance from the survey area boundaries and which have Annex II qualifying features that have the potential to be within the survey area are shown in Figure 3-4 and Table 3-4.

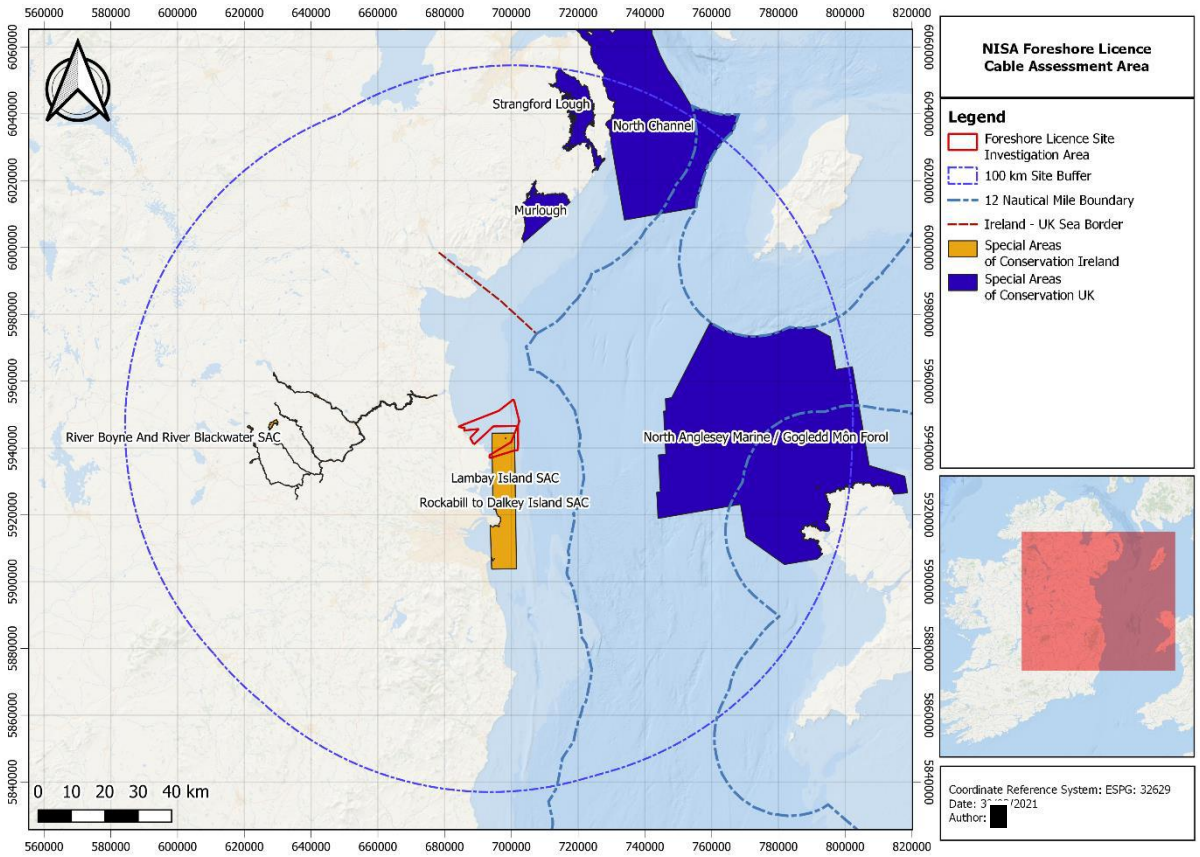

Figure 3-4: Ireland and UK Special Areas of Conservation located within 100km of the Foreshore Licence Site Investigation Area (NPWS, 2020), (JNCC, Natural Resources Wales)

There are seven sites within a 100km radius of the application area that have been designated as Special Areas of Conservation under Annex II of the Habitats Directive which have mobile aquatic or marine species as qualifying interests. All have between one and three species which are mobile and have the potential to be present within the Foreshore Licence Site Investigation Area.

Table 3-4: Special Areas of Conservation within 100km of the Foreshore Licence Site Investigation Area with mobile species listed in Annex II of the EU Habitats Directive that may be present in the site investigation area at least part of the year

Site Name	Mobile Annex II Species	Distance from Site (km)
Rockabill to Dalkey Island SAC	*Phocoena phocoena* (Harbour Porpoise) [1351]	0
Lambay Island SAC	*Halichoerus grypus* (Grey Seal) [1364]	5.91
	Phoca vitulina (Common Seal) [1365]	
River Boyne And River Blackwater SAC	*Salmo salar* (Salmon) [1106]	14.70
	Lampetra fluviatilis (River Lamprey) [1099]	
	Lutra lutra (Otter) [1355]	

Site Name	Mobile Annex II Species	Distance from Site (km)
North Anglesey Marine / Gogledd MÃ´n Forol SAC	*Phocoena phocoena* (Harbour Porpoise) [1351]	42.16
Murlough SAC	*Phoca vitulina* (Common Seal) [1365]	47.02
North Channel SAC	*Phocoena phocoena (*Harbour Porpoise*)* [1351]	63.15
Strangford Lough SAC	*Phoca vitulina* (Common Seal) [1365]	71.91

Rockabill to Dalkey Island SAC (003000) (NPWS, 2014c), which is designated for the protection of an Annex II species is overlapping the Foreshore Licence Site Investigation Area. The next closest SAC to the Foreshore Licence Site Investigation Area that is designated for the protection of an Annex II species is the Lambay Island SAC (000204) (NPWS, 2014d). This site is 5.91 km away from the Foreshore Licence Site Investigation Area. The only other SAC which lies within a 15km radius is the River Boyne And River Blackwater SAC (002299) (NPWS, 2014e) which lies 14.70 km from the Foreshore Licence Site Investigation Area. The remaining 4 SACs that are designated for the protection of an Annex II species are outside the 15km radius, the nearest is North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398) (NRW, 2016a) which is 42.16 km away and the furthest is Strangford Lough six (DAERA-NI, 2015c) which is 71.91 km away.

There are six different species listed on Annex II of the Habitats Directive across the seven Special Areas of Conservation within 100km of the Foreshore Licence Site Investigation Area. These are, *Phocoena phocoena* (Harbour porpoise) [1351], *Halichoerus grypus* (Grey seal) [1364], *Phoca vitulina* (Common seal) [1365], *Salmo salar* (Salmon) [1106], *Lampetra fluviatilis* (River lamprey) [1099] and *Lutra lutra* (Otter) [1355].

***Phocoena phocoena* (Harbour porpoise) [1351]** is a qualifying feature of the Rockabill to Dalkey Island SAC (003000) which overlaps the Foreshore Licence Site Investigation Area. It is also a qualifying feature of North Channel SAC (UK0030399) (JNCC, 2019). The harbour porpoise is the smallest and most abundant cetacean in Irish waters and possibly the most abundant in the northeast Atlantic. It is common around the entire Irish coast. Sightings are common from June through the autumn/winter but reduced sightings in spring suggest they move offshore, possibly to calving/breeding grounds. Three marine SACs have been designated for harbour porpoise in Ireland – Blasket Islands (Kerry), Roaringwater Bay and Islands (Cork) and the Rockabill to Dalkey Island SAC off County Dublin.

The **Grey Seal (*Halichoerus grypus*) [1364]** is a designated Annex II Species for one of the SACs found within 100km from the Foreshore Licence Site Investigation Area: Lambay Island SAC (000204). The grey seal is the larger and more abundant of the two seal species resident in Ireland. They spend much of the year at sea and may range widely in search of prey. They come ashore in autumn to form breeding colonies on rocky shores, beaches and caves, often on small uninhabited islands. They are found all around the coast wherever habitats are suitable and are most abundant along the exposed south, southwest and west coasts. The two major Irish breeding sites for grey seals are the Inishkea Islands (Mayo) and the Blasket Islands (Kerry). Smaller groups breed at Lambay Island (Dublin), Slyne Head (Galway) and the Saltee Islands (Wexford). All of these locations, along with a further five, are

designated as SACs due to the presence of grey seals. All of these are also designated for one or more habitats (e.g. large shallow inlets and bays, estuaries).

***Phoca vitulina* (Common seal) [1365]** is a qualifying feature of the Lambay Island SAC (000204) Murlough SAC (UK0016612) (DAERA-NI, 2015b), the Strangford Lough SAC (UK0016618). These SACs are located between 5.91 km to 71.91 km from the Foreshore Licence Site Investigation Area. The common, or harbour, seal is the smaller of the two seals resident in Ireland. Despite its name it is less common than the Grey Seal. The common seal is the characteristic seal of sandflats and estuaries however are also found on rocky shores. Seals may range widely in search of prey, but individuals often return to favoured haul-out sites to rest or to give birth. Many of the most important haul-out areas are on the west coast. These include Bantry Bay, Kenmare River, Galway Bay, Sligo Bay and the Donegal Coast.

***Salmo salar* (Salmon) [1106]** is a qualifying feature of the River Boyne And River Blackwater SAC (002299). This SACs is located 14.70 km from the Foreshore Licence Site Investigation Area. The salmon is an anadromous fish which spawns in rivers and is only offered protection under Annex II of the Habitats Directive when in freshwater.

***Lampetra fluviatilis* (River lamprey) [1099]** is a qualifying feature of the River Boyne And River Blackwater SAC (002299). This SAC is located 14.70 km from the Foreshore Licence Site Investigation Area. The river lamprey is a native species that inhabits shallow inshore waters and accessible rivers. It is normally anadromous (i.e. spawning in freshwater but completing part of its life cycle in the sea), and pollution or artificial obstacles such as weirs or dams can impede migration. The adult is parasitic, mainly on herring and sprat.

***Lutra lutra* (Otter) [1355]** is a qualifying feature of the River Boyne And River Blackwater SAC (002299). This SACs is located 14.70 km from the Foreshore Licence Site Investigation Area. The otter is a semi-aquatic mammal, which occurs in a wide variety of aquatic habitats such as rivers, streams, lakes, estuaries and on the coast. Populations in coastal areas use shallow, inshore marine areas for feeding but they also require access to fresh water for bathing and terrestrial areas for resting and breeding. Coastal otter habitat ranges from sheltered wooded inlets to more open, low-lying coasts. The otter is found throughout Ireland, which has the densest otter population in western Europe. Over most of the continent the species is scarce to extinct, making the Irish population of otters particularly important.

Table 3-5: Overview of sites designated for Annex II mobile species

SAC Name	Mobile Annex II Species	Overview of site relevant to QI
Rockabill to Dalkey Island SAC	*Phocoena phocoena* (Harbour porpoise) [1351]	The area selected for designation represents a key habitat for the Annex II species harbour porpoise (*Phocoena phocoena*) [1351], within the Irish Sea. The species occurs year-round within the site and comparatively high group sizes have been recorded. Porpoises with young (i.e. calves) are observed at favourable, typical reference values for the species. The site contains a wide array of habitats believed to be important for harbour porpoise including inshore

		shallow sand and mudbanks and rocky reefs scoured by strong current flow.
Lambay Island SAC	*Halichoerus grypus* (Grey seal) [1364] *Phoca vitulina* (Common seal) [1365]	Lambay supports the principal breeding colony of grey seal (*Halichoerus grypus*) [1364], on the east coast of Ireland, numbering 196-252 seals, across all ages. It also contains regionally significant numbers of common seal, of which up to 47 individuals have been counted at the site. Grey seals and common seals occur year around and the island's intertidal shorelines, coves and caves are used by resting and moulting seals.
North Anglesey Marine / Gogledd MÃ´n Forol SAC	*Phocoena phocoena* (Harbour porpoise) [1351]	North Anglesey Marine / Gogledd MÃ´n Forol SAC (3,249km2) is made up of marine areas and sea inlets (NRW, 2016a). According to JNCC (2019) the site supports an estimated 2.4% of the UK Celtic and Irish Seas Management Unit (MU) of harbour porpoise population and occurs within the top 10% of persistent high-density areas for harbour porpoise in UK waters for the summer season.
River Boyne And River Blackwater SAC	*Lampetra fluviatilis* (River lamprey) [1099] *Salmo salar* (Salmon) [1106] *Lutra lutra* (Otter) [1355]	The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic salmon (*Salmo salar*) use the tributaries and headwaters as spawning grounds. The River Boyne is a designated Salmonid Water under the E.U. Freshwater Fish Directive. This site is important for the populations of two other species listed on Annex II of the EU Habitats Directive which it supports, namely River Lamprey (*Lampetra fluviatilis*), which is present in the lower reaches of the Boyne River, and otter (*Lutra lutra*), which can be found throughout the site.
Strangford Lough SAC	*Phoca vitulina* (Harbour Seal) [1365]	Strangford Lough SAC is a large (150 km^2) marine inlet on the east coast of County Down, its northern end lies some 15 km east of Central Belfast (6 km from the outskirts. The Lough supports an impressive range of marine habitats and communities with over 2,000 recorded species. It is important for marine invertebrates, algae and saltmarsh plants, for wintering and breeding wetland birds, and for marine mammals. The site also supports an Annex II species population of *Phoca vitulina* (common seal) [1365]. Common seals range around the shore of the UK and are the characteristic seal of sandflats and estuaries but are also found on rocky shores in Scotland. The vast majority of common seal haul-outs are found on the coasts of Scotland, but with an additional important concentration on The Wash, and a smaller number in Strangford Lough, Northern Ireland.
Murlough SAC	*Phoca vitulina* (Common seal) [1365]	The site adjoins Dundrum Bay in Co. Down and includes the shallow waters of the Bay itself, of importance as the largest area of shallow sub-littoral sandbanks in Northern Ireland. The inter-tidal sands and muds are also extensive, and the

		beach area at Ballykinler is important as a haul-out for Common Seal.
North Channel SAC	*Phocoena phocoena* (Harbour Porpoise) [1351]	Located along the eastern coast of Northern Ireland, the North Channel SAC has been identified as an important winter area for harbour porpoise *Phocoena phocoena*, supporting an estimated 1.2% of the UK Celtic and Irish Seas Management Unit (MU) population. Although small compared to most of the harbour porpoise SACs, this site, with an area of 1,604 km2, supports areas where large groups of up to 100 Harbour Porpoise have been sighted.

3.2.4 Annex V Species

Annex V of the Habitats Directive lists animal and plant species where Member States must ensure that their exploitation and taking in the wild is compatible with maintaining them in a favourable conservation status.

Salmon is also listed on Annex V of the Habitats Directive and has the potential to be in the survey area as smolts migrating from March to June and as adults migrating from March to August. The River lamprey is a migratory species and predominantly anadromous, breeding in freshwater as adults with offspring migrating to sea after a freshwater phase prior to maturation. Migration from the sea to freshwater occurs in October to December where they spawn in late March/April and then return to sea. Both species are migratory species that may be found in the Foreshore Licence Site Investigation Area at certain times of the year as indicated below in Table 3-6.

Table 3-6: Designated migratory species which may be present within the Foreshore Licence Site Investigation Area

Species	Period at which they may be present within the Foreshore Licence Site Investigation Area
***Lampetra fluviatilis* (River lamprey) [1099]**	September to June
***Salmo salar* (salmon) [1106]**	May to June and Autumn Months

3.3 Marine Mammals

Marine mammals present in the Foreshore Licence Site Investigation Area are restricted to cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals). All cetaceans and pinnipeds are European Protected Species (EPS) under Annex IV of the Habitats Directive (92/43/EEC) which lists species of Community Interest in need of strict protection. It is an offence to deliberately capture, kill, injure, or disturb animals classed as EPS. These species are deemed in need of a strict protection regime across their entire natural range within the EU, both within and outside Natura 2000 sites. In addition, Irish territorial waters were declared a Whale and Dolphin Sanctuary in 1991.

Ireland has recorded 25 species of cetacean and 2 species of pinnipeds all of which are recognised as protected species under the EU Habitats Directive and the Irish Wildlife Act. Many of these 25 species have been recorded off the east coast and may be present in the offshore Foreshore Licence Site

Investigation Area at least on a seasonal basis. According to Ireland Marine Atlas (2019a) the range of the following species is recorded in the Foreshore Licence Site Investigation Area and in surrounding waters: bottlenose dolphin, common dolphin, Risso's dolphin, harbour porpoise, fin whale, humpback whale, minke whale, common seal and grey seal.

Bottlenose Dolphin

Bottlenose Dolphins (*T. truncatus*) are a large, gregarious dolphin widely distributed around Ireland and found in tropical and temperate waters worldwide (Wall et al., 2013). Resident or semi-resident populations are known from the Shannon Estuary, Tralee Bay, the Mayo coast and Cork Harbour. There is evidence for the existence of a larger offshore ecotype (Mirimin et al., 2011)

Common Dolphin

The short-beaked Common Dolphin (*Delphinus delphis*) is the second most frequently reported species after the Harbour Porpoise and are the most abundant of all cetacean species recorded in Ireland (Berrow *et al.*, 2010). Surveys indicate a population of 40000 animals in Irish waters (Hammond et al., 2010) They are recorded from all shelf waters with concentrations off the South and South-west Coasts; lower numbers are recorded from deeper waters off the shelf edge (Wall et al., 2013).

Risso's Dolphin

Risso's Dolphin (*Grampus griseus*) in Ireland favour inshore waters and offshore Islands especially off Saltee Islands, Co. Wexford, the Cork coast and the Blasket Islands, Co. Kerry during the summer months, (Berrow et al., 2010) in contrast to deep-water habitats elsewhere in the world (Shirihai & Jarrett, 2006). They have been sighted in all areas and all seasons but there is an inshore peak in the spring. They are the most frequently sighted dolphin species in the Irish Sea (Berrow et al., 2010).

Harbour Porpoise

The Harbour Porpoise (*Phocoena phocoena)* is Ireland's smallest cetacean and is coastally distributed across the northern Pacific and Atlantic. Notwithstanding its small size and elusive nature, it is the marine mammal most frequently seen with sightings concentrated within 10 km of the coast (Berrow et al., 2010). SCANS II estimated a population of 15000 animals in the Irish Sea from a North-western European population of 385000 (Hammond et al., 2006).

Fin Whale

Fin Whales (*Balaenoptera physalus*) are the second-largest animal in the world after the blue whale (*Balaenoptera musculus)* and the largest baleen whale likely to be present close to shore off Ireland. Growing up to 24m in the North Atlantic their distribution is worldwide but concentrated in temperate waters (Shirihai & Jarrett, 2006). In Irish waters nearshore sightings cluster to the South of the country but they are well represented off the shelf edge in deeper waters too (Wall et al., 2013).

Humpback Whale

The Humpback Whale (*Megaptera novaeangliae*) is a large (11-16m) baleen whale with a global distribution (Shirihai & Jarrett, 2006). Sightings of the iconic humpback have increased over recent years in Irish waters with concentrations around the South and Southwest coasts, though all coasts are represented. The Irish photo-ID catalogue of unique Humpback Whale sightings currently comprises more than 100 animals (IWDG, 2020)

Minke Whale

Minke Whales (*Balaenoptera acutorostrata*) are the most common and widely distributed of the Baleen Whales in Ireland and the most likely to be encountered in shallow waters. The smallest of the Baleen Whales their length averages 8.5 metres. Usually encountered singly or in small groups, sightings are most frequent off the Irish coast in spring and autumn (Wall et al., 2013).

Grey Seal

Grey Seals (*Halichoerus grypus*) are the larger of the two seals resident in Irish waters. They are recorded from all coasts and in all seasons and have been sighted out to the edge of the continental shelf (Wall et al., 2013). Recent surveying by the NPWS reported in Morris and Duck (2019) indicates that the Grey Seal population is stable or increasing; 3698 individuals were counted.

Common Seal

Common Seal (*Phoca vitulina*), also known as harbour seal, are smaller animals (maximum length 2m). Favouring more sheltered coasts and a near-shore environment, over 4000 individuals were counted nationally in 2017/2018 (Morris & Duck 2019) and their population is considered stable.

3.4 Fisheries

3.4.1 Data Availability

The availability of information on fishery activity specifically related to fishing grounds and areas in Irish waters is dependent on the target species, fishing gear and the size of the vessels engaged in the fisheries. Broadly speaking good quality data are available for fish species which are managed via a quota system and are fished by larger vessels; conversely less data is available from smaller vessels targeting non-quota species.

Vessels >12 m are legally obliged to transmit VMS (Vessel Electronic Monitoring System) data and (with some exceptions) to submit logbooks of their catches; this information is collated by the Marine Institute (MI) to produce the Atlas of Commercial Fisheries which maps fishery activity. Vessels >12 m are legally required to transmit their position via VMS (Vessel Electronic Monitoring System) to the Fisheries Monitoring Centre (FMC) in Haulbowline Naval Base, Cork; In addition to transmitting their position via VMS they also electronically transmit onboard catch data (E.LOG) to the Sea Fisheries Protection Authority (SFPA). This data is filtered at a later stage by the Marine Institute and processed

by the MI to screen out non-fishing activity which is done on the basis of vessel speed upper and lower parameters in combination with industry knowledge. The data is of low certainty for some fisheries due to the difficulties in relating vessel position at a given time with logbook records for individual species, also data from all fisheries other than otter trawling are considered indicative and not quantitative due to uncertainties around effort.

Vessels between 10 and 12m are not obligated to use a VMS however they are required to record their catch in log-books. Vessels <10 m are neither required to transmit VMS data nor to record their catches in logbooks. Information from this sector is derived from sales notes, the Bord Iascaigh Mhara (BIM) Inshore Sentinel Vessel Programme, the MI Observer Programme and industry knowledge. This classification of vessel accounts for the majority of pot-fishing inshore fleet targeting crab, lobster, shrimp and whelks. Vessels <10m with a polyvalent licence may also target finfish with gillnets, jiggers and longlines. For vessels between 10-12 meters position data which is recorded in logbooks is only at the ICES (International Council for the Exploration of the Sea) Statistical Rectangle scale.

The Irish Groundfish Survey (IGFS) is an annual fisheries-independent trawl survey carried out by the MI in Irish waters to contribute to the assessment of commercial fish stocks and to feed data into the ICES stock assessments which in turn determine the size and allocation of European quotas. These data along with commercial catch data are published in the Irish Stock Book and are also available in mapping formats in Ireland's Marine Atlas. The IGFS does not survey the Irish Sea or the far north of the island, these data gaps are filled by the UK – Northern Ireland Groundfish Survey (NIGFS) and the UK – Scottish West Coast Groundfish Survey (SCOWCGFS) under the coordination of the ICES International Bottom Trawl Survey Working Group (IBTSWG).

3.4.2 Fishing Activity

Ireland's Marine Atlas (Ireland's Marine Atlas, 2019b) indicates that dredge fishing is identified on different parts of the Foreshore Licence Site Investigation Area as shown in Figure 3-5. Areas of pot fishing and net fishing are also identified in the inshore section of the Foreshore Licence Site Investigation Area. Distribution of different fishing methods adjacent to and overlapping the Foreshore License Application Area are presented in Figure 3-5. VMS data mapped in the Atlas of Marine Fisheries (Gerritsen & Kelly, 2019) indicates that most fisheries effort by vessels >12m is by otter trawlers targeting nephrops in the Irish Sea east of the foreshore license application area.

In addition, dredging for razor clams and cockles is common in the NISA site is huge. Operators within this fishery for this site have GPS/iVMS monitoring systems on board and data is very good on this fishery.

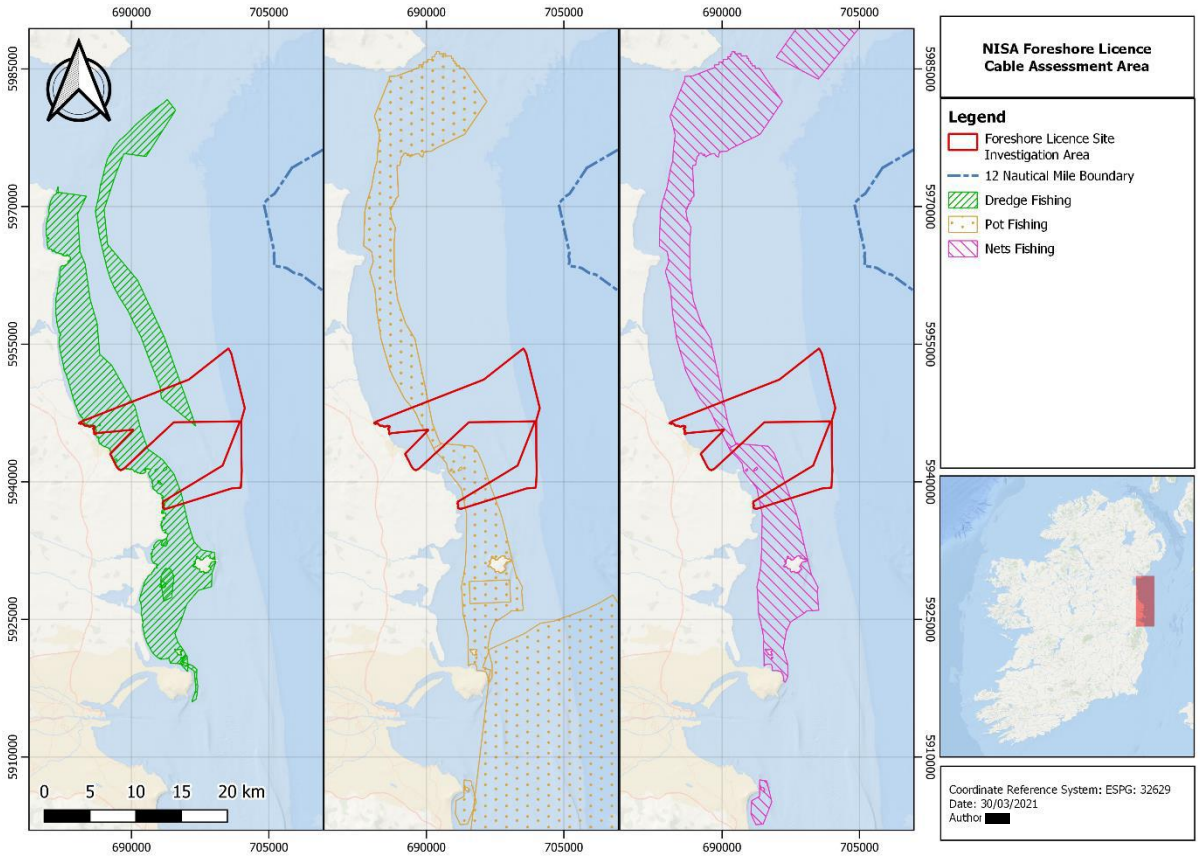

Figure 3-5: Commercial Fishing (Ireland Marine Atlas, 2019b)

Figure 3-6 presents shellfish waters in the vicinity of the Foreshore Licence Site Investigation Area showing that Balbriggan shellfish waters overlaps the area.

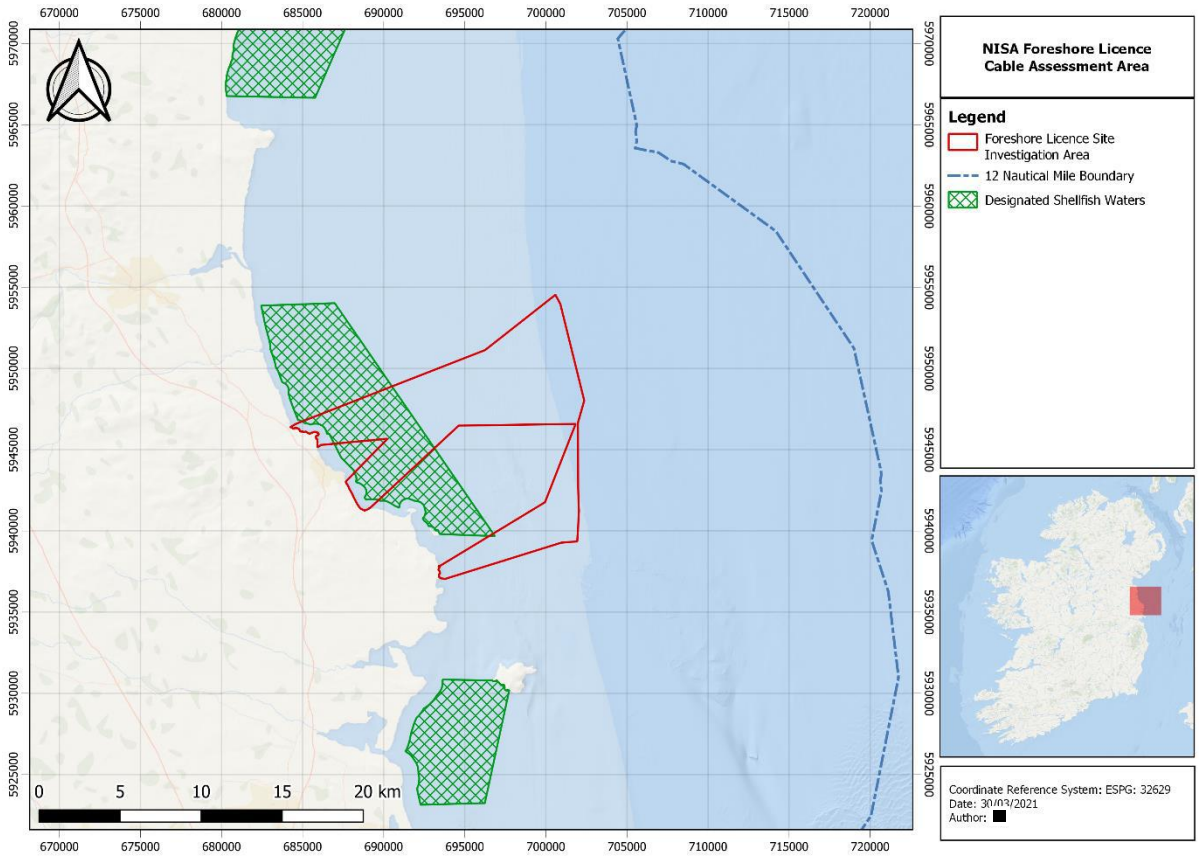

Figure 3-6: Shellfish Waters (DHLGH, 2014)

3.4.3 Fish Ecology

The Foreshore Licence Site Investigation Area overlaps with the nursery and spawning grounds of a number of commercial species of fish; Figure 3-7 shows overlap with herring nursery grounds along with whiting spawning and nursing grounds, Figure 3-8 shows overlap with mackerel nursery grounds along with haddock spawning and nursing grounds, Figure 3-9 shows overlaps with cod nursery and spawning grounds and Figure 3-10 presents the range of wild Atlantic Salmon in relation to the Foreshore Licence Site Investigation Area.

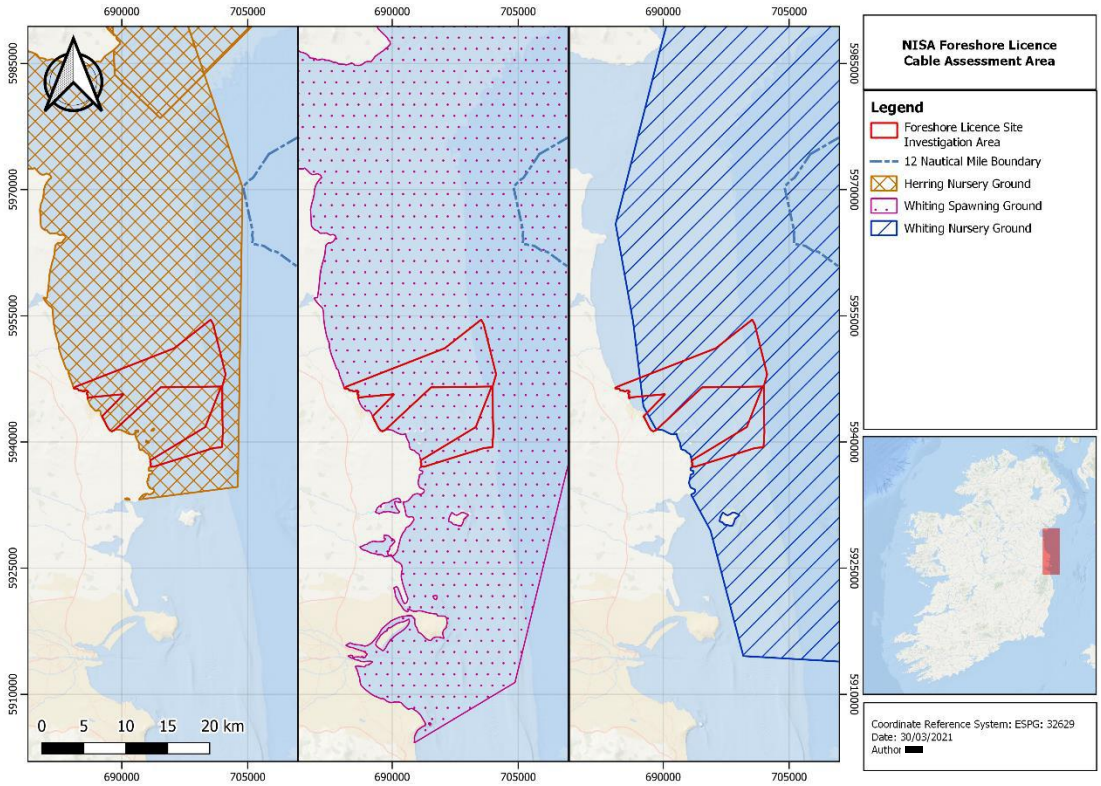

Figure 3-7: Herring Nursery Ground, Whiting Spawning and Nursing Ground (Ireland Marine Atlas, 2019b)

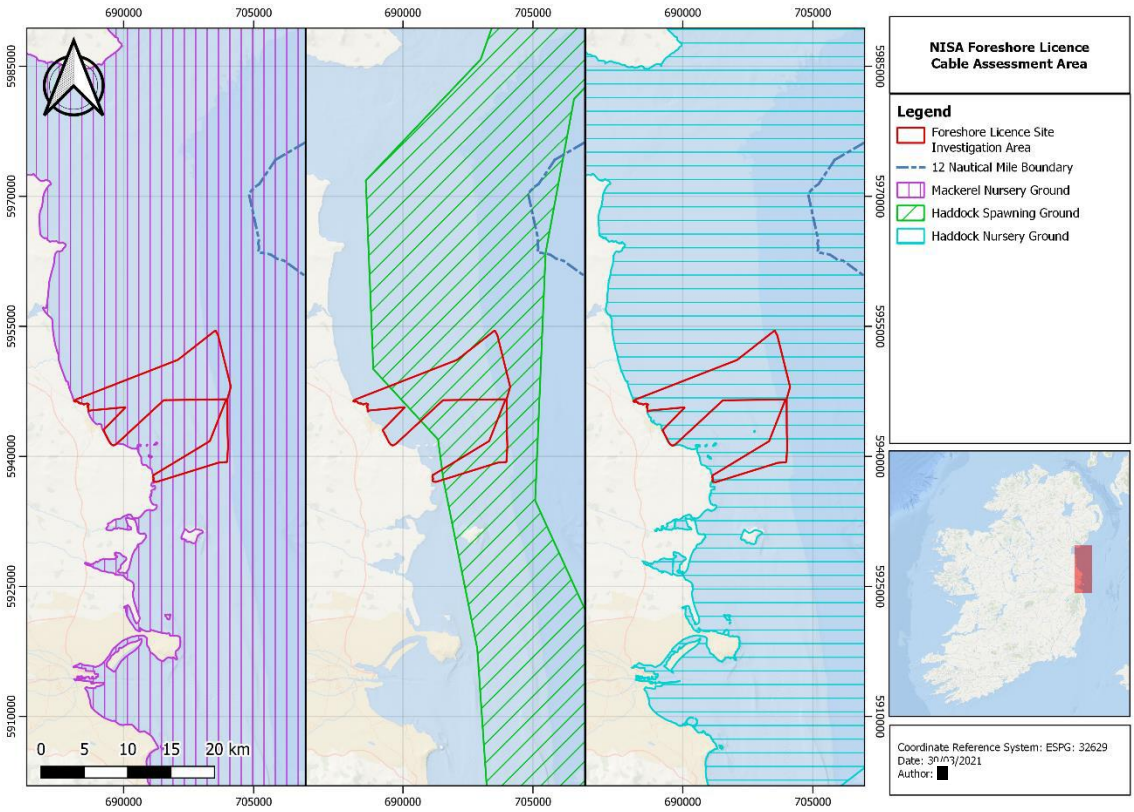

Figure 3-8: Mackerel Nursery Ground, Haddock Spawning and Nursing Ground (Ireland Marine Atlas, 2019b)

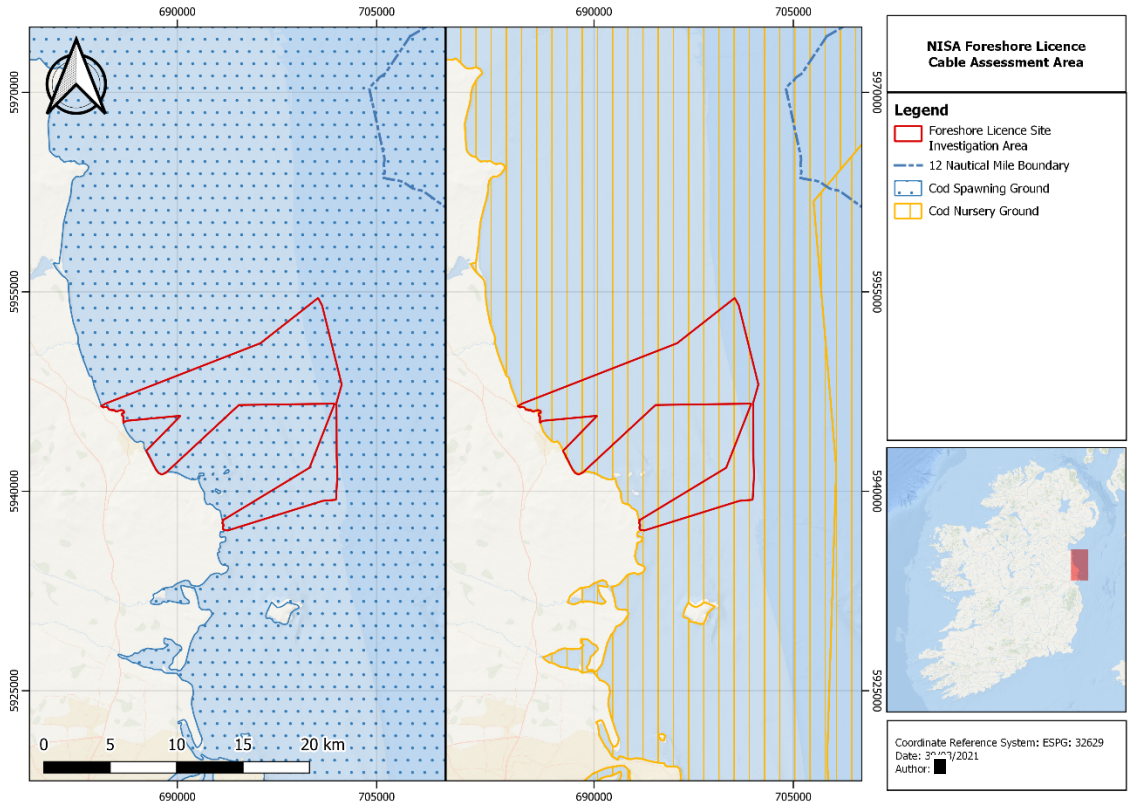

Figure 3-9: Cod Nursery and Spawning Grounds (Ireland Marine Atlas, 2019b)

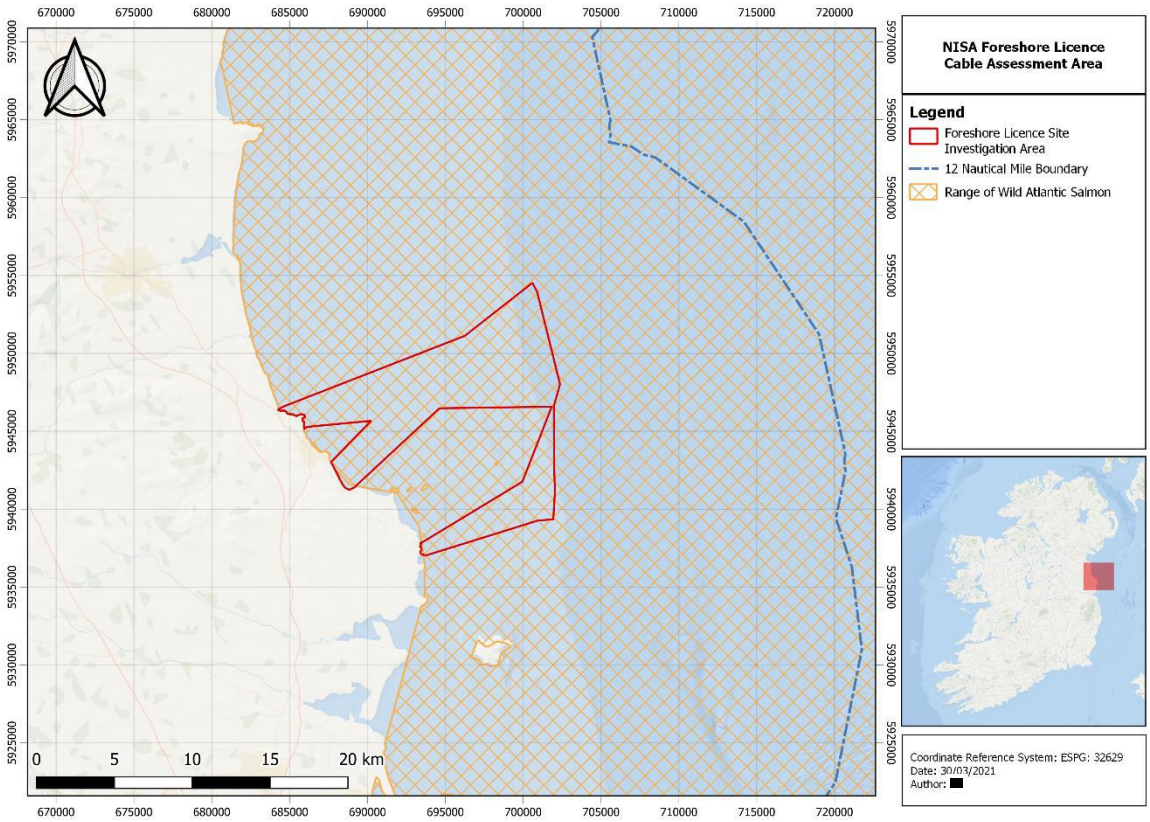

Figure 3-10: Wild Atlantic Salmon (Ireland Marine Atlas, 2019b)

3.5 Marine Traffic

The Irish Coastguard of the Department of Transport, Tourism and Sport (DTTAS) monitors the movement of vessels in Irish waters via an Automatic Identification System (AIS) for maritime transport safety and security. Figure 3-11 shows AIS data from the period from July 2018 to December 2018. The data is mapped on a 40 x 40 m grid and represented visually by the density of marine vessels over the six-month period.

The AIS data is temporally dynamic but it does highlight that most traffic trends in the Irish Sea are north south orientated. As shown in Figure 3-11, there is heavier vessel traffic observed at ports and harbours nearby.

Navigational channels within the site will be addressed through engagement with the relevant stakeholders including the Irish Coast Guard, local ports and harbours and users of the navigational channels, at the appropriate time, should site investigations planned for under this application together with a range of other studies indicate the feasibility of the development of an Offshore Wind Farm in this area.

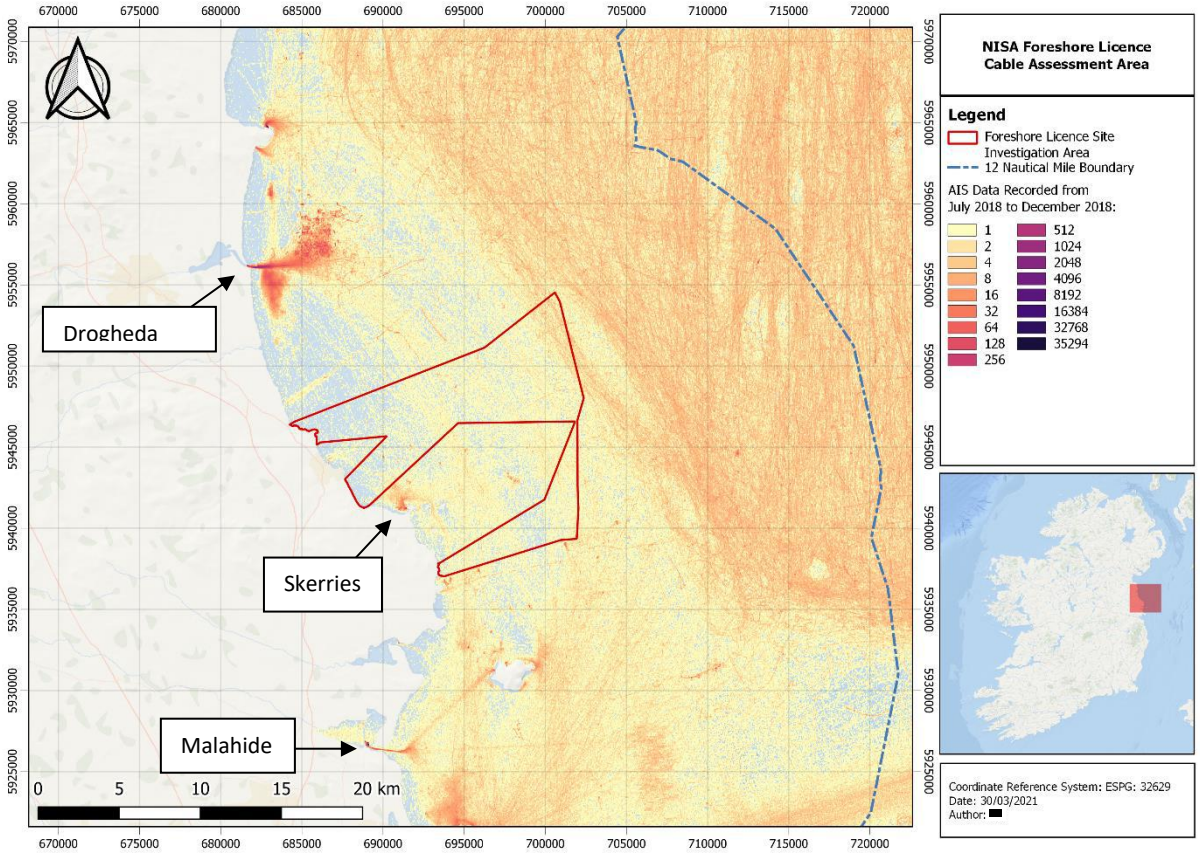

Figure 3-11: Coastguard AIS Traffic Frequency (DTTAS, 2018]

3.6 Subsea Infrastructure and Shipwrecks

Figure 3-12 shows that the 'Geo-Eirgrid' fibre optic submarine telecommunications cable system runs through the Foreshore Licence Site Investigation Area. One gas pipeline is located just south of Foreshore Licence Site Investigation Area, the Interconnector 1 Scotland to Ireland IC1 operated by Gas Networks Ireland and there are other additional cables further south, but these will not impact this Foreshore Licence Application.

Shipwreck data available through both the National Monuments Database and the INFOMAR project data is shown in Figure 3-13.

The National Monument Database identifies five shipwrecks within the Foreshore Licence Site Investigation Area. However, many of the wrecks from the National Monuments Database are unconfirmed unlike the INFOMAR data which has been recently confirmed through geophysical surveys. INFOMAR is a joint venture between the Geological Survey of Ireland and the Marine Institute surveying Ireland's seabed. Part of this involves the identification, mapping and archiving of shipwrecks in Irish waters. The INFOMAR shipwreck data shows that three shipwrecks are located within the Foreshore Licence Site Investigation Area.

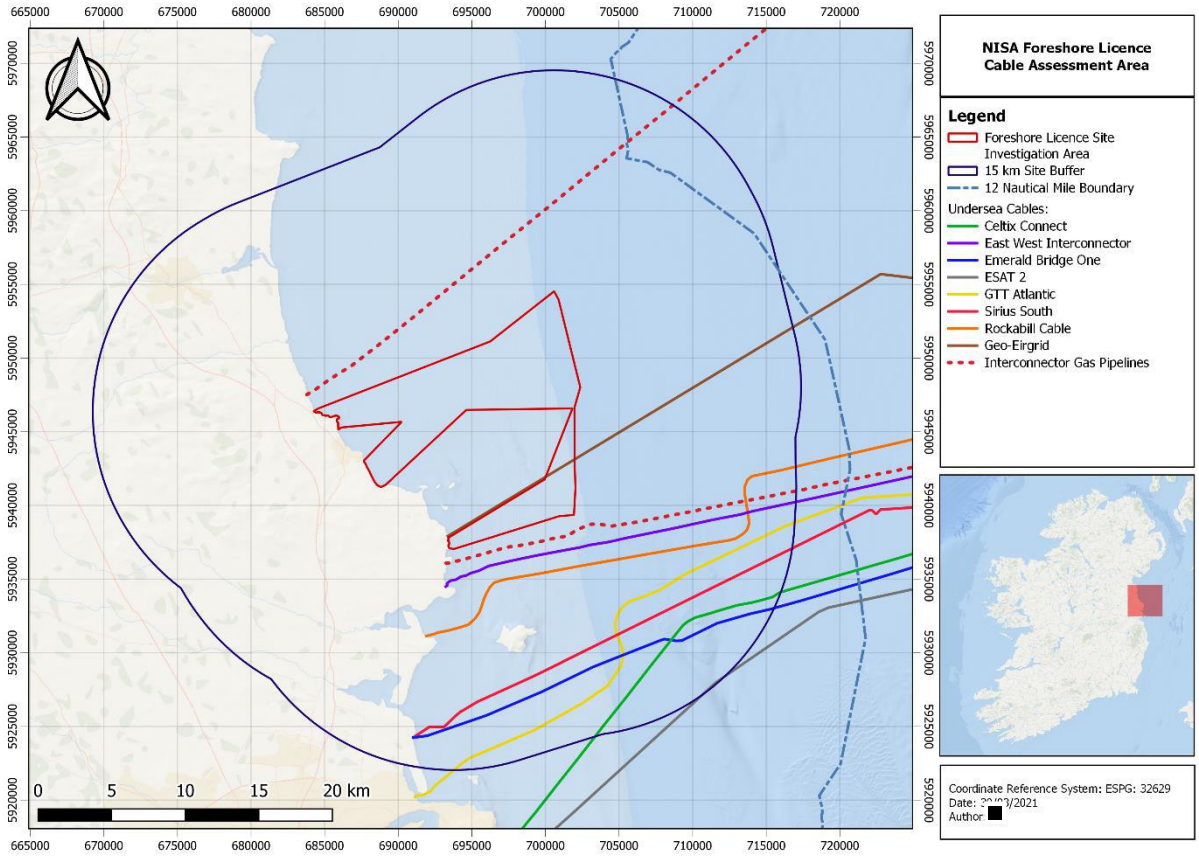

Figure 3-12: Plan of buried services adjacent and within the Foreshore Licence Site Investigation Area (Ref: Admiralty Chart)

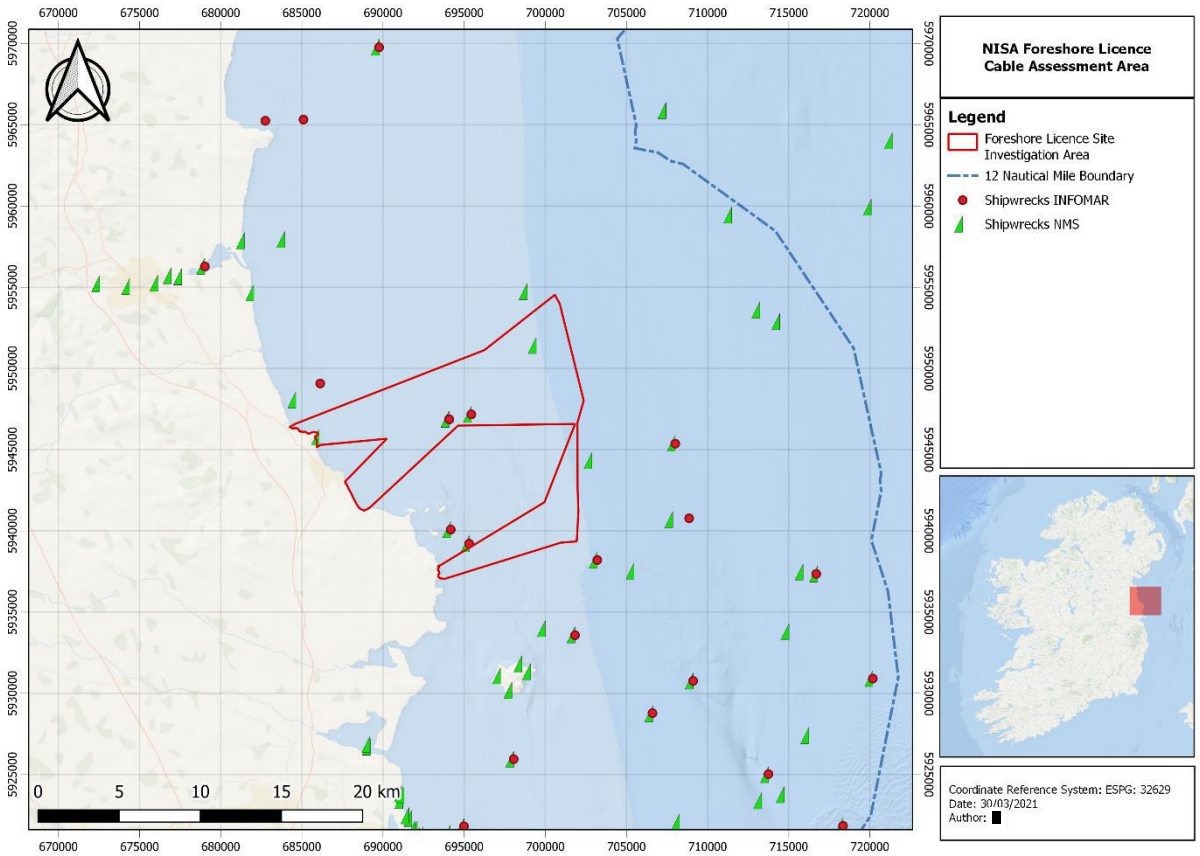

Figure 3-13: National Monument Service (NMS) and INFOMAR shipwreck data (NMS and INFOMAR, 2021)

3.7 Other Proposed Activities in the Area

A review of the DHLGH Foreshore License Applications and Determinations search tool (DHLGH, 2021), was undertaken for the surrounding area of the Foreshore Licence Site Investigation Area. Several applications for investigation licences pertaining to offshore developments are present in close proximity to the Foreshore Licence Site Investigation Area. Figure 3-14 shows the Foreshore License Area for the following applications:

- **Oriel Offshore Wind Farm (FS006840)** by Oriel Windfarm Limits including Geophyscial Surveys (MBES, magnetometer, SSS, SBP, UHRS), Geotechnical Surveys, Ecological and Metocean Surveys – Submitted October 2018.

  The application and determination documents are available at: https://www.gov.ie/en/foreshore-notice/0f8ec-oriel-windfarm-ltd/?referrer=http://www.gov.ie/en/publication/3f608-oriel-windfarm-ltd/

  Oriel Wind Farm area is located off the coast of county Louth, approximately 21.5km north of the Foreshore Licence Site Investigation Area. There is therefore not likely to be any interaction between the activities proposed under the two projects.

- **Cooley Point Offshore Wind Farm (FS006852**) by Hibernian Wind Power including Geophyscial Surveys (MBES, magnetometer, SBP, SSS), Geotechnical Surveys (grab samples,

Cone Penetration Test, Vibrocore, boreholes) Ecological and Archaeological surveys – Submitted July 2018.

The application and determination documents are available at: https://www.gov.ie/en/foreshore-notice/2e898-hibernian-wind-power-cooley-point-co-louth/?referrer=http://www.gov.ie/en/publication/d0e46-hibernian-wind-power-cooley-point-co-louth/

Cooley Point Offshore Wind Farm is located of the coast off county Louth, approximately 4.62km north of the Foreshore Licence Application Area. There is no spatial or temporal overlap with the activities proposed under this application. There is therefore not likely to be any interaction between the activities proposed under the two projects.

- **Clogher Head Offshore Wind Farm (FS006787)** by Hibernian Wind Power including Geophyscial Surveys (MBES, magnetometer, SBP, SSS), Geotechnical Surveys (grab samples, Cone Penetration Test, Vibrocore) Ecological and Archaeological surveys – Submitted November 2017.

  The application and determination documents are available at: https://www.gov.ie/en/foreshore-notice/1d989-hibernian-wind-power-clogher-head/

  Clogher Head Offshore Wind Farm is located of the coast off county Louth, approximately 5.75 km north of the Foreshore Licence Application Area. There is no spatial or temporal overlap with the activities proposed under this application. There is therefore not likely to be any interaction between the activities proposed under the two projects.

- **Braymore Point Offshore Wind Farm (FS006973)** by SSE Renewables Ireland Limited including Geophyscial Surveys (MBES, magnetometer, SBP, SSS), Geotechnical Surveys (Cone Penetration Test, Vibrocore, boreholes), Wind Resource and Metocean Survey, Topography Survey and Environmental Survey – Submitted March 2019.

  The application documents are available at: https://www.gov.ie/en/foreshore-notice/7f010-sse-renewables-braymore-point/

  Braymore Point Offshore Wind Farm is located of the coast off county Dublin, Meath and Louth. There is spatial and possibly temporal overlap with the activities proposed under this Foreshore Licence Application Area.

- **Celtix Connect - Havhingsten Fibre Optic Telecommunication Cable (FS006915)** by Alcatel Submarine Networks for the installation of a telecommunications cable – Submitted January 2020.

  The application documents are available at:

https://www.gov.ie/en/foreshore-notice/81926-celtix-connect-havhingsten-telecommunication-cable-dublin/?referrer=http://www.gov.ie/en/publication/5b49e-celtix-connect-havhingsten-telecommunication-cable-dublin/

Celtix Connect - Havhingsten Fibre Optic Telecommunication Cable installation is planned in Loughshinny co. Dublin. The proposed cable route of Celtix Connect overlaps spatially with the Foreshore Site Investigation Area. That application is at an advanced stage and the works will likely be complete well in advance of this licence being granted. The effects of those works have been deemed to be of temporary in nature and once the cable has been installed the cable burial channel will be returned to its original state. The as laid cable route will be avoided for any physically intrusive surveys as the export cable from the NISA site will not be laid over that cable.

- **PiPiper fibre optic cable (FS006762)** by PiPiper Infrastructure Limited for geophysical survey and localised site investigation for a submarine fibre optic cable – Submitted April 2017.

  The application documents are available at:
  https://www.gov.ie/en/foreshore-notice/14b70-pipiper-infrastructure-ltd/

  The PiPiper fibre optic cable is located off the coastline of county Meath and runs through the north-east corner of the Foreshore Site Investigation Area. This application was submitted in April 2017 however never progressed. There is therefore not likely to be any interaction between the activities proposed under the two projects.

- **North Irish Sea Array (NISA) Offshore Wind Farm Array Site (FS007031)** also by NISA Windfarm Limited including Geophysical Surveys, Geotechnical Surveys, Metocean Surveys, Ecology and Archaeological Survey – Submitted January 2020.

  The application documents are available at:
  https://www.gov.ie/en/foreshore-notice/75eec-fs007031-statkraft-north-irish-sea-array-nisa-site-investigations/?referrer=http://www.gov.ie/en/publication/cf656-fs007031-statkraft-north-irish-sea-array-nisa-site-investigations/

  North Irish Sea Array (NISA) Offshore Wind Farm Array Site is located off the coasts of counties Louth and Dublin and it is situated on the eastern boarder of the Foreshore Site Investigation Area.

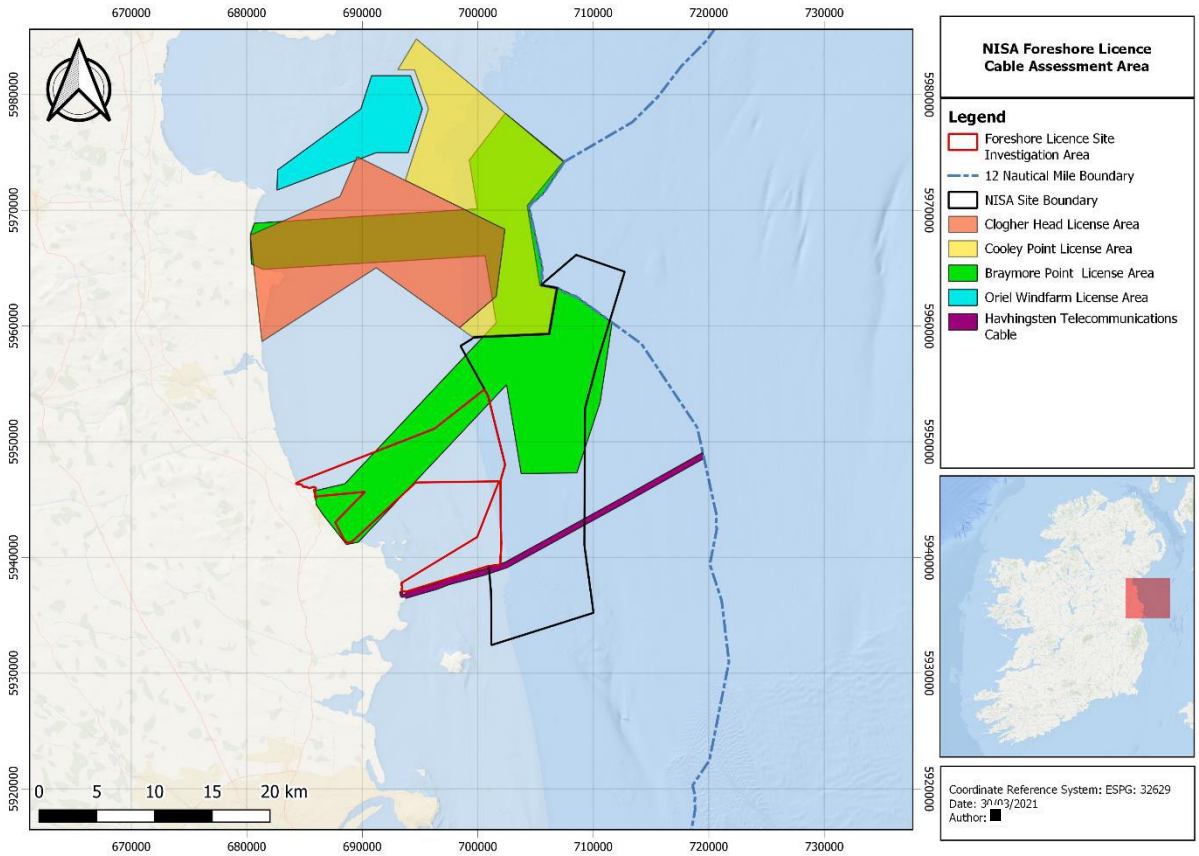

Figure 3-14: Proposed projects in close proximity to the Foreshore Licence Site Investigation Area

3.8 Dumping at Sea

A review of the EPA Dumping at Sea Register (EPA, 2021) was undertaken to identify dumping at sea activities. Any person who wishes to dispose of material at sea is required to apply for a Dumping at Sea permit. The Foreshore and Dumping at Sea (Amendment) Act 2009 empowers the Agency to decide on an application for a permit to dispose of material at sea. Dumping at Sea sites in close proximity to the Foreshore Licence Site Investigation Area are presented in Figure 3-15.

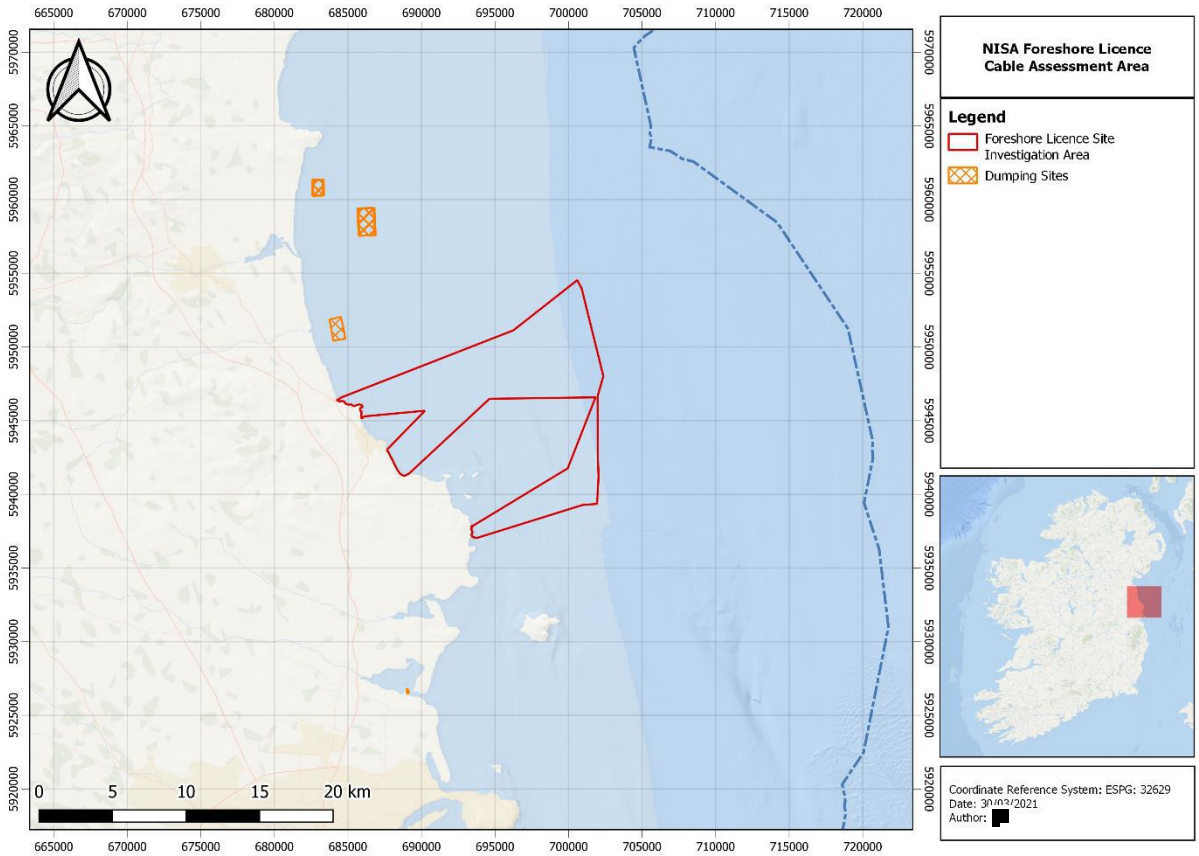

Figure 3-15: Dumping at Sea sites

4 Potential Environmental Impacts

The following are the potential environmental impacts that have been identified for appraisal given the nature of the site investigation activities proposed under this application:

- Physical disturbance to marine benthic communities;
- Disturbance from vibration and underwater noise associated with surveys;
- Injury due to collision (survey vessels/sampling equipment);
- Visual and noise disturbance to bird species;
- Pollution event
- Indirect effect on birds due to effects on prey species

These potential effects are discussed in the following sections (4.1 – 4.6).

4.1 Physical Disturbance to Marine Benthic Communities

It is noted that there is one Natura 2000 site located within the Foreshore Licence Site Investigation Area, Rockabill to Dalkey Island SAC, where there is a potential for direct effect on Annex I habitats and/or on the Qualifying Interests of this SAC.

Benthic communities will be unaffected by geophysical site investigation activities as there is no contact with the seabed. However, geotechnical and ecological site investigation activities (geotechnical including boreholes, CPTs, vibrocores, the benthic surveying including grab sampling and the intertidal sampling and marine mammal monitoring with CPODs mooring) is intrusive and will disturb benthic communities. However, only very small areas of the seabed will be disturbed and sampled during the ecological and geotechnical site investigation activities.

The subtidal benthic survey will involve the extraction of sediment directly from the seabed using a grab sampler. As grab sampling by its nature can only be carried out in soft sediments (muds, sands, gravels), once the sampling device is retrieved any disturbance to the sediment will recover naturally.

A drop-down camera or ROV will be used in advance of undertaking grab sampling to ensure that protected habitats within SACs are not disturbed. Where the presence of sensitive habitats are detected, surveying will be by video with high resolutions stills images only.

An intertidal survey (walkover survey) will be carried out at the landfall for the wind farm export cable once the locations suitable for the cable landing have been identified. A series of locations will also be sampled in areas of both soft sediment and hard substrates to allow a detailed biotope mapping at these landing locations. The area surveyed could be up to 500 m wide.

The intertidal surveys will be undertaken during spring tides in line with guidance in the Marine Monitoring Handbook (Davies et al., 2001). During the walkover survey, biotopes will be identified according to the European Nature Information System (EUNIS) classification. Where possible, boundaries of biotopes will be tracked using a handheld GPS device and recorded using a suitable software package.

Various locations will be sampled by quadrat with dimensions of 0.04 m^2 (0.2 m x 0.2 m), to identify the Benthic macrofauna at the landfall location. Surveying will take place in day light hours and the position of sensitive species within the survey area will be noted and avoided.

During drilling, borehole wall integrity is maintained by constant flushing using biodegradable, miscible drilling mud mixed with sea water. This drilling fluid shall disperse into the water column. Arisings from drillings shall remain on mudline.

Cavities left by drilling, seabed sampling or seabed CPT testing shall infill almost instantly upon removal of equipment. Equipment on the seafloor will leave an impression in the region of the footprint perhaps up to 8m^2 depending on the equipment used. The depth of this impression is dependent on the strength of the material at mudline.

Seabed sampling and testing equipment shall be on the seafloor for a duration in the range of 5mins to 1hr. Drilling equipment will be at mudline or below mudline for a duration in the range of 12 hours to 2 days.

Benthic communities in the footprint of sampling equipment will be impacted through relatively minor disturbance around the drill site and a very small volume of substratum loss, direct displacement or smothering during sampling. Any smothering will be a thin layer due to small volumes of sediment displaced during the sampling. Softer sediments (such as sand and mud) are highly recoverable to disturbance and typical species can recolonise the area.

The geotechnical survey methods proposed are likely to cause a small amount of sediment to become suspended. The resulting sediment suspension will be dispersed and deposited on the sea floor at a location subject to wave action and tidal stream. As a result, the deposition levels of this material will be insignificant and within the storm background levels of sediment migration in the Foreshore Licence Site Investigation Area as it is extremely exposed and prone to strong currents.

Benthic fauna does not have any auditory structures and therefore will not be impacted by any noise inducing activities. Activities that directly interact with the seafloor and cause vibration such as vibrocoring or borehole drilling, may affect benthic invertebrates within the immediate vicinity of the activity while the activity is occurring, causing them to retract into the seabed. This may interfere with crucial behaviours such as foraging and predator avoidance (Roberts at al., 2016). However, the proposed scope of the survey will have a very localised and short-term impact and disturbance from vibrations on benthic species will be only temporary. Geophysical site investigations do not interact with the seabed and therefore will have no effect on benthic communities.

Sampling and testing locations will be an appropriate distance apart (at least 500 m) to ensure that the value of the data collected during the site investigation activities is optimised. As the site investigation activities will not cause any physical obstructions there will not be any likely significant effects to alter the natural circulation of sediment and organic matter, or cause changes to the existing sediment transport processes of any Natura 2000 site. Therefore, no likely significant effects associated with habitat loss or alteration are anticipated and such effects can be excluded at the screening stage without reference to mitigation measures. Effects will be localised in the immediate

vicinity of the individual sampling and testing locations and these locations will be an appropriate distance apart to minimise effects.

4.2 Disturbance from Vibration and Underwater Noise associated with Surveys

Geophysical surveys in the marine environment are a potential source of anthropogenic sound and therefore may have an impact on the marine environment. The level of environmental impact associated with this acoustic activity is variable depending on several factors including the type of equipment being used, its sound signal and propagation characteristics, and the depth in which it is operating (DAHG, 2014).

Both cetaceans and pinnipeds have evolved to use sound as an important aid in navigation, communication, and hunting (Richardson et al., 1995). It is widely accepted that the main environmental concern relating to marine mammals is the potential effects of anthropogenic underwater noise (see Nowacek et al., 2007 for review). Exposure to noise can induce a range of effects on marine mammals: physical effects may include a temporary reduction in hearing sensitivity (Temporary Threshold Shift-TTS) which is reversible over time; or following intense noise exposure, (Permanent Threshold Shift-PTS). Other impacts include masking of biologically important noises by anthropogenic noise (perceptual impacts); behavioural changes such as displacement from feeding, resting, or breeding grounds; and stress (Southall et al., 2007, Southall et al., 2019).

Acoustic instruments and equipment used in targeted marine geophysical investigations produce sound at frequencies within the hearing range of marine mammals (Nowacek et al., 2007). In order to evaluate the potential of the site investigation activities equipment to cause harm to marine mammals, an assessment has been conducted using the approach described in Southall *et al.* (2007). Marine mammals are separated into five groups based on their functional hearing, namely low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, pinnipeds in water and pinnipeds in air. For each of these groups sound pressure levels that would result in injury (PTS or TTS) were proposed for individuals exposed to single, multiple and non-pulsed sources (Table 4-1). For the purposes of this assessment pinnipeds in air are not included.

Table 4-1: Sound Pressure Level (SPL) injury criteria proposed by Southall et al. (2007), for individual marine mammals exposed to discrete noise events

Marine Mammal group	Injury Criteria	
	TTS	PTS
Low-Frequency Cetaceans (Baleen whales)	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
Mid-Frequency Cetaceans (including bottlenose dolphins)	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
High Frequency Cetaceans (including Harbour Porpoise)	224dB re: 1µPa (peak)	230dB re: 1µPa (peak)
Pinnipeds (in water)	212dB re: 1µPa (peak)	218 dB re: 1µPa (peak)

The DAHG (2014) report 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' addresses several key potential sources of anthropogenic sound that may impact detrimentally upon marine mammals in Irish waters. It incorporates a re-examination of the Code of Practice for the Protection of Marine Mammals during Acoustic Seafloor Surveys in Irish Waters (2007) and thereby provides replacement guidance and protective measures in this respect. The DAHG 2014 Guidance will be followed throughout the site investigation activities. The following auditory band widths for marine mammals which may be present in the vicinity of the Foreshore Licence Site Investigation Area are extracted from the DAHG (2014) guidance and are shown in Table 4-2.

Table 4-2: Auditory Bandwidth for Marine Mammal Species

Frequency	Marine Mammal/Species	Estimated Auditory Band Width (kHz)
Low Frequency Cetaceans	Baleen whales (minke, fin and humpback whale)	0.007 - 22
Mid Frequency Cetaceans	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer and pilot whales)	0.15 - 160
High Frequency Cetaceans	Certain toothed whales and porpoises (harbour porpoise)	0.2 - 180
Low Frequency Pinnipeds in water	Seals (grey seal and common seal)	0.075 - 75

The current project entails geophysical and geotechnical surveys the noise characteristics of which are detailed in Table 4-3 below. DAHG (2014) acknowledges that drilling produces moderate levels of continuous omnidirectional sound at low frequencies and that while sound exposure levels from such operations are thought to be below that expected to cause injury to a marine mammal, they have the potential to cause lower-level disturbance, masking or behavioural impacts, for example.

Table 4-3: Potential noise sources generated by the geotechnical marine site investigation activities

Noise Source	Frequency (kHz)	Sound Pressure Level (dB re 1µPa @ 1m)
Shipping Noise	0.05 – 0.3	160-175
Multibeam echosounder (MBES)	400-700	200-228
Side scan sonar (SSS)	300 – 900	228
Pinger or Chirp/Sparker system (SBP)	2 - 16	200
Boomer system (SBP)	2.5	208 - 211
Geotechnical drilling (Rotary)	0.002 - 50	190

Comparing the data on Marine mammal auditory band width (see Table 4-2) and the noise characteristics of the surveys (see Table 4-3) it is deemed that the following will be audible to marine mammals:

- Shipping noise
- Sub-Bottom Profiler (SBP)
- Drilling

The Magnetometer (MM) is a passive device measuring magnetic fields and does not emit sound, Cone Penetration Testing (CPT) and Vibrocore are undertaken with mechanical devices which do not emit significant noise. Multibeam and side scan sonar surveys are typically at such high frequency and low power that they are deemed outside the audible threshold of marine mammals.

The relevant surveys which are within the audible band width for marine mammals are presented in Table 4-4.

Table 4-4: Marine Mammal Auditory Band Width and relevant surveys, marine mammals known in the area are also listed.

Frequency	Marine mammal/Species	Estimated Auditory Bandwidth (kHz)	Audible activity
Low Frequency Cetaceans	Baleen whales (minke, fin and humpback whale)	0.007 - 22	Shipping, SBP, Drilling
Mid Frequency Cetaceans	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer and pilot whales)	0.15 - 160	Shipping, SBP, Drilling
High Frequency Cetaceans	Certain toothed whales and porpoises (Harbour Porpoise)	0.2 - 180	Shipping, SBP, Drilling
Low Frequency Pinnipeds in water	Seals (Grey Seal and Common Seal)	0.075 – 75	Shipping, SBP, Drilling

Studies have demonstrated that fish can be classified as hearing specialists or non-specialists (i.e. generalists) (Popper, 2003). Hearing non-specialists may detect sounds of up to 1500Hz depending on the species, whereas hearing specialists are able to detect sounds of 3000Hz or above, again depending on the species (Popper *et al.,* 2004). Hearing specialists generally have better sensitivity (they can hear at lower thresholds) than non-specialists. Atlantic salmon (*Salmo salar*) hear up to 380Hz (Hawkins & Johnstone, 1978) therefore shipping (50-300Hz) noise would be audible to this species.

A study (Mickle *et al*., 2009) carried out on auditory responses in the sea lamprey showed the species detected tones of 50–300 Hz with equal sensitivity but did not detect sounds above 300Hz, therefore shipping noise is also likely audible to lamprey species. Three Annex II species, salmon, river lamprey and sea lamprey, may be able to hear the underwater noise associated with surveys. However, these three species can be screened out as although shipping noise would be audible to these species, they are not considered to be hearing specialists (Popper et al., 2003) and therefore not sensitive to the activities of the survey.

The twaite shad (*Alosa fallax*) is a species of the family Clupeidae. All fish in the order Clupeiformes have swim bladders and inner ear structures suggesting that they have specialist hearing capabilities and can detect sounds of 3kHz or above (Popper et al., 2004). Teague & Clough (2011) recorded positive significant reactions in juvenile twaite shad to sound frequencies of between 30 and 60 kHz with a peak at 45kHz. Therefore, based on the operating frequencies of the site investigation activities, twaite shad may be impacted by some of the site investigation activities and shipping noise.

4.3 Visual and Noise Disturbance to Bird Species

The physical presence of the survey vessels may result in temporary disturbance to individual birds present in the vicinity of the Foreshore Licence Site Investigation Area. There is also the potential for disturbance due to human activity and survey equipment noise i.e. drilling. Such disturbance may result in birds being temporarily displaced from their chosen feeding/resting location; however, they will be able to move to alternative locations nearby. There is existing shipping activity in the region and birds are accustomed to physical disturbance from marine traffic therefore, the introduction of additional vessels (1-2) is unlikely to cause significant disturbance. The zone of influence of disturbance on nesting birds has been assessed as up to 2km from the survey area (JNCC, 2017) depending on bird sensitivity.

To allow for the mobility of bird species which could forage into the Zone of Influence, all SPAs designated for bird species within 15 km of the Foreshore Licence Site Investigation Area have been screened in for assessment under Stage 1 Appropriate Assessment Screening (refer Section 3.2.1 and 5.1 for further details in relation to distances for screening).

4.4 Indirect effects to birds due to effects on prey species

The proposed survey activities are of a short term and temporary nature with very localised effects and therefore in most cases are not likely to have an effect on the ability of bird species to successfully forage (refer Sections 4.3 and 5.3.3 for more detail) within the Foreshore Licence Site Investigation Area as most bird species can easily move to another foraging location nearby.

However, there may be specific instances where even short term, temporary effects could disturb the preferred prey species of particular bird species in such a way as to affect the availability of that prey at a crucial time for that bird species (e.g. during the breeding season). This may have an effect on the prey biomass available to specific bird species and a knock-on effect on the breeding success of certain bird species.

One such instance concerns the Roseate Terns of the Rockabill SPA. During the breeding season the Roseate Terns are known to remain close to the island (within a few kilometres). Following fledging of chicks, the Roseate Terns forage further away. Increased activity within the SPA area and disturbance to the SPA sediment may affect the Roseate Terns preferred prey species: sand eel. Sand eel may burrow in disturbed waters so the access to food for chicks may be limited. This may worsen chick growing conditions.

4.5 Injury Due to Collision (survey vessels/sampling equipment)

There is a risk of collision between marine mammals and survey vessels. However, it is largely recognised that the key factors contributing to collision between marine mammals and vessels are the presence of both in the same area and vessel speed (see Schoeman et al., 2020 for review). Injuries to marine mammals from vessel strikes are species-dependent but generally are more severe at higher impact speeds (Wang et al., 2007). Vessels involved in these surveys are likely to be either stationary or travelling slowly (i.e. 5 knots or lower), thus allowing both the vessel and any animal in the area time to avoid collision.

Cetacean and pinnipeds in the area are exposed to vessels of all sizes on a regular basis as the site investigation area is in a busy shipping area. As a result, they are likely to maintain a distance from all survey vessels for the short time period of site investigation activities before returning to the area once site investigation activities has finished. Therefore, the collision risk posed by the site investigation activities is likely to be significantly lower than that posed by commercial shipping activity. A survey vessel in the area will not pose a collision risk to seabirds foraging the area.

4.6 Pollution Event

The Foreshore Licence Application site investigations will result in a temporary increase in vessels using the area which could theoretically increase the risk of accidents and resultant fuel spills. Given the nature and size of the vessels it is unlikely that any spillage would be significant. However, in the event of an accidental spillage/pollution event, any pollutant would immediately be diluted and mixed within the water column due to tidal currents, wind, and wave action.

All vessels used shall, as required by law, be MARPOL compliant and fully certified by the Maritime Safety Office. Therefore, it is considered not likely that there would be any occurrence of a pollution event, accidental or otherwise that could directly or indirectly affect any Natura 2000 site.

5 Appropriate Assessment Stage 1 Screening

Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

i. Whether a plan or project is directly connected to or necessary for the management of the site, and;
ii. Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.

As the site investigation activities are not directly connected with or necessary to the management of a Natura 2000 site, Stage 1 screening is therefore required to assess whether the proposed site investigation activities are likely to have a significant effect on any Natura 2000 site.

5.1 Criteria for Natura 2000 site selection for screening

Selection follows guidance from the National Parks and Wildlife Service (Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities) (DEHLG, 2010) which recommends that the distance should be evaluated on a case-by-case basis and that the precautionary principle should be adopted.

As the proposed project is entirely marine based with all site investigation activities located in the marine environment generally there would be no possible direct interaction and no pressure pathway on terrestrial or freshwater SAC's that have no coastal habitat and no mobile species with a marine element. However, the cable corridor route area and its potential landfall extends to coastal and land-based environments and therefore are subject to various site investigation activities. One site which at first glance may not be expected to have any interaction with the project may potentially be affected due to the presence of an Annex II species (River Boyne and River Blackwater SAC – Otter – SAC is linked to the Foreshore Licence Site Investigation Area by the River Boyne), therefore it has been included in this screening.

Otherwise, the criteria for Natura 2000 site selection for screening is as follows:

- Include any Natura 2000 site within or adjacent to the Foreshore Licence Site Investigation Area.
- Include any Natura 2000 site within the likely zone of impact of the Foreshore Licence Site Investigation Area, currently a distance of 15km is recommended and this is considered appropriate for the activities proposed under this application. N.B See note above re terrestrial and freshwater sites with no marine element and the exceptions in this case.
- Include Special Areas of Conservation that is more than 15km from the Foreshore Licence Site Investigation Area that contain mobile receptors that have the potential to occur within the site investigation area and be impacted by the site investigation activities (i.e. migrating fish species, seals, porpoises and dolphins). An upper limit of 100km distance was selected for these sites.

Please refer to Sections 3.2.1 and 3.2.2 for further information in relation to the rational for the adoption of 15km as an upper distance for birds and direct effects on SAC Annex I habitats.

5.2 Identification of Relevant Natura 2000 Sites and Qualifying Interests/Special Conservation Interests

The Natura 2000 sites considered for the AA screening are listed in Table 5-1. Qualifying Interests and Special Conservation Interests listed in Table 5-1 are based on the most up to date data available and sourced from the National Parks and Wildlife website (NPWS.ie). In total, 21 Natura 2000 sites were deemed relevant and screened in for Appropriate Assessment Stage One Screening. These include 16 Natura 2000 sites which fall within the 15km buffer zone of the Foreshore Licence Site Investigation Area:

- Rockabill SPA (004014)
- Skerries Islands SPA (004122)
- River Nanny Estuary and Shore SPA (00415)
- Rogerstown Estuary SPA (004015)
- Lambay Island SPA (004069)
- Malahide Estuary SPA (004025)
- Boyne Estuary SPA (004080)
- Baldoyle Bay SPA (004016)
- Ireland's Eye SPA (004117)
- Rockabill to Dalkey Island SAC (003000)
- Rogerstown Estuary SAC (000208)
- Lambay Island SAC (000204)
- Malahide Estuary SAC (000205)
- Boyne Coast And Estuary SAC (001957)
- River Boyne And River Blackwater SAC (002299)
- Baldoyle Bay SAC (000199)

Within 100km of the site there are 4 additional coastal or marine Special Areas of Conservation which have mobile qualifying interests that have the potential to occur within the site investigation area and be impacted by the site investigation activities (e.g. migrating fish species, seals, otters and porpoises):

- North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)
- Murlough SAC (UK0016612)
- Strangford Lough SAC (UK0016618)
- North Channel SAC (UK0030399)

Table 5-1: Identification of relevant Natura 2000 sites within the Zone of Influence of the Foreshore Licence Site Investigation Area.

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
Rockabill SPA (004014)	Purple Sandpiper *(Calidris maritima)* [A148] Roseate Tern *(Sterna dougallii)* [A192] Common Tern *(Sterna hirundo)* [A193] Arctic Tern *(Sterna paradisaea)* [A194]	Overlaps	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	**Low:** Zone of influence /standard displacement buffer is up to 2km for most seabirds (JNCC, 2017). Rockabill supports the largest breeding population of Roseate Tern in Europe. Breeding season: April – August. However, tern species including the Roseate Tern are considered of low or very low sensitivity to disturbance/displacement for most human based marine activities including dredging (comparable if not louder above water noise levels than the activities proposed under this FLA) and traffic and transport (faster moving vessels than those involved in the activities under this FLA). The closest point to the island itself of the proposed activities (and therefore the breeding colonies) is 1.7km. It is therefore considered to be of sufficient distance from the proposed activities that disturbance to the breeding terns species is not likely. Similarly noise from tern colonies can be in the region of 80dB. Given the closest	**Screened in**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
				distance to the island is 1.7km the bird species of Rockabill are not likely to be disturbed by noise from the survey activities. **Medium:** Site investigation activities may cause temporary displacement from chosen feeding grounds in the immediate vicinity of the survey vessel. In most cases bird species will be able to move to alternative feeding grounds nearby. However, in the case of the Roseate Tern the preferred prey species is the Sand Eel which may burrow into disturbed sediments, making it difficult for Roseate Terns to obtain enough food to feed chicks. The Roseate Tern is known to remain very close to Rockabill Island until chicks are fledged. Affects to prey species could disproportionally affect their chick rearing ability. Both benthic survey and geotechnical survey (boreholes, CPTs, vibrocores etc.) activities have the potential to significantly affect the prey species of the Roseate Tern.	

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
				See 5.3.3 below for more detail	
Skerries Islands SPA (004122)	Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Purple Sandpiper (*Calidris maritima*) [A148] Turnstone (*Arenaria interpres*) [A169] Herring Gull (*Larus argentatus*) [A184]	1.4	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	**Low:** Zone of influence /standard displacement buffer is up to 2km for most seabirds except for ducks and divers which require up to 4km (JNCC, 2017). The QIs of the Skerries Islands SPA are considered of low to medium sensitivity to noise and/or disturbance from human based activities. However, given the proximity of the islands to the harbour town of Skerries, the existing level of marine traffic in the area, the levels of background noise to which the QI species are habituated and the nature of the activities proposed under this FLA it is considered not likely that the QI species of the Skerries Islands SPA will be disturbed either during their breeding season or as a result of noise generated by the site investigation activities. **Low:** Site investigation activities may cause temporary displacement from chosen feeding grounds in the immediate vicinity of the survey vessel however the effect will be very localised and temporary in nature and temporarily	**Screen Out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
				displaced birds will be able to (1) move to alternative feeding grounds nearby and (2) are likely to quickly return to the area once the vessel has moved on. Considering the wide variety of prey species consumed by the bird species of the Skerries Islands SPA and the very localised nature of the site investigation activities it is considered not likely that there will be any indirect effect on the bird species (qualifying interests) of the Skerries Islands SPA due to effects on their prey species.	
River Nanny Estuary and Shore SPA (00415)	Oystercatcher (*Haematopus ostralegus*) [A130] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Herring Gull (*Larus argentatus*) [A184] Wetland and Waterbirds [A999]	1.77	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	**Low**: All but one (Herring Gull) of the QI species of the River Nanny Estuary and Shore SPA are overwintering wetlands and waterbirds. It is mostly used as a roost site however the overwintering birds also feed in the large intertidal area. The site investigation activities will not take place in the areas used by these birds. The effects of the site investigation activities are temporary and very localised. It is considered not likely that the overwintering QIs of the SPA will be affected as a result of noise generated by the surveys. It is also considered not	**Screened Out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
				likely that they will be indirectly affected by effects to their prey species. The SPA is also designated for the species Herring Gull. The Herring Gull is considered of very low sensitivity to noise/disturbance. In addition it has a varied diet. Therefore it is considered not likely that the Herring gull would be affected by either noise generated by the survey activities or indirectly affected by affects on its prey species. **Low:** Most of the QI species are migratory wintering birds and waders which feed within inshore shallow waters and inlets. These areas do not fall within the locations of the site investigation activities proposed under this FLA. It is considered not likely that the	
Rogerstown Estuary SPA (004015)	Greylag Goose (*Anser anser*) [A043] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Shoveler (*Anas clypeata*) [A056] Oystercatcher (*Haematopus ostralegus*) [A130]	3.25	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds**	**Low**: The QI species of the Rogerstown Estuary SPA feed ashore or in nearshore shallow inlets. The site investigation activities will not take place in the areas used by these birds. The effects of the site investigation activities are temporary and very localised. It is	**Screened Out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Ringed Plover (*Charadrius hiaticula*) [A137] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]		**due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	considered not likely that the QIs of the SPA will be affected as a result of noise generated by the surveys. **None:** Most of the QI species are migratory wintering birds and waders which feed within inshore shallow waters and inlets. These areas do not fall within the locations of the site investigation activities proposed under this FLA. The feeding grounds of these bird species of this SPA will not be affected by the proposed survey activities. It is considered not likely that there will be any indirect effects to the bird species of the SPA due to effects to their prey species.	
Lambay Island SPA (004069)	Fulmar (*Fulmarus glacialis*) [A009] Cormorant (*Phalacrocorax carbo*) [A017] Shag (*Phalacrocorax aristotelis*) [A018] Greylag Goose (*Anser anser*) [A043] Lesser Black-backed Gull (*Larus fuscus*) [A183] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199] Razorbill (*Alca torda*) [A200]	5.45	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** 3. **Temporary reduction of feeding grounds due to the survey activities.**	**None:** Zone of influence /standard displacement buffer is up to 2km for most seabirds except for ducks and divers which require up to 4km (JNCC, 2017). Therefore any breeding sites of the QIs of the Lambay Island SPA are outside the zone of influence of the site investigation activities. It is not likely that the QIs will be either disturbed during their breeding season nor disturbed as a	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Puffin (*Fratercula arctica*) [A204]		4. **Indirect effects due to disturbance to prey species**	result of noise generated by the site investigation activities. **None:** The site investigation activities will not interact with the feeding or roosting grounds of any overwintering bird species. **Low:** Individual birds which enter the site investigation area may be temporarily displaced from their chosen feeding location but can easily move to another location nearby. **SPA is 4.22km from the site investigation activities** **See 5.3.3 below for more detail**	
Malahide Estuary SPA (004025)	Great Crested Grebe (*Podiceps cristatus*) [A005] Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Pintail (*Anas acuta*) [A054] Goldeneye (*Bucephala clangula*) [A067] Red-breasted Merganser (*Mergus serrator*) [A069]	9.31	1. **Disturbance due to noise as a result of surveys** 2. **Temporary reduction of feeding grounds due to the survey activities.**	**None:** The site is only designated for overwintering bird species. There will be no interaction between the site investigation activities and the site or its QIs.	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Knot (*Calidris canutus*) [A143] Dunlin (*Calidris alpina*) [A149] Black-tailed Godwit (*Limosa limosa*) [A156] Bar-tailed Godwit (*Limosa lapponica*) [A157] Redshank (*Tringa totanus*) [A162] Wetland and Waterbirds [A999]		3. **Indirect effects dur to disturbance to prey species**	The QIs will not be affected by noise, reduction of feeding grounds or indirect effects on prey species. SPA is 7.44km from the proposed site investigation activities **See 5.3.3 below for more detail**	
Boyne Estuary SPA (004080)	Shelduck (*Tadorna tadorna*) [A048] Oystercatcher (*Haematopus ostralegus*) [A130] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Lapwing (*Vanellus vanellus*) [A142] Knot (*Calidris canutus*) [A143] Sanderling (*Calidris alba*) [A144] Black-tailed Godwit (*Limosa limosa*) [A156] Redshank (*Tringa totanus*) [A162] Turnstone (*Arenaria interpres*) [A169] Little Tern (*Sterna albifrons*) [A195] Wetland and Waterbirds [A999]	9.51	**1. Disturbance during breeding season** **2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	**None:** Zone of influence /standard displacement buffer is up to 2km for most seabirds except for ducks and divers which require up to 4km (JNCC, 2017). Therefore any breeding sites of the Little Tern within the Boyne Estuary SPA are outside the zone of influence of the site investigation activities. In addition Little Tern forages close to its colony. It is not likely that the Little Tern will be either disturbed during its breeding season, disturbed as a result of noise generated by the site investigation activities nor be affected in any way with respect to feeding grounds or effects on prey species.	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
				None: The site investigation activities will not interact with the feeding or roosting grounds of any overwintering bird species. **SPA is 9.51km from the site investigation activities** **See 5.3.3 below for more detail**	
Baldoyle Bay SPA (004016)	Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] Shelduck (*Tadorna tadorna*) [A048] Ringed Plover (*Charadrius hiaticula*) [A137] Golden Plover (*Pluvialis apricaria*) [A140] Grey Plover (*Pluvialis squatarola*) [A141] Bar-tailed Godwit (*Limosa lapponica*) [A157] Wetland and Waterbirds [A999]	14.60	**1. Disturbance due to noise as a result of surveys** **2. Temporary reduction of feeding grounds due to the survey activities.** **3. Indirect effects dur to disturbance to prey species**	**None:** The site is only designated for overwintering bird species. There will be no interaction between the site investigation activities and the site or its QIs. The QIs will not be affected by noise, reduction of feeding grounds or indirect effects on prey species. **Spa is 12.88km from the site investigation activities.** **See 5.3.3 below for more detail**	**Screened out**
Ireland's Eye SPA (004117)	Cormorant (*Phalacrocorax carbo*) [A017] Herring Gull (*Larus argentatus*) [A184] Kittiwake (*Rissa tridactyla*) [A188] Guillemot (*Uria aalge*) [A199]	14.83	**1. Disturbance during breeding season**	**None:** Zone of influence /standard displacement buffer is up to 2km for most seabirds except for ducks and divers which require up to 4km (JNCC,	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Razorbill (*Alca torda*) [A200]		**2. Disturbance due to noise as a result of surveys** **3. Temporary reduction of feeding grounds due to the survey activities.** **4. Indirect effects due to disturbance to prey species**	2017). Therefore any breeding sites of the QIs of the Ireland's Eye SPA are outside the zone of influence of the site investigation activities. It is not likely that the QIs will be either disturbed during their breeding season nor disturbed as a result of noise generated by the site investigation activities. **Low:** Individual birds which enter the site investigation area may be temporarily displaced from their chosen feeding location but can easily move to another location nearby. The QIs are not likely to be affected by either a reduction in feeding grounds or indirectly affected by effects to prey species. **SPA is 13.27km from the site investigation activities** **See 5.3.3 below for more detail**	
Rockabill to Dalkey Island SAC (003000)	Reefs [1170]	Overlaps	**Physical disturbance to marine benthic communities by:** **1. Habitat disturbance and smothering**	**High:** Qualifying Interest (Reefs) are subject to potential direct impact from the geotechnical survey activities and benthic sampling	**Screened In**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
			during all intrusive survey works 2. Increased suspension of solids in water column 3. Vibration from geo-technical equipment 4. Sediment penetration and some substratum loss		
	Phocoena phocoena (Harbour Porpoise) [1351]		1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment) 3. Visual and noise disturbance	**High:** Mobile species and the site investigation activities overlaps with its designated habitat area.	**Screened In**
Rogerstown Estuary SAC (000208)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	4.02	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]				
Lambay Island SAC (000204)	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	5.91	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**
	Halichoerus grypus (Grey Seal) [1364] *Phoca vitulina* (Common Seal) [1365]		**1. Disturbance from vibration and underwater noise associated with surveys** **2. Injury due to collision (survey vessels/sampling equipment)** **3. Visual and noise disturbance**	**High:** Mobile species so has potential to pass through survey area	**Screened In**
Boyne Coast And Estuary SAC (001957)	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Embryonic shifting dunes [2110]	7.60	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]				
Malahide Estuary SAC (000205)	Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetaliea maritimi*) [1410] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	8.57	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**
Baldoyle Bay SAC (000199)	Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	14.63	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**
River Boyne And River Blackwater SAC (002299)	Alkaline fens [7230] Alluvial forests with Alnus glutinosa and Fraxinus excelsior (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	14.70	**None**	**None:** no survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Lampetra fluviatilis (River Lamprey) [1099] *Salmo salar* (Salmon) [1106]		**Disturbance from vibration and underwater noise associated with surveys**	**Low:** Mobile species so have potential to pass through Foreshore Licence Site Investigation Area. Species are not sensitive to sound therefore not likely to be affected by the site investigation activities. Salmon is not protected as Annex II species except in freshwater.	**Screened Out**
	Lutra lutra (Otter) [1355]		**1. Visual and noise disturbance** **2. Disturbance from vibration and underwater noise associated with surveys**	**Medium:** River Boyne And River Blackwater SAC is linked to the proposed cable route area via the river estuaries. Therefore, there is a potential for the Otter to pass through a small area of the proposed cable route area	**Screened In**
North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)	*Phocoena phocoena* (Harbour porpoise) [1351]	42.16	**1. Disturbance from vibration and underwater noise associated with surveys** **2. Injury due to collision (survey vessels / sampling equipment)** **3. Visual and noise**	**High: Mobile species so has potential to pass through survey area**	**Screened In**
Murlough SAC (UK0016612)	Sandbanks which are slightly covered by sea water all the time [1110] Mudflats and sandflats not covered by seawater at low tide [1140]	47.02	**None**	**None**: No survey work within these habitats, no pathway for interaction.	**Screened out**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Embryonic shifting dunes [2110] "Shifting dunes along the shoreline with *Ammophila arenaria* (""white dunes"")" [2120] Dunes with *Salix repens ssp. argentea (Salicion arenariae*) [2170]			**See 5.3.1 below for more detail**	
	Marsh fritillary butterfly *Euphydryas (Eurodryas, Hypodryas) aurinia* [1065]		**None**	**None: No survey work within this butterfly species, no pathway for interaction.**	**Screened Out**
	Phoca vitulina (Common Seal) [1365]		**1. Disturbance from vibration and underwater noise associated with surveys** **2. Injury due to collision (survey vessels / sampling equipment)** **3. Visual and noise**	**High: Mobile species so has potential to pass through survey area**	**Screened In**
North Channel SAC (UK0030399)	*Phocoena phocoena* (**Harbour Porpoise**) [1351]	63.15	**Disturbance from vibration and underwater noise associated with surveys** **Injury due to collision (survey vessels/sampling equipment)**	**High:** Mobile species so has potential to pass through survey area.	**Screened In**

Site Name (Site Code)	Qualifying Interest	Distance to Foreshore Licence Site Investigation Area (Km)	Potential Pressures	Likelihood of interaction between QI and project/likelihood of significant effects on the SAC/SPA or QIs	Conclusion
			Visual and noise disturbance		
Strangford Lough SAC (UK0016618)	Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Salicornia and other annuals colonizing mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]	71.91	**None**	**None**: No survey work within these habitats, no pathway for interaction. **See 5.3.1 below for more detail**	**Screened out**
	Phoca vitulina (Common Seal) [1365]		**1. Disturbance from vibration and underwater noise associated with surveys** **2. Injury due to collision (survey vessels/sampling equipment)** **3. Visual and noise disturbance**	**High**: Mobile species so has potential to pass through survey area	**Screened In**

5.3 Screening Assessment of Likely Significant Effect

5.3.1 Direct Effects – Physical Disturbance to Marine Benthic Communitities; Habitat Loss

The General Conservation Objectives with regards to designated habitats of the Special Areas of Conservation considered in this report are set out in Table 5-2 below and are adapted from NPWS literature.

Table 5-2: Adapted from General Conservation Objectives for Special Areas of Conservation (NPWS (2019) The Status of EU Protected Habitats and Species in Ireland).

General Conservation Objectives for Annex I Habitats	
To maintain or restore favorable conservation status of habitats, which is defined by the following list of attributes and targets:	
Attribute	**Target**
Habitat area and distribution	Its natural range, and area it covers within that range, are stable or increasing
Habitat Structure	The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
Designated Species	The conservation status of its typical species is favourable and achieved through maintaining or improving population dynamics, natural range and sufficient availability of habitat to support population size
Future Prospects	The targets for both are likely to continue to be met into the future

In addition, specific conservation objectives are in place for the following SACs and Habitats within 15km of the Foreshore Licence Site Investigation Area.

Rockabill to Dalkey Islands SAC (003000)

Conservation objectives for: Rockabill to Dalkey Island SAC (003000)		
To maintain the favourable conservation condition of the **Reefs [1170]** in the Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent area is stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	Distribution is stable or increasing, subject to natural processes.
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; and Subtidal reef community complex.

Rogerstown Estuary SAC (000208)

1130 Estuaries		
To maintain the favourable conservation condition of Estuaries in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community extent	Hectares	Maintain the extent of the Zostera-dominated community and the Mytilus edulis-dominated community, subject to natural processes.
Community structure: *Zostera* density	Shoots/m²	Conserve the high quality of the *Zostera*-dominated community, subject to natural processes
Community structure: *Mytilus edulis* density	Individuals/m²	Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Sand to coarse sediment with *Nephtys cirrosa* and *Scolelepis squamata* community complex; Estuarine sandy mud to mixed sediment with *Tubificoides benedii*, *Hediste diversicolor* and *Peringia ulvae* community complex

1140 Mudflats and sandflats not covered by seawater at low tide		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community extent	Hectares	Maintain the extent of the Zostera-dominated community and the Mytilus edulis-dominated community, subject to natural processes.
Community structure: Zostera density	Shoots/m^2	Conserve the high quality of the Zostera-dominated community, subject to natural processes
Community structure: *Mytilus edulis* density	Individuals/ m^2	Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Sand to coarse sediment with *Nephtys cirrosa* and *Scolelepis squamata* community complex; Estuarine sandy mud to mixed sediment with *Tubificoides benedii, Hediste diversicolor* and *Peringia ulvae* community complex

1310 Salicornia and other annuals colonising mud and sand		
To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary 0.90ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and subcommunities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*). No new sites for this species and an annual spread of less than 1% where it is already known to occur

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary37.2ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Allow creek and pan structure to develop, subject to natural processes, including erosion and succession

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation composition: negative indicator species	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

1410 Mediterranean salt meadows (Juncetalia maritimi)		
To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Rogerstown Estuary 2.18ha
Habitat distribution	Occurrence	No decline, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated

1410 Mediterranean salt meadows (Juncetalia maritimi)		
To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - Spartina anglica	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)		
To restore the favourable conservation condition of Shifting dunes along the shoreline with Ammophila arenaria ('white dunes') in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Rush - 1.25ha, Portrane - 1.31ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of dune grasses	Percentage cover	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*)
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Rush - 3.24ha; Portrane - 5.13ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Rogerstown Estuary SAC, which is defined by the following list of attributes and targets		
Attribute	**Measure**	**Target**
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: bare ground	Percentage Cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage Cover	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: scrub/tree	Percentage Cover	No more than 5% cover or under contro

Lambay Island SAC (000204)

Conservation Objectives for: Lambay Island SAC (000204)		
1170 Reefs		
To maintain the favourable conservation condition of Reefs in Lambay Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target Notes**
Habitat area	Hectares	The permanent area is stable or increasing, subject to natural processes
Habitat distribution	Occurrence	The distribution of reefs is stable or increasing, subject to natural processes
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; Laminaria-dominated community complex.

1230 Vegetated sea cliffs of the Atlantic and Baltic coast		
To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Lambay Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat length	Kilometres	Area stable, subject to natural processes, including erosion. Total length of cliff section mapped: 7.27km.
Habitat distribution	Occurrence	No decline, subject to natural processes
Physical structure: Functionality and hydrological regime	Occurrence of artificial barriers	No alteration to natural functioning of geomorphological and hydrological processes due to artificial structures

1230 Vegetated sea cliffs of the Atlantic and Baltic coast		
To maintain the favourable conservation condition of Vegetated sea cliffs of the Atlantic and Baltic coasts in Lambay Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation structure: zonation	Occurrence	Maintain range of sea cliff habitat zonations including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: Vegetation height	Centimeters	Maintain structural variation within sward
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub- communities with typical species listed in the Irish Sea Cliff Survey (Barron et al., 2011)
Vegetation composition: negative indicator species	Percentage	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: bracken and woody species	Percentage	Cover of bracken (*Pteridium aquilinum*) on grassland and/or heath less than 10%. Cover of woody species on grassland and/or heath less than 20%

Malahide Estuary SAC (000205)

1140 Mudflats and sandflats not covered by seawater at low tide		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community extent	Hectares	Maintain the extent of the Zostera-dominated community and the *Mytilus edulis*-dominated community, subject to natural processes.
Community structure: Zostera density	Shoots/m^2	Conserve the high quality of the Zostera-dominated community, subject to natural processes
Community structure: *Mytilus edulis* density	Individuals/ m^2	Conserve the high quality of the *Mytilus edulis* dominated community, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Sand to coarse sediment with *Nephtys cirrosa* and *Scolelepis squamata* community complex; Estuarine sandy mud to mixed sediment with *Tubificoides benedii, Hediste diversicolor* and *Peringia ulvae* community complex

1310 Salicornia and other annuals colonising mud and sand		
To maintain the favourable conservation condition of Salicornia and other annuals colonising mud and sand in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary- 1.93ha

1310 Salicornia and other annuals colonising mud and sand		
To maintain the favourable conservation condition of Salicornia and other annuals colonising mud and sand in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (*Spartina anglica*). No new sites for this species and an annual spread of less than 1% where it is already known to occur

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 25.33ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Allow creek and pan structure to develop, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To restore the favourable conservation condition of Atlantic salt meadows (Glauco-Puccinellietalia maritimae) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation composition: negative indicator species	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

1410 Mediterranean salt meadows (Juncetalia maritimi)		
To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Malahide Estuary - 0.64ha
Habitat distribution	Occurrence	No decline, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009)

1410 Mediterranean salt meadows (Juncetalia maritimi)		
To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation structure: negative indicator species - Spartina anglica	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)		
To restore the favourable conservation condition of Shifting dunes along the shoreline with Ammophila arenaria ('white dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 1.80ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of dune grasses	Percentage cover	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*)
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. Total area mapped: 21.42ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation ('grey dunes') in Malahide Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: bare ground	Percentage Cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in Ryle et al. (2009)
Vegetation composition: negative indicator species (including *Hippophae rhamnoides*)	Percentage Cover	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: scrub/tree	Percentage Cover	No more than 5% cover or under control

Boyne Coast And Estuary SAC (001957)

1130 Estuaries		
To maintain the favourable conservation condition of Estuaries in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal estuarine mud and fine sand with Hediste diversicolor and Corophium volutator community; and Subtidal fine sand dominated by polychaetes community

1140 Mudflats and sandflats not covered by seawater at low tide		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Intertidal estuarine mud and fine sand with Hediste diversicolor and Corophium volutator community; and Fine sand dominated by bivalves community complex.

1310 Salicornia and other annuals colonising mud and sand		
To restore the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Baltray- 2.91ha, Mornington- 1.14ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To maintain the favourable conservation condition of Atlantic salt meadows (Glauco- Puccinellietalia) in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Baltray- 17.67ha, Mornington- 8.76ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Allow creek and pan structure to develop, subject to natural processes, including erosion and succession

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To maintain the favourable conservation condition of Atlantic salt meadows (Glauco- Puccinellietalia) in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation composition: negative indicator species	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

2110 Embryonic shifting dunes		
To restore the favourable conservation condition of Embryonic shifting dunes in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-sites mapped: Baltray- 2.52ha, Mornington- 0.67ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of foredune grasses	Percentage cover	More than 95% of sand couch (Elytrigia juncea) and/or lyme-grass (Leymus arenarius) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities with typical species: sand couch (Elytrigia juncea) and/or lyme-grass (Leymus arenarius)
Vegetation composition: negative indicator species	Hectares	Negative indicator species (including non-native species) to represent less than 5% cover

2110 Embryonic shifting dunes		
To restore the favourable conservation condition of Embryonic shifting dunes in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
2120 Shifting dunes along the shoreline with Ammophila arenaria (white dunes)		
To restore the favourable conservation condition of Shifting dunes along the shoreline with Ammophila arenaria (white dunes) in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Baltray- 2.97ha, Mornington- 1.99ha.
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation composition: plant health of dune grasses	Percentage cover	95% of marram grass (*Ammophila arenaria*) and/or lyme-grass (*Leymus arenarius*) should be healthy (i.e. green plant parts above ground and flowering heads present)
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the presence of species-poor communities dominated by marram grass (*Ammophila arenaria*) and/or lymegrass (*Leymus arenarius*)
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area increasing, subject to natural processes including erosion and succession. For sub-sites mapped: Baltray-26.41ha; Mornington-20.46ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: functionality and sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: bare ground	Percentage Cover	Bare ground should not exceed 10% of fixed dune habitat, subject to natural processes
Vegetation structure: sward height	Centimetres	Maintain structural variation within sward

2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)		
To restore the favourable conservation condition of Fixed coastal dunes with herbaceous vegetation (grey dunes) in Boyne Coast and Estuary SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with typical species listed in Ryle et al. (2009)
Vegetation composition: negative indicator species	Percentage Cover	Negative indicator species (including non-natives) to represent less than 5% cover
Vegetation composition: scrub/trees	Percentage Cover	No more than 5% cover or under control

River Boyne And River Blackwater SAC (002299)

7230 Alkaline fens 91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* * denotes a priority habitat		
To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected:		
Attribute	**Measure**	**Target**
Favourable conservation status of a habitat is achieved when: - its natural range, and area it covers within that range, are stable or increasing, and - the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and - the conservation status of its typical species is favourable.		

Baldoyle Bay SAC (000199)

1140 Mudflats and sandflats not covered by seawater at low tide		
To maintain the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent habitat area is stable or increasing, subject to natural processes
Community distribution	Hectares	Conserve the following community types in a natural condition: Fine sand dominated by Angulus tenuis community complex; and Estuarine sandy mud with Pygospio elegans and Tubificoides benedii community complex.

1310 Salicornia and other annuals colonising mud and sand		
To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoyle - 0.383ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.

1310 Salicornia and other annuals colonising mud and sand		
To maintain the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain, or where necessary restore, natural circulation of sediments and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover	Maintain the presence of species-poor communities with typical species listed in the Saltmarsh Monitoring Project (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - *Spartina anglica*	Hectares	No significant expansion of common cordgrass (Spartina anglica), with an annual spread of less than 1%

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To maintain the favourable conservation condition of Atlantic salt meadows (Glauco- Puccinellietalia maritimae) in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoyle - 11.98ha
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Allow creek and pan structure to develop, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession

1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)		
To maintain the favourable conservation condition of Atlantic salt meadows (Glauco- Puccinellietalia maritimae) in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain range of sub-communities with typical species listed in SMP (McCorry and Ryle, 2009)
Vegetation composition: negative indicator species	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

1410 Mediterranean salt meadows (Juncetalia maritimi)		
To maintain the favourable conservation condition of Mediterranean salt meadows (Juncetalia maritimi) in Baldoyle Bay SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession. For sub-site mapped: Baldoyle - 2.64ha
Habitat distribution	Occurrence	No decline, subject to natural processes.
Physical structure: sediment supply	Presence / absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions
Physical structure: creeks and pans	Occurrence	Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession
Physical structure: flooding regime	Hectares flooded; frequency	Maintain natural tidal regime
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession
Vegetation structure: vegetation height	Centimetres	Maintain structural variation within sward
Vegetation structure: vegetation cover	Percentage cover at a representative sample of monitoring stops	Maintain more than 90% of area outside creeks vegetated
Vegetation composition: typical species and subcommunities	Percentage cover at a representative sample of monitoring stops	Maintain range of subcommunities with characteristic species listed in SMP (McCorry and Ryle, 2009)
Vegetation structure: negative indicator species - Spartina anglica	Hectares	No significant expansion of common cordgrass (*Spartina anglica*) with an annual spread of less than 1% where it is already known to occur

As outlined in Section 4.2, impacts will only affect benthic habitats and their associated fauna in the direct footprint of sampling equipment (environmental and geotechnical surveys). In addition, the effect of the surveys will be localised, temporary in nature and in most cases will have an imperceptible temporary effect within the vicinity of each survey location. Any sediment disturbed as a result of geotechnical and ecological benthic surveys is expected to be dispersed by the prevailing tides and will be far less than any typical storm event.

It is considered not likely that the survey activities will create any barrier to any SAC or effect the tidal flows either to or from any SAC, either directly or indirectly.

Annex I habitats (QIs) within SACs (subtidal, shallow water and intertidal areas) which are present within the Foreshore Licence Site Investigation Area will be exposed to habitat disturbance and loss during intrusive survey works (i.e. geo-technical and benthic sampling activities) if they are within the direct footprint of the sampling equipment. Therefore, it is considered likely that the Conservation Objectives of the Annex I habitats i.e. natural range and area occupied will only be affected by the proposed survey activities where the Annex I Habitat within the SAC overlaps with physically intrusive site investigations (benthic grab sampling and geotechnical site investigations).

There is one SAC overlapping the site investigation area: Rockabill to Dalkey Island SAC. It is designated for the Annex I Habitat [Reefs]. The reef habitat only constitutes a very small area of the SAC (c. 1%) however areas of the reef are located at the edge of the site investigation area and possibly within it.

Therefore, likely significant effects upon the conservation objectives of the following site cannot be excluded at this stage as an impact pathway exists in relation to qualifying Annex I habitats and it is screened in for Stage 2 Appropriate Assessment (AA):

- Rockabill to Dalkey Island SAC (003000)

The following SACs within 15km of the Foreshore Licence Site Investigation Area are not likely to be affected as no works will take place within those SACs and no pressure pathway exists that may result in a likely significant effect on those QIs. Therefore, they will not be considered further in terms of effects to Annex I habitats and can be screened out at this stage:

- Rogerstown Estuary SAC (000208)
- Malahide Estuary SAC (000205)
- Boyne Coast And Estuary SAC (001957)
- Baldoyle Bay SAC (000199)

The following SACs have Annex I habitats that have been excluded from further assessment, however, these sites have not been screened out of the Stage 2 AA (NIS) as these SACs have designated mobile species that may be present in the Foreshore Licence Site Investigation Area at least some of the year. This is addressed in Section 5.3.2.

- Lambay Island SAC (000204)

- River Boyne And River Blackwater SAC (002299)
- North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)
- Murlough SAC (UK0016612)
- Strangford Lough SAC (UK0016618)
- North Channel SAC (UK0030399)

Wetlands [A999]

The following SPAs are designated for Wetlands given the importance of wetland habitats to overwintering wetlands and waterbirds.

- Rogerstown Estuary SPA
- River Nanny Estuary and Shore SPA
- Malahide Estuary SPA
- Boyne Estuary SPA
- Baldoyle Bay SPA

The conservation objectives for wetlands relate to the habitat area and is characterised as "The permanent area occupied by the wetland should be stable".

No site investigations will take place in the SPAs listed above, there will be no barrier affect created by the site investigations and the site investigations will not alter the tidal flows to or from the SPAs. Therefore, it is not likely that the conservation objectives for the SPAs listed above will be affected by the site investigation activities within the Foreshore Licence Site Investigation Area.

5.3.2 Disturbance from vibration and underwater noise associated with surveys

Mobile marine Annex II species may be impacted by underwater noise associated with surveys. However, two of these species: River Lamprey *(Lampetra fluviatilis)* and Salmon *(Salmo salar*) can be screened out from further assessment i9n the absence of mitigation measures as although shipping noise would be audible to these species, they are not considered hearing sensitive (refer to Section 4.2 for further detail on the hearing sensitivity of migratory fish species) and the low number of survey vessels involved would not significantly affect them.

Harbour Porpoise

There is the potential for significant effects on the harbour porpoise (*Phocoena phocoena* [1351]) due to underwater noise levels during the surveys, therefore the harbour porpoise cannot be screened out of further assessment at this stage and the following sites must proceed to Stage 2 Appropriate Assessment for the qualifying interest Harbour Porpoise:

- Rockabill to Dalkey Island SAC (003000)
- North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)
- North Channel SAC (UK0030399)

Common (Harbour) Seal

There is potential for significant effects on Harbour Seal (*Phoca vitulina* [1365]) due to underwater noise levels during the surveys therefore Harbour Seal cannot be screened out of further assessment at this stage and the following sites must proceed to Stage 2 Appropriate Assessment for the qualifying interest Harbour Seal:

- Lambay Island SAC (000204)
- Murlough SAC (UK0016612)
- Strangford Lough SAC (UK0016618)

Grey Seal

There is the potential for significant effects on the Grey Seal (*Halichoerus grypus* [1364]) due to underwater noise levels during the surveys, therefore the Grey Seal cannot be screened out for further assessment at this stage and the following sites must proceed to Stage 2 Appropriate Assessment for the qualifying interest Grey Seal:

- Lambay Island SAC (000204)

Otter

There is the potential for significant effects on the Otter (*Lutra lutra*) due to underwater noise levels during the surveys. The Otter is a mobile species but remains close to the coast and therefore any SAC's not located along the coast will not be impacted. However, any SAC's located along the coast cannot be screened out for further assessment at this stage and the following site must proceed to Stage 2 Appropriate Assessment for the qualifying interest Otter:

- River Boyne And River Blackwater SAC (002299)

5.3.3 Visual and Noise Disturbance to Birds and Indirect Effects on Bird Species due to Effects on Prey Species

The physical presence of the survey vessel/vessels may cause some temporary disturbance to birds in the immediate vicinity of the site investigation activities. This may result in birds being temporarily displaced from their chosen feeding/resting location; however, they are likely to move to another nearby location. The presence of 1-2 extra vessels in the area is not deemed a significant increase in vessel activity given the typical levels of activity in the area.

The temporary nature and imperceptible effects of the survey activities is not likely to have a significant effect on the prey species of all but one of the qualifying interests of the SPAs (Roseate Tern – Rockabill Island SPA). Therefore, it is considered not likely that all but one of the bird species (Roseate Tern – Rockabill Island SPA) will be indirectly affected as a result of an effect on their fish prey species.

Considering the conservation objectives of the SPAs examined, the physical presence of survey vessels may result in temporary disturbance to individual birds present in the vicinity of the survey area. However, due to the nature of the surveys and the very short duration of the surveys, it is deemed that the proposed surveys will not impact on bird species directly or indirectly for eight of the nine SPAs considered. Therefore, it is considered not likely that there will be any significant effects either directly or indirectly on eight of the Special Protection Areas or their Qualifying Interests/Special Conservation Interests examined.

Significant indirect effects on the Roseate Tern of **Rockabill Island SPA** as a result of effects on the prey species: Sand Eel cannot be ruled out at this time and therefore this site must progress to Stage 2 Appropriate Assessment for the Qualifying Interest Roseate Tern. This is discussed further below.

According to JNCC (2017), the zone of influence of disturbance for nesting birds is up to 2km as it is during this time the bird is most vulnerable to disturbance. With regards to distance from the nine SPAs considered in this report, site investigation activities will be at least 2km for five of the nine SPAs considered:

i) Lambay Island SPA (004069)
ii) Malahide Estuary SPA (004025)
iii) Boyne Estuary SPA (004080)
iv) Baldoyle Bay SPA (004016)
v) Ireland's Eye SPA (004117)

On the above basis it is considered not likely that bird species of the above listed SPAs will be affected either directly or indirectly by the site investigation activities within the Foreshore Licence Site Investigation Area and they can therefore be screened out of further consideration.

Three SPAs fall within 2km of the site investigation activities and must be further examined in this screening assessment:

- Rockabill SPA (004014)
- Skerries Islands SPA (004122)
- River Nanny Estuary and Shore SPA (00415)

Rockabill SPA

The conservation objectives for all bird species for which the site is designated are characterised below:

Conservation objectives for: Rockabill SPA (004014)		
To maintain the favourable conservation condition of the **Purple Sandpiper (*Calidris maritima*)** [A148] in the Rockabill SPA, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Population trend	Percentage change	Long term population trend stable or increasing

Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by purple sandpiper other than that occurring from natural patterns of variation
To maintain the favourable conservation condition of the **Roseate Tern (*Sterna dougallii*) [A192], Common Tern (*Sterna hirundo*) [A193] and Arctic Tern (*Sterna paradisaea*) [A194]** in the Rockabill SPA, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
Productivity rate: fledged young per breeding pair	Mean number	No significant decline
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant decline
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding common tern population

Rockabill SPA (004014) overlaps the application area. Rockabill consists of two small, low-lying, granitic islets situated c. 7 km off the Co. Dublin coast. The islands are separated by a narrow channel, though are connected at low spring tides. The site includes the two islands and the surrounding seas to a distance of 3.5 km from the islands. The site is a SPA under the EU Birds Directive, of special conservation interest for the following species: Purple Sandpiper, Roseate Tern, Common Tern and Arctic Tern. All three species of tern which occur are listed on Annex I of the EU Birds Directive.

The site supports nationally important breeding populations of Common Tern and Arctic Tern, and a nationally important wintering population of Purple Sandpiper. It also supports an internationally important colony of breeding Roseate Tern. Rockabill supports the largest breeding population of migratory seabird Roseate Tern in Europe. In 2018, 1642 Roseate Tern primary nests were counted on Rockabill making it the highest recorded to date. The bird is resident from April to October with the breeding season lasting until August. One of the main factors controlling the population size is the availability of sufficient food to raise its chicks. Sand eels are the preferred food and breeding success tends to be high when these are plentiful. Rockabill waters are food hotspots for Roseate Terns as they are abundant with Sand Eels, Sprats and Herring (http://roseatetern.org/rockabill.html). During the breeding season the Roseate Terns are known to remain close to the island. Following fledging of chicks, the Roseate Terns forage further away.

Site investigation activities will take place within the SPA. Tern species are of low or very low sensitivity to noise. While the site investigation activities overlap with the SPA, the SPA extends seaward a distance of approximately 3km from the island itself. The site investigation activities are at a distance of 1.7km from the island at the closest point. In addition noise output from tern colonies has been recorded as being in the region of 80dB (Irish Water, June 2018). Given the low sensitivity of

tern species to disturbance or noise, and the distance of 1.7km from the site investigation activities at the closest point it is considered not likely that the site investigation activities would cause disturbance to nesting terns as a result of either additional vessels (1-2) in the survey area or as a result of noise generated by the site investigation activities.

Increased activity within the SPA area and disturbance to the SPA sediment may affect the Roseate Terns' preferred prey species: sand eel. Sand eel may burrow in disturbed waters so the access to food for chicks may be limited. This may worsen chick growing conditions. Should geotechnical or benthic survey work occur within the SPA during the breeding season (end April to August) likely significant effects on the conservation objectives of the SPA as a result of effects on prey biomass availability of the Roseate Tern cannot be ruled out in the absence of mitigation measures and the site must proceed to Stage 2 Appropriate Assessment for the qualifying interest Roseate Tern.

Skerries Islands SPA

The conservation objectives for all bird species for which the site is designated are characterised below:

Conservation objectives for: Skerries Islands SPA (004122)		
To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: **Cormorant (*Phalacrocorax carbo*) (A017), Shag (*Phalacrocorax aristotelis*) (A018), *Light-bellied Brent Goose* (Branta bernicla hrota)(A046), *Purple Sandpiper* (Calidris maritima) (A148), Turnstone *(Arenaria interpres)* (A169), Herring Gull (Larus argentatus) (A184)**		
Attribute	**Measure**	**Target**
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by QIs other than that occurring from natural patterns of variation

The marine boundary of Skerries Island SPA is located 1.40km the site investigation area at it closest point. The site is a Special Protection Area (SPA) under the EU Birds Directive, of special conservation interest for the following species: Cormorant, Shag, Light-bellied Brent Goose, Purple Sandpiper, Turnstone and Herring Gull. The islands are of importance for both breeding seabirds and wintering waterfowl. Birds arrive and depart throughout the seasons from their Arctic breeding grounds and African wintering grounds.

The area is designated for a range of over wintering birds and breeding Cormorant and Herring Gull. Bird species listed for the SPA are of very low to medium sensitivity to noise. They are also shown to become habituated to noise. Therefore, disturbance is likely to be to individual birds in the immediate vicinity of the site investigation equipment or vessels only and will be temporary in nature. It is not likely to have any affect, on either population trend of distribution for the species within the SPA.

Regarding the Cormorant, Shag and Herring Gull, according to JNCC (2017) the zone of influence of disturbance for nesting birds is up to 2km however given the volume of marine traffic which the Herring Gull and Cormorant is habituated to and the species low to medium sensitivity to disturbance

it is considered not likely that the conservation objectives for the Herring Gull and Cormorant within Skerries Islands SPA would be affected by the site investigations in the bay which will be of a temporary nature. Adult cormorants and gulls often utilise man made areas including ships, therefore it is likely that the effect on these species during breeding season in the area will be low and noise generated during the survey should have also minimal effect. Therefore, this SPA can be **screened out** at this stage from further consideration.

River Nanny Estuary and Shore SPA (00415)

River Nanny Estuary and Shore SPA is designated for a number of over wintering birds, waders and Herring Gull. The conservation objectives were common across all species and are characterised below**:**

Conservation objectives for: River Nanny Estuary and Shore SPA (00415)		
To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA: **Oystercatcher (Haematopus ostralegus) [A130], Ringed Plover, (Charadrius hiaticula) [A137], Golden Plover (Pluvialis apricaria) [A140], Knot (Calidris canutus) [A143], Sanderling (Calidris alba) [A144], Herring Gull (Larus argentatus) [A184]**		
Attribute	**Measure**	**Target**
Population trend	Percentage change	Long term population trend stable or increasing
Distribution	Number, range, timing and intensity of use of areas	No significant decrease in the range, timing or intensity of use of areas by named species, other than that occurring from natural patterns of variation

The marine boundary of River Nanny Estuary and Shore SPA is 1.77km at its closest point with the Proposed Cable Route Area. The site is a Special Protection Area (SPA) under the EU Birds Directive, of special conservation interest for the following species: Oystercatcher, Ringed Plover, Golden Plover, Knot, Sanderling, Herring Gull.

The area is designated for a range of over wintering birds and breeding Herring Gull. Disturbance is likely to be to individual birds in the immediate vicinity of the site investigation equipment or vessels only and will be temporary in nature. Therefore, it is not likely to have any affect, on either population trend of distribution for the species within the SPA.

Regarding Herring Gull, according to JNCC (2017) the zone of influence of disturbance for nesting birds is up to 2km however given the volume of marine traffic which the Herring Gull is habituated to and the species very low sensitivity to disturbance it is considered not likely that the conservation objectives for the Herring Gull within this SPA would be affected by the site investigations which will be of a temporary nature.

The over wintering birds feed in inshore shallow waters, inlets. These areas do form part of the site investigations activities. These species will not be exposed to physical reduction of feeding grounds.

Therefore, it is considered not likely that the conservation objectives of the SPA with respect to the over wintering bird species and breeding species will be affected by the site investigation activities within the Foreshore Licence Site Investigation Area and they can be **screened out** at this stage from further consideration.

As discussed in Chapter 5.3.1 no site investigation activities will take place within this SPA and the conservation objectives with regards to the [A999] Wetlands of the SPA will not be affected by the site investigation activities.

In light of the above assessments there is one SPA (Rockabill Island SPA), for which significant effects cannot be ruled out in the absence of mitigation measures at this time and must proceed to a Stage 2 Appropriate Assessment (Natura Impact Statement)

5.3.4 Pollution Event

The International Convention for the Prevention of Pollution from Ships 1973, as modified by the Protocol of 1978 (MARPOL 73/78, MARPOL is short for maritime pollution and 73/78 short for the years 1973 and 1978) is one of the most important international marine environmental conventions. It aims to prevent both operational and accidental discharge into the marine from sea going vessels. Ireland ratified the various elements of the MARPOL Convention through the Sea Pollution Act 1991, the Sea Pollution (Amendment) Act 1999 and the Sea Pollution (Miscellaneous Provisions) Act 2006.

It was given further legal effect through several Statutory Instruments under these Acts. The Acts place a legal obligation upon operators of vessels to implement measures to prevent both operational and accidental discharges from ships of substances, which may damage the marine environment as well as human health. In light, of these legal obligations, an incidence of pollution, whether from operational activities or from an accidental occurrence is considered not likely and therefore sites further than 15km from the Foreshore Licence Site Investigation Area are not considered further in this screening report in this respect.

All vessels used shall, as required by law, be MARPOL Compliant and fully certified by the Maritime Safety Office. Therefore, it is considered not likely that there would be any occurrence of a pollution event that could directly or indirectly affect any of the sites or their Qualifying Interests.

5.4 In-combination effects

Other activities or proposed activities of the Statkraft Foreshore Licence Application Area are outlined in Section 3.7 of this report. Details of the relationship between the activities proposed or in operation under those projects and the activities proposed under the Statkraft Foreshore Licence Application are examined in Table 5-3.

- Oriel Offshore Wind Farm (FS006840)
- Cooley Point Offshore Wind Farm (FS006852)
- Clogher Head Offshore Wind Farm (FS006787)
- Braymore Point Offshore Wind Farm (FS006973)

- Celtix Connect - Havhingsten Fibre Optic Telecommunication Cable (FS006915)
- PiPiper fibre optic cable (FS006762)
- North Irish Sea Array (NISA) Offshore Wind Farm Array Site (FS007031)
- Drogheda Port – dumping at sea site

Table 5-3: Consideration of in-combination effects

Project/Activity/Development name and application/licence reference number	Licence status	Proposed activities	Spatial Overlap and Area (if applicable)	Potential in – combination effects	Conclusion
Celtix Connect - Havhingsten Fibre Optic Telecommunication Cable (FS006915)	Consultation	Cable installation - Pre-cable laying grapnel run	Partial Overlap 0.017 km^2	There is a very small spatial overlap between the NISA Foreshore Licence Site Investigation Area and Celtix Connect installation area However that licence application is at an advance stage and installation is expected to be complete in the overlapping area by April 2021. The Celtix Connect cable is due to land within Loughshinny Harbour whereas the cable assessment area for NISA lies to the north of the harbour area and does not overlap the Celtix Connect landfall area. In addition, the as laid cable area will likely lie just south of the NISA Foreshore Licence Site Investigation Area and in any case will be avoided during physically intrusive site investigations due to operational reasons (i.e. to ensure no actual overlap between the two cables or cable install trenches). Both cable systems (Celtix Connect and NISA export cables) will require access into the future to enable cable maintenance for both cables.	The effects under both applications are determined to be temporary and localised and therefore there is not likely to be any in-combination effects as a result of the two projects.
Braymore Point Offshore Wind Farm (FS006973)	Consultation	Geophysical, Geotechnical, Archaeological, Ecological, Oceanographic and Meteorological investigations	Partial Overlap 49.18 km^2	There is a significant overlap between the Foreshore Licence Application Area and the SSE Renewables Site Investigation Area. A licence was recently granted for the activities and there is the potential for in-combination effects on marine mammals due to underwater noise if geophysical surveys are undertaken within the overlapping area within the same time period depending on the parameters of the surveys.	Possible in-combination effects on marine mammals due to underwater noise disturbance if geophysical surveys are undertaken in the same area within the same time period.
North Irish Sea Array (NISA) Offshore Wind Farm Array Site (FS007031)	Consultation	Geophysical, Geotechnical, Environmental surveys	On the boarder - none	There is no spatial overlap with this project. Effects of site investigations proposed under the Foreshore Licence Application are determined to be temporary and very localised therefore it is considered not likely that there will be any cumulative effects caused by any interaction between the two projects which are a part of the same development.	No likely in-combination effects.

Project/Activity/Development name and application/licence reference number	Licence status	Proposed activities	Spatial Overlap and Area (if applicable)	Potential in – combination effects	Conclusion
Cooley Point Offshore Wind Farm (FS006852)	Consultation	Geophysical, Geotechnical, Archaeological, Ecological surveys	None	There is no spatial overlap with this project. Effects of site investigations proposed under the Foreshore Licence Application are determined to be temporary and very localised therefore it is considered not likely that there will be any cumulative effects caused by any interaction between the two projects even if activities are undertaken within the same time period.	No likely in-combination effects.
Oriel Offshore Wind Farm (FS006840)	Consultation	Geophysical Geotechnical Ecological and Metocean surveys	None	There is no spatial overlap with this project. Effects of site investigations proposed under the Foreshore Licence Application are determined to be temporary and very localised therefore it is considered not likely that there will be any cumulative effects caused by any interaction between the two projects even if activities are undertaken within the same time period.	No likely in-combination effects.
Clogher Head Offshore Wind Farm (FS006787)	Consultation	Geophysical, Geotechnical, Archaeological, Ecological surveys	None	There is no spatial overlap with this project. Effects of site investigations proposed under the Foreshore Licence Application are determined to be temporary and very localised therefore it is considered not likely that there will be any cumulative effects caused by any interaction between the two projects even if activities are undertaken within the same time period.	No likely in-combination effects.
Drogheda Port – dumping at sea site	Operational	Dumping at sea of dredged material	None	There is no spatial overlap with this project. Effects of site investigations proposed under the Foreshore Licence Application are determined to be temporary and very localised therefore it is considered not likely that there will be any cumulative effects caused by any interaction between the two projects even if activities are undertaken within the same time period.	No likely in-combination effects.

5.5 Screening Statement

The possible effects on the Special Areas of Conservation, Special Protection Areas and the relevant Qualifying Interests/Species of Community Interest have been assessed in the Stage 1 Appropriate Assessment Screening.

Likely significant effects either alone or in-combination with other plans and projects have been screened in for 1 SPA and its Qualifying Interests and for 3 SACs and the specified Qualifying Interests within the 15km of the site investigation activities:

Rockabill SPA (004014)

- Roseate Tern (*Sterna dougallii*) [A192]

Rockabill to Dalkey Island SAC (003000)

- Reefs [1170]
- *Phocoena phocoena* (Harbour Porpoise) [1351]

Lambay Island SAC (000204)

- *Halichoerus grypus* (Grey Seal) [1364]
- *Phoca vitulina* (Common Seal) [1365]

River Boyne and River Blackwater SAC (002299)

- *Lutra lutra* (Otter) [1355]

As negative effects or possible in-combination effects on Annex II qualifying interests cannot be ruled out from disturbance from vibration and underwater noise associated with site investigation activities, Stage 2 Appropriate Assessment is required for the following SACs within 100km of the Foreshore Licence Site Investigation Area not already listed above:

North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)

- *Phocoena phocoena* (Harbour Porpoise) [1351]

Murlough SAC (UK0016612)

- *Phoca vitulina* (Common Seal) [1365]

Strangford Lough SAC (UK0016618)

- *Phoca vitulina* (Common Seal) [1365]

North Channel SAC

- *Phocoena phocoena* (Harbour Porpoise) [1351])

5.6 Screening Statement Summary

A summary of the sites that are screened in for further assessment under a Stage 2 Natura Impact Statement together with the Likely Significant Effects are set out in Table 5-3.

Table 5-4: Summary of Likely Significant Impacts

Site Name	Qualifying Interests	Impact
Rockabill SPA (004014)	Annex I Birds: Roseate Tern (*Sterna dougallii*) [A192]	1. Temporary reduction of feeding grounds due to the survey activities. 2. Indirect effects on Roseate Tern due to effects on prey species
Rockabill to Dalkey Island SAC (003000)	Annex I Habitats: Reefs [1170]	Physical disturbance to marine benthic communities by: 1. Habitat disturbance and smothering during all intrusive survey works 2. Increased suspension of solids in water column 3. Vibration from geo-technical equipment 4. Sediment penetration and some substratum loss
	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment) 3. Visual and noise disturbance
Lambay Island SAC (000204)	Annex II Species: *Halichoerus grypus* (Grey Seal) [1364] *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels/sampling equipment) 3. Visual and noise disturbance
River Boyne and River Blackwater SAC (002299)	Annex II Species: *Lutra lutra* (Otter) [1355]	1. Visual and noise disturbance 2. Disturbance from vibration and underwater noise associated with surveys
North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment)
Murlough SAC (UK0016612)	Annex II Species: *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys

Site Name	Qualifying Interests	Impact
		2. Injury due to collision (survey vessels / sampling equipment)
Strangford Lough SAC (UK0016618)	Annex II Species: *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment)
North Channel SAC (UK0030399)	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels/sampling equipment)

6 Stage 2 Appropriate Assessment (Natura Impact Statement)

6.1 Conservation Objectives for Qualifying Intrests

6.1.1 Rockabill SPA (004014) (NPWS, 2013d)

Conservation objectives for: Rockabill SPA (004014)		
To maintain the favourable conservation condition of the **Roseate Tern (*Sterna dougallii*) [A192]** in the Rockabill SPA, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Breeding population abundance: apparently occupied nests (AONs)	Number	No significant decline
Productivity rate: fledged young per breeding pair	Mean number	No significant decline
Distribution: breeding colonies	Number; location; area (Hectares)	No significant decline
Prey biomass available	Kilogrammes	No significant decline
Barriers to connectivity	Number; location; shape; area (hectares)	No significant decline
Disturbance at breeding site	Level of impact	Human activities should occur at levels that do not adversely affect the breeding common tern population

6.1.2 Rockabill to Dalkey Island SAC (003000) (NPWS, 2013e)

Conservation objectives for: Rockabill to Dalkey Island SAC (003000)		
To maintain the favourable conservation condition of the **Reefs [1170]** in the Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat area	Hectares	The permanent area is stable or increasing, subject to natural processes.
Habitat distribution	Occurrence	Distribution is stable or increasing, subject to natural processes.
Community structure	Biological composition	Conserve the following community types in a natural condition: Intertidal reef community complex; and Subtidal reef community complex.
To maintain the favourable conservation condition of the ***Phocoena phocoena* (Harbour Porpoise) [1351]** in the Rockabill to Dalkey Island SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use.
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the Harbour Porpoise population

6.1.3 Lambay Island SAC (000204) (NPWS, 2013f)

Conservation objectives for: Lambay Island SAC (000204)		
To maintain the favourable conservation condition of the ***Halichoerus grypus*** **(Grey Seal) [1364] and** ***Phoca vitulina*** **(Common Seal) [1365]** in the Lambay Island SAC which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Access to suitable habitat	Number of artificial barriers	Species range within the site should not be restricted by artificial barriers to site use.
Breeding behaviour	Breeding sites	The breeding sites should be maintained in a natural condition.
Moulting behaviour	Moult haul-out sites	The moult haul-out sites should be maintained in a natural condition.
Resting behaviour	Resting haul-out sites	The resting haul-out sites should be maintained in a natural condition.
Disturbance	Level of impact	Human activities should occur at levels that do not adversely affect the Grey Seal and Common Seal population at the site.

6.1.4 River Boyne and River Blackwater SAC (002299)

Conservation objectives for: River Boyne and River Blackwater SAC (002299)		
To maintain the favourable conservation condition of the ***Lutra lutra*** **(Otter) [1355]** in the River Boyne and River Blackwater SAC which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution	Percentage positive survey sites	No significant decline
Extent of terrestrial habitat	Hectares	No significant decline
Extent of freshwater habitat (river)	Kilometres	No significant decline
Extent of freshwater habitat (lake)	Hectares	No significant decline
Couching sites and holts	Number	No significant decline
Fish biomass availability	Kilogrammes	No significant decline
Barriers to connectivity	Number	No significant increase

6.1.5 North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398) (NRW, 2016a)

Conservation Objectives for: North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398)	
To avoid deterioration of the habitats of the ***Phocoena phocoena*** **(Harbour porpoise) [1351]** or significant disturbance to the **Harbour Porpoise**, thus ensuring that the integrity of the site is maintained, and 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	
Attribute	**Target**
Species is a viable component of the site	Maintained or restored in the long term – subject to natural change
Disturbance	No significant disturbance of the species
Habitats and processes	Habitats and processes relevant to **Harbour Porpoise** and its prey are maintained or restore in the long term – subject to natural change

6.1.6 Murlough SAC (UK0016612) (DAERA-NI, 2015b)

Conservation Objectives for: Murlough SAC (UK0016612)		
To maintain (and if feasible enhance) population numbers and distribution of ***Phoca vitulina*** **(Common Seal) [1365]** in the Murlough SAC which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Population	Number of Common Seals counted during the autumn moult period.	The seal population is to be maintained at the level of 106 individuals
Reproduction - Pups	Percentage of pups in relation to number of seals counted in the moult period.	The pup percentage should be maintained at 25% of overall individuals
Habitats and processes	Integrity of haul-outs.	The integrity of haul-outs used by the seals is to be maintained
Disturbance	Disturbance events.	Disturbance levels be contained to a level where they do not significantly impact the population

6.1.7 Strangford Lough SAC (UK0016618) (DAERA-NI, 2015c)

Conservation Objectives for: Strangford Lough SAC (UK0016618)		
To maintain (and if feasible enhance) population numbers and distribution of ***Phoca vitulina*** **(Common Seal) [1365]** in the Strangford Lough SAC which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Population	Number of Common Seals counted during the autumn moult period.	The seal population is to be maintained at the level of 210 individuals
Reproduction - Pups	Percentage of pups in relation to number of seals counted in the moult period.	The pup percentage should be maintained at 25% of overall individuals
Habitats and processes	Integrity of haul-outs.	The integrity of haul-outs used by the seals is to be maintained
Disturbance	Disturbance events.	Disturbance levels be contained to a level where they do not significantly impact the population

6.1.8 North Channel SAC (UK0030399) (JNCC, 2019)

Conservation Objectives for: North Channel SAC (UK0030399)	
1351 Harbour Porpoise (Phocoena phocoena)	
Ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters.	
Attribute	Target
Species is a viable component of the site	Maintained or restored in the long term – subject to natural change.
Disturbance	No significant disturbance of the species.
Habitats and processes	Habitats and processes relevant to Harbour Porpoise and its prey are maintained or restore in the long term – subject to natural change.

6.2 Impact Assessment

The impact of the site investigation activities on marine mammals is owing to disturbance from vibration and underwater noise associated with the site investigation activities; noise associated with the survey is discussed in detail in Section 4.3.

6.2.1 Harbour Porpoise (*Phocoena phocoena*) [1351]

The conservation objectives to maintain the favourable conservation condition of Harbour Porpoise (*Phocoena phocoena*) in the Rockabill to Dalkey Island SAC (003000), the North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398) and North Channel SAC (UK0030399) are listed in Sections 6.1.2 and 6.1.5 and 6.1.8 respectively and are defined by the following 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 community at the site

The site investigation activities will not impact any of the conservation objectives for the Harbour Porpoise, as listed above. However, the species may be impacted by disturbance from vibration and underwater noise associated as a result of the site investigation activities. Harbour Porpoise (*Phocoena phocoena*) hear in the high frequency range (200-180,000Hz) (DAHG, 2014). There is potential impact on this species from the site investigation activities due to noise vibration of Shipping, SBP and Drilling. These activities have the potential to be within the hearing threshold of Harbour Porpoise. There is also a risk of injury due to collision (survey vessels/sampling equipment).

Mitigation: The site investigation activities will be of short duration and of a temporary nature. The protocol 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' (DAHG, 2014) will be followed at all times. The 'soft-start' procedure will be used to ensure that there will be minimal disturbance to this species. The survey vessels will be slow moving and therefore any risk due to collision is unlikely.

In addition, Statkraft will engage with other parties to ensure that any potential for interactions between the activities proposed under this application and the Braymore Licence that may affect the Harbour Porpoise are negated or if not possible to negate engagement will be undertaken to ensure they are minimised.

Therefore, the conservation objectives for the Harbour Porpoise community at these sites will not be adversely affected and integrity of the Rockabill to Dalkey Island SAC (003000) the North Anglesey Marine / Gogledd Môn Forol SAC (UK0030398) and North Channel SAC (UK0030399) will be maintained.

6.2.2 Grey Seal (*Halichoerus grypus*) [1364]

The conservation objectives to maintain the favourable conservation condition of the Grey Seal (*Halichoerus grypus*) [1364] in Lambay Island SAC (000204) are listed in Section 0 and are defined by the following attributes and targets:

- Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use.
- Breeding behaviour: Conserve the breeding sites in a natural condition.
- Moulting behaviour: Conserve the moult haul-out sites in a natural condition.
- Resting behaviour: Maintain the resting haul-out sites in a natural condition.
- Disturbance: Human activities should occur at levels that do not adversely affect the Grey Seal population at the site.

The site investigation activities will not impact on any of the conservation objectives for the Grey Seal, as listed above. However, the species may be impacted by disturbance from vibration and underwater noise associated with the site investigation activities. Grey Seal hear in the low frequency range (75-75,000 Hz) (DAHG, 2014) and therefore, are susceptible to noise vibration of Shipping, SBP, Drilling surveys. These activities have the potential to be within the hearing threshold of Grey Seals. There is also a risk of injury due to collision (survey vessels/sampling equipment).

Mitigation: The site investigation activities will be of short duration and of a temporary nature. The protocol 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' (DAHG, 2014) will be followed at all times. The 'soft-start' procedure will be used to ensure that there will be minimal disturbance to this species. The survey vessels will be slow moving and therefore any risk due to collision is unlikely. The site investigation activities will not restrict the species range in any way or impact on the breeding, haul-out or breeding sites of the species.

In addition, Statkraft will engage with other parties to ensure that any potential for interactions between the activities proposed under this application and the Braymore Licence that may affect the Grey Seal are negated or if not possible to negate engagement will be undertaken to ensure they are minimised.

Therefore, the conservation objectives for the Grey Seal population at Lambay Island SAC (000204) will not be adversely affected and integrity of all these sites will be maintained.

6.2.3 Common Seal (*Phoca vitulina* [1365])

The conservation objectives to maintain the favourable conservation condition of Common Seal in Lambay Island SAC (000204), Murlough SAC (UK0016612) and Strangford Lough SAC (UK0016618) are listed in Sections 0, 6.1.6 and 6.1.7 respectively and are defined by the following five attributes and targets:

- Access to suitable habitat: Species range within the site should not be restricted by artificial barriers to site use.
- Breeding behaviour: The breeding sites should be maintained in a natural condition.
- Moulting behaviour: The moult haul-out sites should be maintained in a natural condition.
- Resting behaviour: The resting haul-out sites should be maintained in a natural condition.
- Disturbance Human activities should occur at levels that do not adversely affect the c Common Seal population at the site

The site investigation activities will not impact on any of the conservation objectives for the Common Seal, as listed above. However, the species may be impacted by disturbance from vibration and underwater noise associated with the site investigation activities. Common Seals hear in the low frequency range (75-75,000 Hz) (DAHG, 2014) and therefore are susceptible to noise vibration of Shipping, SBP, Drilling surveys. These activities have the potential to be within the hearing threshold of Common Seal. There is also a risk of injury due to collision (survey vessels/sampling equipment).

Mitigation: Given the short duration and temporary nature of the site investigation activities, the fact that the protocol 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' (DAHG, 2014) will be followed at all times, with pre-monitoring by a qualified and experienced MMO followed by the use of the Ramp-up Procedure ("soft-start") will ensure that there will be minimal disturbance to this species (see Appendix 1 for MMO protocols). In addition to the fact that survey vessels will be slow moving and therefore any risk due to collision is unlikely.

In addition, Statkraft will engage with other parties to ensure that any potential for interactions between the activities proposed under this application and the Braymore Licence that may affect the Common Seal are negated or if not possible to negate engagement will be undertaken to ensure they are minimised.

Therefore, the conservation objectives for the Common Seal population at both sites will not be adversely affected and integrity of Lambay Island SAC (000204), Murlough SAC (UK0016612) and Strangford Lough SAC (UK0016618) will be maintained.

6.2.4 Otter (*Lutra Lutra*) [1355]

The conservation objectives to maintain the favourable conservation condition of the Otter (*Lutra lutra*) [1355] in the River Boyne and River Blackwater SAC (002299) are listed in Section 6.1.4 and are defined by the following seven attributes and targets.

- Distribution: No significant decline

- Extent of terrestrial habitat: No significant decline
- Extent of freshwater habitat (river): No significant decline
- Extent of freshwater habitat (lake): No significant decline
- Couching sites and holts: No significant decline
- Fish biomass availability: No significant decline
- Barriers to connectivity: No significant increase

The proposed survey will not impact on any of the conservation objectives for the Otter, as listed above. However, the species may be impacted by disturbance from vibration and underwater noise associated with the proposed site investigation activities as well as disturbance from the site investigation activities generally. The Otter is not known to be very sensitive to noise in the water however the site investigation activities could impact on the species if they enter the site investigation activities area. There is also a risk of injury due to collision (survey vessels/sampling equipment).

Mitigation:

While there are no specific mitigation measures for otter for the proposed activities, the site investigation activities will be short in duration and of a temporary nature and compliant with DAHG (2014) (Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters). This will ensure that there are no Otter present in the area prior to undertaking surveys. In addition to the fact that survey vessels will be slow moving and therefore any risk due to collision is unlikely. The proposed survey will not restrict the species range in any way or impact on the population size, range or habitat quality of the site.

There are no likely in-combination effects identified for otter with any of the other proposals identified in this report.

Therefore, the conservation objectives for the Otter at the River Boyne and River Blackwater SAC (002299) will not be adversely impacted and the integrity of this site will be maintained.

6.2.5 Breeding seabirds

Rockabill SPA

The conservation objectives to maintain the favourable conservation condition of breeding seabirds with respect to the Rockabill SPA are defined as:

1. Breeding population abundance: apparently occupied nests (AONs) – no significant decline
2. Productivity rate: fledged young per breeding pair - no significant decline in mean number
3. Distribution: breeding colonies - no significant decline in number, location or area
4. Prey biomass available - no significant decline in kilogrammes available
5. Barriers to connectivity - no significant decline
6. Disturbance at breeding site - Human activities should occur at levels that do not adversely affect the breeding common tern population.

With regards to Rockabill SPA there may be a direct effect on conservation objective 4 as a result of disturbance to the seabed which can result in burrowing of the Roseate Terns preferred prey species and a consequent reduction in access to the prey species for the tern species. This may affect the ability of the tern species to successfully raise their young and therefore may have an indirect effect on conservation objectives number 2.

Mitigation Measures:

No geotechnical or benthic site investigation activities will be undertaken within the SPA during the nesting season.

The implementation of the above mitigation measure with respect to the breeding tern colonies in the Rockabill SPA will ensure that the conservation objectives of the SPA are not adversely impacted, and the integrity of the site will be maintained.

6.2.6 Benthic Habitats (Annex I Habitats)

The conservation objectives with respect the Rockabill to Dalkey Island SAC (003000) are set out in Section 6.1.2.

As the survey work will occur within one Natura 2000 site - Rockabill to Dalkey Island SAC, it is likely that the survey activities will lead to a significant effect on the conservation objectives set for the qualifying features (Annex I habitats) of this site. Particular attention needs to be drawn to Annex I habitats – Reefs where no intrusive works should not be carried out in order to avoid habitat disturbance and loss.

Annex I habitat (Reef) within the SAC (subtidal, shallow water and intertidal areas) which is present within the Foreshore Licence Site Investigation Area will be exposed to habitat disturbance and loss during intrusive survey works (i.e. geo-technical and benthic sampling activities) if it is within the direct footprint of the sampling equipment. Therefore, it is considered likely that the Conservation Objectives of the Annex I habitats i.e. natural range and area occupied will be affected by the proposed survey activities.

Mitigation:

The geotechnical and ecological sampling locations will be established after thorough geophysical data analysis, where all effort will be made to choose sampling locations avoiding potential Annex I habitats with particular attention to reefs. The number of sampling locations will be kept to a minimum necessary to confirm habitat type and to collect sufficient geotechnical data to minimise habitat disturbance and loss. Each sampling location will be visually inspected first with underwater camera or ROV in order to confirm lack of Annex I habitats. In case of identification of Annex I habitat the sampling location will be repositioned and again subject to visual inspection clearance before commencement of any intrusive work on the repositioned location. If required, ROV may be used for geotechnical and sediment sampling (for phys-chem sediment analysis and core for geotechnical

scope of works) in the area where no other sampling equipment can access due to environmental constraints.

With respect to intertidal surveys: surveys will be undertaken within daylight hours and sensitive species and habitats within the survey area will be identified, recorded and avoided during sampling.

Samples taken within the intertidal area will be small and by their nature will be taken from soft sediments only (i.e. any Annex I Habitat [Reefs] will be avoided).

The implementation of these mitigation measures will ensure that adverse impacts on the Annex I Habitat Reefs within the Rockabill to Dalkey Island SAC is avoided. These measures will ensure that the SAC examined will not be adversely affected and the integrity of the SAC will be maintained.

6.3 Cumulative Impacts

6.3.1 Assessment of in-combination Effects from other Plans and Projects

Applications for projects in the same area of coast were examined to assess if there was any potential for in-combination effects with the site investigation activities at the cable corridor area for the NISA offshore wind farm. A description of other proposed and operational plans and projects in the area is provided in Section 3.7. An assessment of likely cumulative effects was undertaken during the Stage 1 Appropriate Assessment Screening (Section 5.4). That assessment concluded that there was at least a partial spatial overlap and a potential temporal overlap between two of the projects examined and the activities proposed under this Foreshore Licence Application.

However, it was determined that given the nature of the activities proposed under the applications there was only the potential for in-combination effects between this application and one other project, The Braymore Foreshore Licence (FS006973). There are likely in-combination effects on marine mammals due to disturbance from vibration and underwater noise should geophysical survey activities be undertaken within the overlapping area at the same time (depending on survey parameters).

Should it become apparent that there is likely to be a temporal overlap between the Braymore Project and the activities proposed under this application Statkraft will engage with the holders of the Braymore licence to ensure that surveys are scheduled in such a way as to mitigate against any harmful effects to marine mammals. This will include ensuring that activities are a sufficient distance apart to prevent the occurrence of in-combination effects.

6.4 Summary of Mitigation Measures

Table 6-1: Summary of Mitigation Measures

Site Name	Qualifying Interests	Impact	Mitigation
Rockabill SPA (004014)	Annex I Birds: Purple Sandpiper (*Calidris maritima*) [A148]	1. Temporary reduction of feeding grounds due to the survey activities.	Geotechnical and benthic sampling works will be avoided within the SAC during the Roseate Tern nesting season.

Site Name	Qualifying Interests	Impact	Mitigation
	Roseate Tern (*Sterna dougallii*) [A192] Common Tern (*Sterna hirundo*) [A193] Arctic Tern (*Sterna paradisaea*) [A194]	2. Disturbance due to noise as a result of surveys	
Rockabill to Dalkey Island SAC (003000)	Annex I Habitats: Reefs [1170]	Physical disturbance to marine benthic communities by: 1. Habitat disturbance and smothering during all intrusive survey works 2. Increased suspension of solids in water column 3. Vibration from geo-technical equipment 4. Sediment penetration and some substratum loss	With respect to intertidal surveys; surveys will be undertaken within daylight hours so that sensitive habitats within the survey area will be identified, recorded and avoided during sampling. With respect to subtidal surveys an ROV or drop-down camera will be used in advance of grab sampling or geotechnical site investigations to identify sensitive Habitats and ensure they are not disturbed during site investigation activities. If sensitive habitats are identified they will be subject to non-intrusive sampling only (i.e. photos or video) and an alternative location will be physically sampled
	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment) 3. Visual and noise disturbance	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.
Lambay Island SAC (000204)	Annex II Species: *Halichoerus grypus* (Grey Seal) [1364] *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels/sampling equipment) 3. Visual and noise disturbance	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.
River Boyne and River Blackwater SAC (002299)	Annex II Species: *Lutra lutra* (Otter) [1355]	1. Visual and noise disturbance 2. Disturbance from vibration and underwater noise associated with surveys	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.
North Anglesey Marine / Gogledd MÃ´n Forol SAC (UK0030398)	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment)	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.

Site Name	Qualifying Interests	Impact	Mitigation
Murlough SAC (UK0016612)	Annex II Species: *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment)	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.
Strangford Lough SAC (UK0016618)	Annex II Species: *Phoca vitulina* (Common Seal) [1365]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels / sampling equipment)	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.
North Channel SAC (UK0030399)	Annex II Species: *Phocoena phocoena* (Harbour Porpoise) [1351]	1. Disturbance from vibration and underwater noise associated with surveys 2. Injury due to collision (survey vessels/sampling equipment)	Compliance with NPWS 2014 Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters.

6.5 Appropriate Assessment Conclusion

The screening undertaken within this report identified the factors that may affect Natura 2000 sites. Eight Natura 2000 sites (one SPA and seven SACs) were screened in for a Stage 2 Appropriate Assessment (Natura Impact Statement).

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to the sites assessed in this report, the potential impact sources and pathways, how these could impact on the sites' Qualifying Interests and whether the predicted impacts would adversely affect the integrity of the European sites. Mitigation measures are set out above (see section 6.3 and Section 6.4) and they ensure that any impacts on the conservation objectives of the European site will be avoided during the proposed project such that there will be no risk of adverse effects to them.

It has been objectively concluded following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed project and the implementation of specific mitigation measures where appropriate, that the proposed site investigation activities will not pose a risk of adversely impacting (either directly or indirectly) the integrity of any European site or Annex II listed species either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.

It is therefore concluded that the proposed site investigation activities will not have a significant adverse impact on the Natura 2000 sites, either alone or in combination with other plans or projects.

7 Marine Mammal Risk Assessment for Non-Qualifying Mammals

All cetaceans are European Protected Species (EPS) protected under Annex IV of the EC Habitats Directive (92/43/EEC), which lists Species of Community Interest in need of strict protection. It is an offence to deliberately capture, kill, injure or disturb animals classed as EPS. Ireland has recorded 25 species of cetacean and two species of pinnipeds all of which are recognised as protected species under the EU Habitats Directive and the Irish Wildlife Act. Marine mammals likely to be present in the Foreshore Licence Site Investigation Area are restricted to cetaceans (whales, dolphins and porpoises) and pinnipeds (seals).

The purpose of this section is to examine the possible impacts of the proposed activities on those non-qualifying mammals identified as having the potential to be present in the area, and address protective measures aimed at reducing any impact to these species. This examination is under Article 12 of the Habitats Directive and does not form part of the Appropriate Assessment Screening Report or the subsequent Natura Impact Statement which has examined the Natura Sites and their qualifying interests and reached a conclusion in relation to those sites independently.

7.1 Identification of Relevant Non-Qualifying Marine Mammals

According to Ireland Marine Atlas (2019a) the area subject of the proposed works under the Site Investigation Licence Application is known to be within the range of the following Marine Mammals which are not qualifying interests of any of the sites examined in the Appropriate Assessment Screening Report (Chapter 5) of this document and therefore not subject to Appropriate Assessment under Article 6(3) of the Habitats Directive:

- Bottlenose Dolphin
- Common Dolphin
- Risso's Dolphin
- Fin Whale
- Humpback Whale
- Minke Whale
- Beaked Whale
- Common Seal

7.2 Impact Assessment and Protective Measures under Article 12

The seven species identified in Section 3 and listed above in Section 7.1 are most likely to be affected by:

- Disturbance from vibration and underwater noise associated with surveys
- Injury due to collision (survey vessels/Sampling equipment)

According to (Southall et al., 2007) Humpback, Fin and Minke Whale's, all hear in the low frequency range (7-22,000 Hz), Risso's dolphin, Common Dolphin hear in the mid frequency range (150 -

160,000Hz). All therefore, are susceptible to noise vibration of Shipping, SBP, Drilling surveys. There is also a risk of injury to any marine mammal due to collision (survey vessels/sampling equipment).

Protective Measures: The protocol 'Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters' (DAHG, 2014) will be followed at all times including the use of the 'soft-start' procedure. This will ensure that there will be minimal disturbance to these species. In addition, the proposed works will be short in duration and of a temporary nature and survey vessels will be slow moving (<5 knots), therefore any risk due to collision is unlikely.

7.3 Conclusions

The protective measures outlined above will ensure that no marine mammals that are not qualifying interests of SACs within 100km of the Foreshore Licence Site Investigation Area but whose range overlap the Foreshore Licence Site Investigation Area will be affected by the proposed site investigation activities.

References

Anneli Englund, Simon Ingram and Emer Rogan, 2008. An updated population status report for bottlenose dolphins using the Lower River Shannon SAC in 2008. Final report to the National Parks and Wildlife Service. University College Cork.

Berrow, S.D. 2009. Winter distribution of Bottle-nosed Dolphins *Tursiops truncatus* (Montagu) in the inner Shannon Estuary. Irish Naturalists' Journal. 30(1), 35-39.

Berrow, S.D., Whooley, P., O'Connell, M. and Wall, D. 2010. Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, 60pp.

Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds. OJ L 103, 25.4.1979, p. 1–18. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31979L0409

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. OJ L 206, 22.7.1992, p. 7–50. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043

Cronin, M. & O. Ó Cadhla (2004) Aerial surveying of grey seal breeding colonies on the Blasket Islands, Co. Kerry, the Inishkea Group, Co. Mayo and the Donegal coast during the 2003 breeding season.

Cronin, M., Duck, C.D., Ó Cadhla, O., Nairn, R., Strong, D., & O'Keeffe, C. (2004) An assessment of population size and distribution of harbour seals in the Republic of Ireland during the moult season in August 2003. Irish Wildlife Manuals, No. 11. National Parks & Wildlife Service, Department of Arts, Heritage & the Gaeltacht, Dublin.

Cronin M (2007) The abundance, habitat use and haul-out behaviour of harbour seals (*Phoca vitulina vitulina*) in southwest Ireland. PhD thesis, University College Cork, 263 pp

Cronin M, Duck C, Ó Cadhla O, Nairn R, Strong D, O'Keeffe C (2007) An assessment of population size and distribution of harbour seals in the Republic of Ireland during the moult season in August 2003. Journal of Zoology 273:131-139

Crowe, O. 2005. Ireland's Wetlands and their Waterbirds: Status and Distribution. Birdwatch Ireland, Newcastle, Co. Wicklow.

DAERA-NI. 2015a. Upper Lough Erne SAC; Available at: https://www.daera-ni.gov.uk/publications/reasons-designation-special-area-conservation-upper-lough-erne [Accessed on 28/01/2021]

DAERA-NI. 2015b. Murlough SAC; Available at: https://www.daera-ni.gov.uk/publications/reasons-designation-special-area-conservation-murlough [Accessed on 28/01/2021]

DAERA-NI. 2015c. Strangford Lough SAC; Available at: https://www.daera-ni.gov.uk/publications/reasons-designation-special-area-conservation-strangford-lough [Accessed on 28/01/2021]

DAHG. 2012. Marine Natura Impact Statements in Irish Special Areas of Conservation – A Working Document. April 2012. Prepared by the National Parks and Wildlife Service of the DAHG.

DAHG. 2014. Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters. January 2014. Prepared by the National Parks and Wildlife Service of the DAHG.

DAHG. 2019. National Monuments Service: Wreck Viewer. Available at: https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=89e50518e5f4437abfa6284ff39fd640

DEHLG. 2010a. Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (Department of Environment, Heritage and Local Government, 2010 revision).

DEHLG. 2010b. Appropriate Assessment under Article 6 of the Habitats Directive: guidance for Planning Authorities (Department of Environment, Heritage and Local Government, Circular NPW 1/10 & PSSP 2/10).

DHLGH. 2014. Department of Housing, Local Government, and Heritage. Shellfish Waters Directive Areas. Available at: Shellfish Waters Directive Areas - Datasets - data.gov.ie [Accessed on 01/02/2021]

DTTAS. 2018. Irish Coastguard, Automatic Information System Data, July 2018 – December 2018.

Duck, C. & Morris, C. (2013) An aerial survey of harbour seals in Ireland: Part 2: Galway Bay to Carlingford Lough. August-September 2012. Unpublished report to the National Parks & Wildlife Service, Department of Arts, Heritage & the Gaeltacht, Dublin.

EC Environment Directorate-General. 2000. Managing Natura 2000 Sites: The Provision of Article 6 of the Habitats Directive 92/43/EEC

EC Environment Directorate-General. 2001. Assessment of Plans and Projects Significantly Affecting Natura 2000 sites: Methodical Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC

EC 2007. Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC CLARIFICATION OF THE CONCEPTS OF: ALTERNATIVE SOLUTIONS, IMPERATIVE REASONS OF OVERRIDING PUBLIC INTEREST, COMPENSATORY MEASURES, OVERALL COHERENCE, OPINION OF THE COMMISSION.

EC 2018. Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

EMODnet. 2019. Map Viewer. Available at: http://www.emodnet.eu/

Englund, A., Ingram, S. and Rogan, E. 2007. Population status report for bottlenose dolphins using the Lower River Shannon SAC, 2006 – 2007. Final report to the National Parks and Wildlife Service, Ireland, pp37.

Gerritsen, H.D. and Kelly, E. 2019. Atlas of Commercial Fisheries around Ireland, third edition. Marine Institute, Ireland. ISBN 978-1-902895-64-2. 72 pp.

Hammond, P.S., Mcleod, K., Gillespie, D., Swift, R. and Winship, A. 2010. Cetacean Offshore Distribution and Abundance in the European Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St. Andrews, St. Andrews, Fife, KY16 2LB UK.

Hammond, P.S., McLeod, K., Scheidat M. 2006. SCANS II estimates of abundances. Available at: http://biology.st-andrews.ac.uk/scans2/inner-furtherInfo.html

Harrington, R. (1990). 1989 survey of breeding herds of common seal *Phoca vitulina* with reference to previous surveys. Unpublished Wildlife Service Report. Mammal Conservation Section, Research Laboratory, Newtownmountkennedy, Co. Wicklow. 9pp.

Hawkins, A.D. and Johnstone, A.D.F. 1978. The hearing of the Atlantic salmon, *Salmo salar*. Journal of Fish Biology,13,655–673.

Heardman, C., O'Donnell, D. and McMahon, D. (2006). The status of the harbour seal *Phoca vitulina* L. in inner Bantry Bay Co. Cork and inner Kenmare River, Co. Kerry, 1964-2004. Irish Naturalists Journal 28(5): 181-191.

Ingram, Simon & Rogan, Emer. (2002). Identifying critical areas and habitat preferences of bottlenose dolphins *Tursiops truncatus*. Marine Ecology Progress Series. 244. 247-255. 10.3354/meps244247.

Ireland Marine Atlas. 2019a. Data from the [Species distribution Marine Mammals] theme accessed through Ireland's Marine Atlas. Available at: http://atlas.marine.ie/

Ireland Marine Atlas. 2019b. Species Distribution Sea Fisheries. Retrieved from Ireland's Marine Atlas: http://atlas.marine.ie/

Irish Water Ringsend Wastewater Treatment Plant Upgrade Project, Appropriate Assessment Screening and Natura Impact Statement June 2018 p 38 of 62

IWDG. 2020. Sightings available at: https://iwdg.ie

JNCC and Natural England. 2017. Joint SNCB Interim Displacement Advice Note. Report by Natural Resources Wales. Report for The Crown Estate.

JNCC, 2017a. Inshore and Offshore Special Area of Conservation (SAC): North Anglesey Marine / Gogledd Môn Forol SAC Selection Assessment Document. Available at:

https://data.jncc.gov.uk/data/f4c19257-2341-46b3-8e29-49665cd8f3d2/NorthAnglesey-SAC-Selection-Assessment-Document.pdf [Accessed on 05/02/2021]

JNCC, 2019. North Channel SAC. Available at: https://jncc.gov.uk/our-work/north-channel-mpa/ [Accessed on 18/02/2021]

JNCC, Natural England and CCW. 2010. The protection of marine EPS from injury and disturbance. Guidance for the marine area in England and Wales and the UK offshore marine area.

JNCC. North Channel SAC. https://jncc.gov.uk/our-work/north-channel-mpa/

Kiely O (1998) Population biology of grey seals (*Halichoerus grypus* Fabricius 1791) in western Ireland. PhD, National University of Ireland, University College Cork

Kiely O, Myers A (1998) Grey Seal (*Halichoerus grypus*) Pup Production at the Inishkea Island Group, Co. Mayo, and Blasket Islands, Co. Kerry. Biology and Environment - Proceedings of the Royal Irish Academy 98B:113-122

Lyons D. O. (2004) Summary of National Parks & Wildlife Service surveys for common (harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*), 1978 to 2003. Irish Wildlife Manuals, No. 13. National Parks & Wildlife Service, Department of Environment, Heritage and Local Government. Dublin, Ireland

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. Report on research carried out under the Irish Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies.

Marine Institute. 2014. New multibeam on RV Celtic Voyager for seabed mapping. Available at: https://www.marine.ie/Home/site-area/news-events/news/new-multibeam-rv-celtic-voyager-seabed-mapping

Mickle, M. F., Miehls, S. M., Johnson, N. S. and Higgs, D. M. 2009. Hearing capabilities and behavioural response of sea lamprey (*Petromyzon marinus*) to low-frequency sounds. Canadian Journal of Fisheries and Aquatic Sciences, 2019, 76(9): 1541-1548.

Mirimin, Luca & Miller, Roseanne & Dillane, E. & Berrow, Simon & Ingram, Simon & Cross, Tom & Rogan, Emer. (2011). Fine-scale population genetic structuring of bottlenose dolphins in Irish coastal waters. Animal Conservation. 14. 342 - 353. 10.1111/j.1469-1795.2010.00432.x.

Morris C.D. & Duck C.D. (2019). Aerial thermal-imaging survey of seals in Ireland, 2017 to 2018. Irish Wildlife Manuals, No. 111 National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Nowacek DP, Thorne LH, Johnston DW, Tyack PL. (2007). Responses of cetaceans to anthropogenic noise Mammal Review. 37: 81-115. DOI: 10.1111/j.1365-2907.2007.00104.x

NPWS. 2009a. Threat Response Plan: Otter (2009-2011). National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin.

NPWS. 2009b. Skerries Island SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004122.pdf [Accessed 26/01/21]

NPWS. 2011a. Lambay Island SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004069.pdf [Accessed 26/01/21]

NPWS. 2011b. Ireland's Eye SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004117.pdf [Accessed 26/01/21]

NPWS. 2013a. Malahide Estuary SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004025.pdf [Accessed 26/01/21]

NPWS. 2013b. Rogerstown Estuary SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000208.pdf [Accessed 27/01/21]

NPWS. 2013c. Baldoyle Bay SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000199.pdf [Accessed 27/01/21]

NPWS. 2013d. Rockabill SPA; Conservation Objectives. Available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004014.pdf [Accessed 05/02/21]

NPWS. 2013e. Rockabill to Dalkey Island SAC; Conservation Objectives. Available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO003000.pdf [Accessed 05/02/21]

NPWS. 2013f. Lambay Island SAC; Conservation Objectives. Available at: https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000204.pdf [Accessed 05/02/21]

NPWS. 2014a. Rogerstown Estuary SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004015.pdf [Accessed 26/01/21]

NPWS. 2014b. Baldoyle Bay SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004016.pdf [Accessed 26/01/21]

NPWS. 2014c. Rockabill to Dalkey Island SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY003000.pdf [Accessed 27/01/21]

NPWS. 2014d. Lambay Island SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000204.pdf [Accessed 27/01/21]

NPWS. 2014e. River Boyne And River Blackwater SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002299.pdf [Accessed 27/01/21]

NPWS. 2014f. Ireland's Eye SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002193.pdf [Accessed 27/01/21]

NPWS. 2015a. Rockabill SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004014.pdf [Accessed 26/01/21]

NPWS. 2015b. River Nanny Estuary and Shore SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004158.pdf [Accessed 26/01/21]

NPWS. 2015c. Boyne Estuary SPA; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004080.pdf [Accessed 26/01/21]

NPWS. 2016a. Boyne Coast And Estuary SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY001957.pdf [Accessed 27/01/21]

NPWS. 2017a. Malahide Estuary SAC; Site Synopsis. Available at: https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY000205.pdf [Accessed 27/01/21]

NRW. 2016a. North Anglesey Marine / Gogledd Môn Forol possible SAC. Available at: https://naturalresources.wales/guidance-and-advice/environmental-topics/consultations/our-own-consultations-closed/closed-2016/new-marine-sac/north-anglesey-marine/?lang=en [Accessed 05/02/21]

NRW. (2018). Pen Llŷn a`r Sarnau / Lleyn Peninsula and the Sarnau Special Area of Conservation: Indicative site level feature condition assessments 2018. NRW Evidence Report Series, Report No: 234, 58pp, NRW, Bangor.

NRW. (2016). West Wales Marine / Gorllewin Cymru Forol SAC Selection Assessment

Ó Cadhla O, Strong D (2007) Grey seal moult population survey in the Republic of Ireland, 2007. 22pp

Ó Cadhla, O., Strong, D., O'Keeffe, C., Coleman, M., Cronin, M., Duck, C., Murray, T., Dower, P., Nairn, R., Murphy, P., Smiddy, P., Saich, C., Lyons, D. & Hiby, A.R. (2008). An assessment of the breeding population of grey seals in the Republic of Ireland, 2005. Irish Wildlife Manuals No. 34. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. 60pp.

Ó Cadhla, O., Keena, T., Strong, D., Duck, C. and Hiby, L. (2013) Monitoring of the breeding population of grey seals in Ireland, 2009 - 2012. Irish Wildlife Manuals, No. 74. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin

Popper, A. N. 2003. Effects of Anthropogenic Sound on Fishes. Fisheries, 28:10,24-31.

Popper, A. N., Dennis T.T. Plachta, Mann, D A. and Higgs, D. 2004. Response of clupeid fish to ultrasound: a review, ICES Journal of Marine Science, Volume 61, Issue 7, Pages 1057–1061.

Richardson, W.J., Greene Jr., C.R., Malme, C.I. and Thomson, D.H. 1995. Marine mammals and noise. Academic Press: San Diego. ISBN 0-12-588441-9

Roberts, L., Harding, H.R., Voellmy, I., Bruintjes, R., Simpson, S.D., Radford, A.N., Breithaupt, T. & Elliott, M. 2016. 'Exposure of benthic invertebrates to sediment vibration: From laboratory experiments to outdoor simulated pile-driving', Proceedings of Meetings on Acoustics, vol. 27, no. 1, 010029.

Roycroft, D., Cronin, M., Mackey, M. Ingram, S.N. and Ó Cadhla, O. (2006). Risk assessment for marine mammal and seabird populations in south-western Irish waters (R.A.M.S.S.I). Final report to the Higher Education Authority of Ireland. Coastal & Marine Resources Centre, University College Cork. 198pp.

Schoeman RP, Patterson-Abrolat C and Plön S. 2020. A Global Review of Vessel Collisions With Marine Animals. Front. Mar. Sci. 7:292. doi: 10.3389/fmars.2020.00292

S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Available at: http://www.irishstatutebook.ie/eli/2011/si/477/made/en/print

Shirihai, B.L. and Jarrett, B. (2006). Whales, dolphins and other marine mammals of the world. Princeton University Press, Princeton.

Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene., C.R. Jr., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack, P.L. 2007. Marine mammal noise exposure criteria: Initial scientific recommendations. Aquatic Mammals 33(4): 411-521.

Southall, Brandon, Finneran, James, Reichmuth, Colleen, Nachtigall, Paul, Ketten, Darlene, Bowles, Ann, Ellison, William, Nowacek, Douglas, Tyack, Peter. (2019). Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendations for Residual Hearing Effects. Aquatic Mammals. 45. 125-232. 10.1578/AM.45.2.2019.125.

Summers, C.F., Warner, P.J., Nairn, R.G.W., Curry, M.G. & Flynn, J. (1980). An assessment of the status of the common seal *Phoca vitulina vitulina* in Ireland. Biological Conservation 17: 115-123.

Teague, N. and Clough, S.C. 2011. Investigations into the response of 0+ Twaite Shad (*Alosa fallax*) to ultrasound and its potential as an entrainment deterrent. International Fish Screening Techniques: Edited By: A.W.H. Turnpenny and R.A. Horsfield, Turnpenny Horsfield Associates Ltd, UK.

Warner, P.J. (1983). An assessment of the breeding populations of common seals (*Phoca vitulina vitulina* L.) in the Republic of Ireland during 1979. Irish Naturalists' Journal 21: 24-26.

Wall D., Murray C., O'Brien J., Kavanagh L.,Wilson C., Ryan C., Glanville B., Williams D., Enlander I., O'Connor I., McGrath D.,Whooley P. and Berrow S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Merchants Quay, Kilrush, Co Clare.

Wang, Chengfeng & Lyons, S & Firestone, Jeremy & Corbett, James & Assistant, Ph. 2007. Using Ship Speed and Mass to Describe Potential Collision Severity with Whales: An Application of the Ship Traffic, Energy and Environment Model (STEEM).