



SCREENING FOR APPROPRIATE ASSESSMENT REPORT FOR
MARITIME USAGE LICENCE APPLICATION – LIC230001,
NORTH IRISH SEA ARRAY WINDFARM LTD, SITE
INVESTIGATION OFF THE COAST OF COUNTIES DUBLIN,
MEATH AND LOUTH.

Application No. LIC230001

21st February 2024

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Statement of Authority

This Screening for Appropriate Assessment Report has been undertaken by the Assessment, Research and Development Unit within MARA, a specialist unit with the appropriate expertise in environmental assessment.

1. Introduction

1.1 Project Overview

North Irish Sea Array Windfarm Limited (NISA Ltd) are seeking a Maritime Usage Licence for a period of up to 7 years to conduct site investigation activities for the proposed North Irish Sea Array (NISA) wind farm to be located approximately 12km off the coast of counties Dublin, Meath and Louth. The objective of the NISA site investigations is to determine the environmental conditions, seafloor and subsurface geological characteristics within the Licence Area. The overall area which is the subject of this application is approximately 125km².

1.2 Application documents submitted

A Maritime Usage Licence application was received from NISA on the 10th of October 2023 and was deemed complete on the 25th of October 2023. The following documents were submitted as part of this application:

- i. Application for a Maritime Usage Licence under the Maritime Area Planning Act 2021, dated 9th October 2023
- ii. Maritime Usage Licence Map, dated 6th October 2023
- iii. Supporting Information for Screening for Appropriate Assessment (SISAA) Report, dated 9th October 2023
- iv. Natura Impact Statement Report, dated 9th October 2023
- v. Risk Assessment for Annex IV Species Report, dated 9th October 2023
- vi. Assessment of Impact of Maritime Usage (AIMU) Report, dated 9th October 2023

The following revised documents were submitted on the 7th of February 2024:

- i. Supporting Information for Screening for Appropriate Assessment (SISAA) Report, dated 7th February 2024
- ii. Natura Impact Statement Report, dated 7th February 2024
- iii. Assessment of Impact of Maritime Usage (AIMU) Report, dated 7th February 2024

1.3 Legislative background and AA process

The Marine Area Planning Act 2021 and amendments (MAP Act) requires that a Maritime Usage Licence be obtained from the Maritime Area Regulatory Authority (MARA) for a number of activities, including but not exclusively:

- Navigational and Maintenance Dredging
- Marine Environmental surveys for the purposes of scientific discovery and site investigations
- Installation of navigational markers/ moorings/ aids to navigation not undertaken by the Commissioners of Irish Lights
- Installation of non-permanent platforms or pontoons

- Depositing of any substance or object on or in the sea or seabed
- Removal of any substance or object from the sea or seabed
- Use of explosives
- Maintenance of any cable, pipeline, oil, gas or carbon storage facility / structure not provided for under any other statutory approval, and
- The harvesting of seaweed

Article 6(3) and 6(4) of Directive 92/43/EEC as amended (the Habitats Directive) place strict legal obligations on Member States regulating the conditions under which development that has the potential to impact on European Sites can be implemented and requiring that an Appropriate Assessment be carried out of plans or projects, not directly connected with or necessary to the management of a site as a European Site, but which are likely to have a significant effect thereon, either individually or in combination with other plans or projects . An AA Screening assessment is carried out to determine whether a plan or project is likely to have a significant effect on a European Site.

Article 6.3 states that: *“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”*

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 a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.*

Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.”

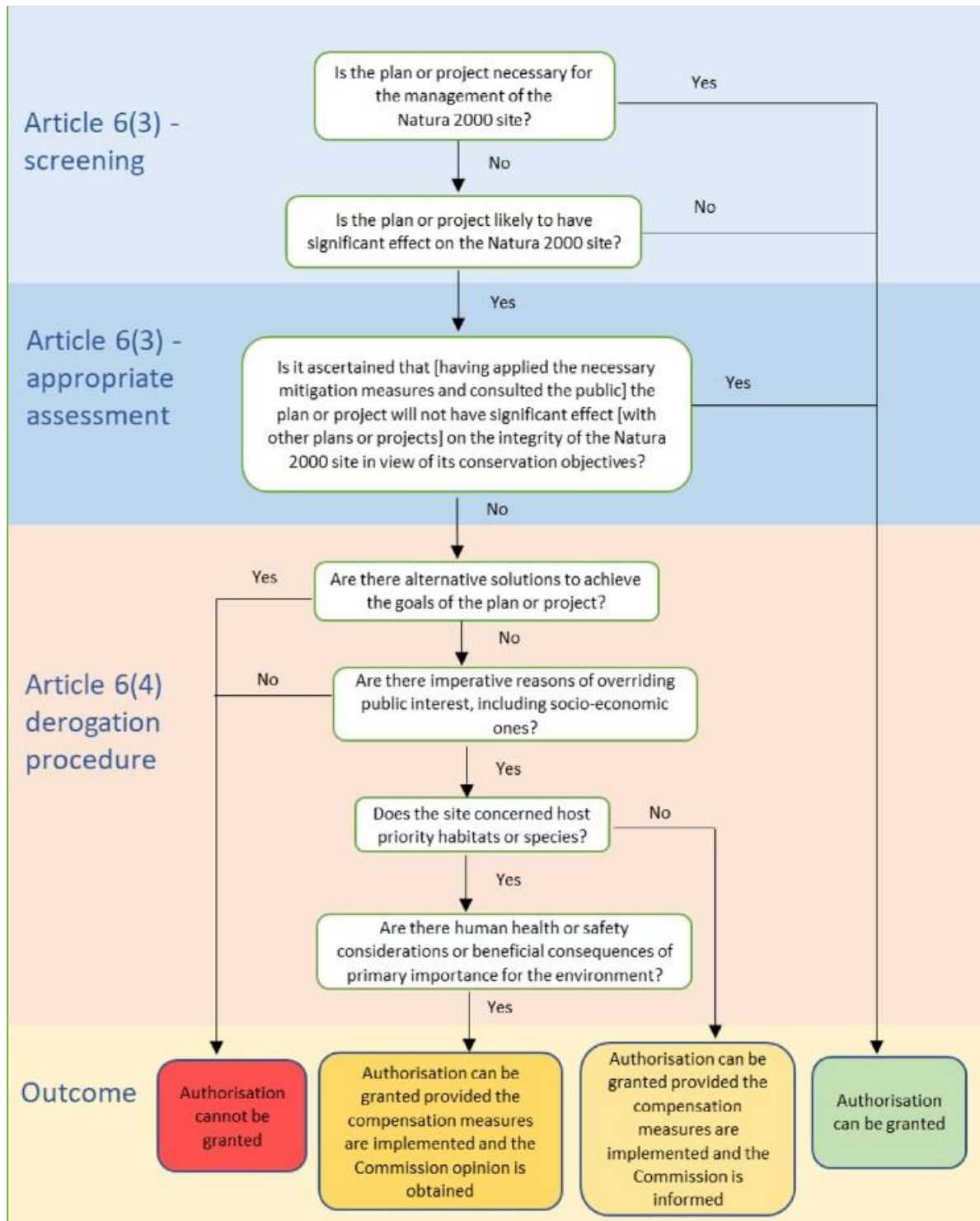


Figure 1 Article 6 Appropriate Assessment Process (from EU 2021/C437/01)

1.4 MARA Assessment Process

The Assessment, Research and Data (ARD) Unit within MARA is responsible for carrying out environmental screening and any environmental assessment determined as being required following screening, in accordance with the requirements set out in Habitats Directive.

The European Communities (Birds and Natural Habitats) Regulations 2011 as amended, give effect to the Habitats Directive as a matter of Irish law and require, inter alia, that a public authority carry out screening for Appropriate Assessment of a plan or project for which an application for consent is received. Where a public authority following screening determines that an Appropriate Assessment is required these Regulations require that the assessment carried out by a public authority include a determination pursuant to Article 6(3) of the Habitats Directive as to whether or not the plan or project would adversely affect the integrity of a European site.

MARA's ARD team is responsible for carrying out a Stage 1 Appropriate Assessment Screening of any application for a Maritime Usage Licence received and any Stage 2 Appropriate Assessment that may be required following screening in accordance with these Regulations. On receipt of an application to MARA for a Maritime Usage Licence the application and any associated documentation is referred to the ARD Unit for the purposes of carrying out its environmental assessments.

On completion of all environmental assessments by the ARD unit and after incorporating any suggested conditions which may be recommended by the ARD Unit, the application is then evaluated by the Licensing Unit in MARA to give consent to the activities applied for.

This report has been prepared with reference to the following guidelines and legislation:

- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna. Official Journal of the European Communities.
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).
- European Communities (Birds and Natural Habitats) Regulations 2011 as amended SI No. 477 of 2011.
- EU Commission Notice Official Journal of the European Union 2021 C437/1
- The Marine Area Planning Act 2021 and amendments (MAP Act)
- Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Commission 2019. Office for Official Publications of the European Communities, Luxembourg.
- Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities. DEHLG, 2009. Revision 2010.
- Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Department of Arts, Heritage and the Gaeltacht, 2014
- Appropriate Assessment Screening for Development Management OPR Practice Note PN01 March 2021
- Relevant case law

2 Project Description

NISA Ltd are seeking consent to conduct site investigation activities to inform design of the proposed NISA offshore wind farm array and cables, located off the east coast of Ireland. The site investigations will identify the hydrographical, geophysical, geotechnical, metocean, ecological, archeological and water quality characteristics of the area.

The Applicant has applied for a seven year Licence to carry out site investigations works. These surveys will take place over specified time periods (see section 2.2) and include geophysical, geotechnical, metocean, ecological, archeological and water quality surveys.

The total time period proposed to undertake the hydrographical and geophysical surveys is from 4 to 8 weeks. See section 2.2.2 to section 2.2.6 for schedules associated with the geotechnical, metocean, ecological, archeological and water quality surveys.

2.1 Location

At its furthest extent the Maritime Usage Licence Application area lies approximately 25km off the coast of counties Dublin, Meath and Louth and makes landfall near Balbriggan, County Dublin. The overall area of this Maritime Usage Licence Application is approximately 125km².

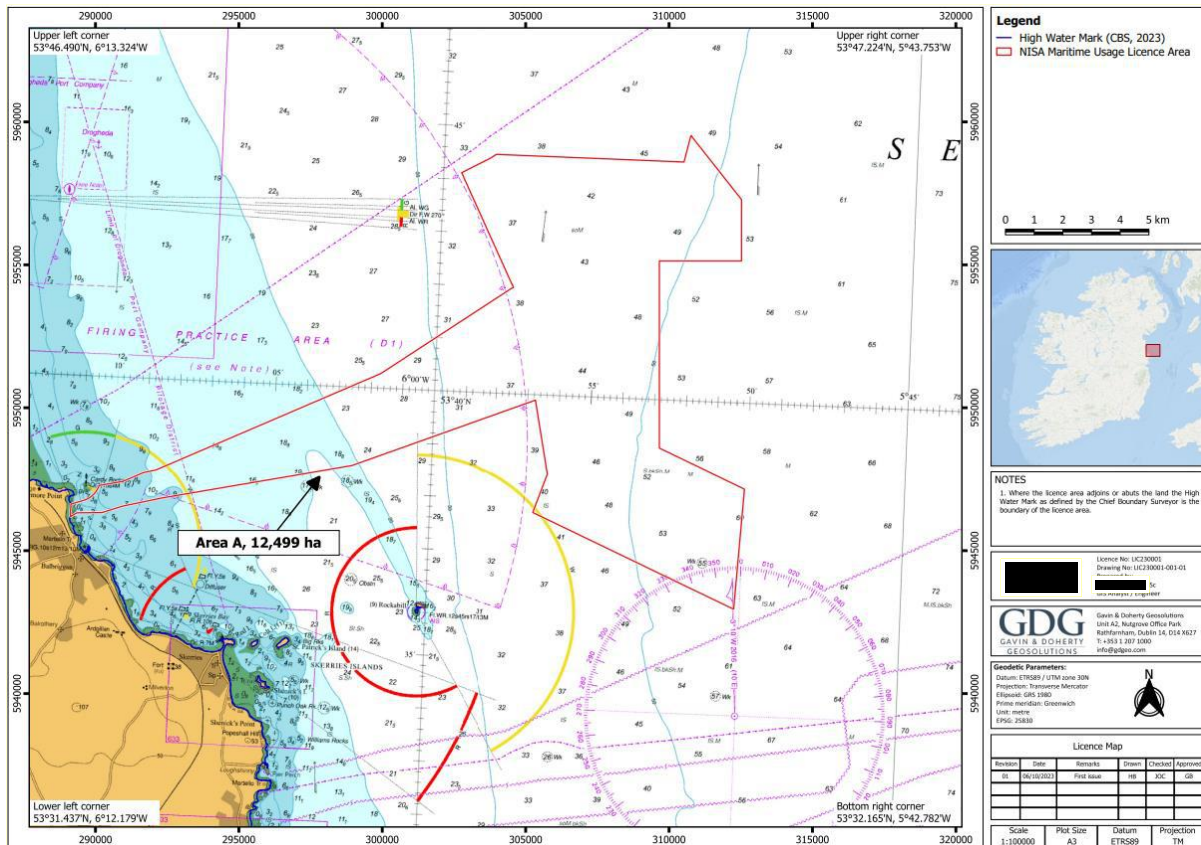


Figure 2 Maritime Usage Licence map

2.2 Description of the receiving environment

The sediment in the area is largely that of sandy mud and muddy sand with an area of reef to the north east of Skerries village. Water depths in the survey area range from the intertidal to approximately 60m depth.

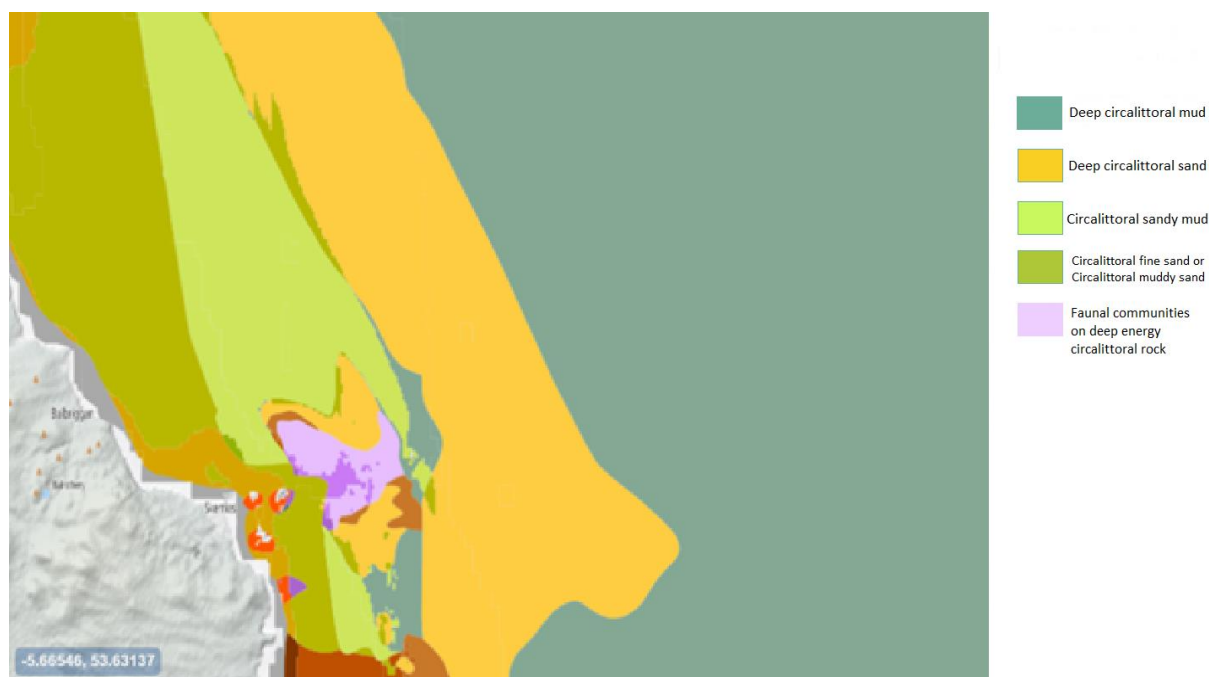


Figure 3 Substrate within the vicinity of the Maritime Usage Licence Application Area.
<https://www.emodnet-seabedhabitats.eu/>

2.3 Description of the proposed survey works

The applicant proposes to carry out hydrographical, geophysical, geotechnical, Metocean, ecological, archaeological and water quality monitoring surveys.

2.3.1 Hydrographical and geophysical surveys

Single Beam Echosounder (SBES):

The Single Beam Echosounder is a system designed to provide precise depth measurements along with seafloor profiling data. Typical equipment includes the Kongsberg 200 9G Single Beam Echosounder, with a maximum ping rate of up to 30 pings per second. Operating frequencies are approximately 200 kHz with sound pressure levels of 221.6dB re1 μ Pa @1m.

Multibeam Echosounder (MBES):

MBES is a system for collecting detailed topographical data of the seabed. Typical equipment includes the Kongsberg EM3002D multi-beam system with mounting system including AML SV Smart Probe, Kongsberg EM 2040 MKII or similar. For these surveys the equipment will operate at a typical central frequency of 400 kHz with sound pressure levels in the range of 198dB re1 μ Pa @1m.

Side Scan Sonar (SSS):

SSS surveys are used to determine sediment characteristics and seabed features. The EdgeTech 4205 may be taken as an indicative example of an SSS device and for these surveys will have a potential operating frequency range of approximately 300/600kHz in the offshore area and 600/900kHz in the shallower nearshore area with sound pressure levels of 220-230dB re1 μ Pa @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 with the sensor responding to local variability in magnetic field and therefore emits no sound.

Sub-bottom Profiling (SBP) - Parametric Sub Bottom Profiler:

SBP is used to develop an image of the subsurface, identifying different strata encountered in the shallow sediments. The Innomar "standard" Sub-Bottom Profiler 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 232 dB (typically operated at <200dB) re1 μ Pa @1m, which would be used in both nearshore and offshore areas.

Sub-bottom Profiling (SBP) – Boomer:

The Applied Acoustics AA301 is an indicative example of a boomer, the instrument consists of a piezo electric plate transducer mounted on a surface tow catamaran frame. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m). The Boomer SBP operates in a frequency range of 0.5 kHz to 5 kHz, with sound pressure levels in the range of 205-211dB re1 μ Pa @ 1m which would be used in the nearshore shallower area.

Sub-bottom profiling (SPB) – Sparker:

The applied Acoustics Dual 400 Tip is an indicative example of a sparker system used in sub-bottom profiling. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m) or a multi-channel hydrophone such as the Geometrics GeoEel LH-16™ Digital Streamer. The sparker source has a frequency range of between 0.4-5kHz and a recorded sound pressure of 203dB re1 μ Pa @1m.

Acoustic Corer:

The Acoustic Corer™ (Pangeo subsea/Kraken Robotics) creates a high-resolution 12m wide acoustic core penetrating the sub-seabed to depths greater than 40m. The Acoustic Corer provides a 3D image of stratigraphy layers and anomalies across the entire foundation footprint. The acoustic corer has a low frequency 1.5 to 6 kHz and high frequency 4.5 to 12 kHz chirp and Peak SL 195dB & 190dB re 1uPa @1m respectively.

Sub-bottom Imager (SBI):

The Sub-Bottom Imager uses advanced acoustic technology to image beneath the seabed. The SBI has an operating frequency of 4.5 to 12.5 kHz and emits a sound level of 190dB re 1uPa @1m. Acoustic positioning system; Ultrashort Baseline (USBL):

The Applied Acoustics EasyTrak Nexus Model EZT-2691 is an example of an ultrashort baseline acoustic positioning system. The system consists of a transceiver unit and a set of transponders. The transceiver unit emits acoustic signals, which are picked up by the transponders. The signals are used to determine the position and orientation of the transponders relative to the transceiver, with high accuracy and precision. The frequency emitted ranges between 18-32kHz and a recorded sound pressure of 192dB re1μPa @1m.

Refraction Seismic (Beach and Intertidal):

Land based refraction seismic refraction survey relies on the refraction of compressional seismic waves which occurs when a subsurface interface exists with higher seismic velocity than the overlying deposits. For shallow investigations the interface between the superficial deposits and rock provides such a contrast. Refraction seismic profiles would be undertaken using onshore survey equipment at low tide within the intertidal area. A sledgehammer and metal plate sound source would be used to create compressional wave energy. Refracted sound signals will be received on a geophone array and recorded on a digital seismograph. Positions and levels of the geophones would be recorded using RTK GPS techniques.

Hydrographical and geophysical surveys schedule:

The hydrographical and geophysical survey area will be refined prior to undertaking the surveys to minimise time on site; with the total time period proposed to undertake the hydrographical and geophysical surveys being from approximately 4 to 8 weeks.

The typical frequencies and the maximum peak sound pressure levels (SPL_{peak}) of the proposed geophysical equipment are given in table 1.

Noise Source	Frequency	Sound Pressure Level (dB re 1μPa @ 1m)
Shipping Noise	50 - 300 kHz	160-175 dB
SBEC	200 kHz	221 dB
MBES	400 kHz	198 dB
SSS	300 – 900 kHz	220 - 230 dB
SBP - parametric	2 - 115 kHz	232 dB
SBP - boomer	0.5 - 5 kHz	205 – 211 dB
Acoustic Corer	1.5 – 12 kHz	195 dB
Sub-bottom Imager	4.5 – 12.5 kHz	190 dB
USBL	18 – 32 kHz	192 dB
Geotechnical drilling (Rotary)	1 - 120 Hz	145 dB
Seismic CPT	1 - 280 Hz	145 dB
P-S wireline logging	1 - 240 Hz	70 dB

Table 1 Summary of the noise sources from geophysical and geotechnical surveys.

2.3.2 Geotechnical survey

Boreholes – Rotary Drilling:

Boreholes may be up to 80 m below the sea floor within the Licence Area. All drilling equipment used will follow the ISO and API technical specifications for drilling equipment. Marine rotary drilling is a technique used to bore holes into the seabed. The drilling process involves rotating a drill bit attached to a drill string and applying downward pressure to cut through the rock formations. Geotechnical sampling tools, including push and piston samples, can then be deployed into the ground to recover intact material. The typical frequencies emitted from rotary drilling are between 0.001-0.120kHz and a recorded sound pressure of approximately 145dB re1 μ Pa @1m.

This activity will be split between two surveys with a preliminary survey typically taking up to 10 weeks and an interim survey typically taking approximately up to 20 weeks. The total number of boreholes proposed in the maritime usage licence area is 94 and the time required for each borehole is from between 24 and 36 hours.

Cone Penetration Tests (CPT):

CPTs are in-situ tests that are used to identify soil type. In this test a cone penetrometer is pushed into the seafloor at a standard rate and data is recorded at regular intervals during penetration. CPTs can be performed as either Seabed or downhole in boreholes. Two types of CPT surveys are proposed, namely Seismic CPT and P-S wireline.

Seismic CPT:

A seismic CPT provides the same data as a standard CPT test with the addition of geophones (receivers) located behind the shoulder of the cone. A seismic source, typically consisting of two to three pneumatic or hydraulic trigger hammers, is positioned on the seabed, triggered to create a sound wave, which then propagates through the ground, and is recorded by the cone. The arrival times of the soundwave to the cone is measured, and provides an indication of the material. The typical frequencies emitted from CPT and seismic CPT are between 0.001-0.28kHz and a recorded sound pressure of approximately 145dB re1 μ Pa @1m.

P-S wireline logging:

A P-S wireline logging probe is a method similar to Seismic CPTs, however the source is located within the probe, with geophones spaced either side of the source. The data is used to determine rock and soil properties, and the test is conducted after a borehole has been completed within the annulus created by the drilling. The typical frequencies emitted from P-S wireline logging are between 0.001-0.24kHz and a recorded sound pressure of approximately 70dB re1 μ Pa @1m.

The total number of CPTs proposed in the maritime usage licence area is 224 and the time required for each test is from between 30 minutes and 1 hour.

Vibrocore / Gravity Corer:

Vibrocore and Gravity Corer are methods of collecting un-consolidated seabed samples. A maximum of 110 sample locations will be required for either vibrocore or gravity sampling with a target depth of 6m below seafloor within the Licence Area.

The total time required for gravity corer activity is maximum of 24 days but gravity corer is part of same survey as boreholes so approximately 10 weeks for preliminary survey and approximately 20 weeks for the interim survey.

Intertidal Trial Pits:

Trial pits are used to recover large bulk samples of soil and/or where thorough visual examination of strata is required. Trial pits can be dug by hand if required (due to the presence of underground services for example) but will most likely be dug using a machine excavator. An example excavator is a hydraulic wheeled backhoe loader (e.g. JCB 3CX - Figure 0-20). Pits are generally excavated to a depth of up to 5m, and are typically 3m x 1m in size. Trial Pits will be excavated, photographed and backfilled with the original suitable excavated material.

2.3.3 Metocean

Floating LiDAR:

Floating LiDAR buoys will be deployed to measure the wind resource within the OWF Area. Deployment of this buoy will include anchor points on the seafloor. LiDAR may be deployed for a period of between 12 to 24 months. A maximum of 5 floating LiDAR buoys may be deployed

Acoustic Doppler Current Profiler (ADCP):

ADCPs may be used to examine wave and current conditions in the Licence Area. This equipment is installed on the seabed and anchored with a suitable mooring structure. A maximum of 5 ADCPs may be used to examine wave and current conditions in the Licence Area.

Wave Buoy:

Waverider buoys may be deployed to measure wave heights and direction to feed into the detailed design of the project within the OWF area. They will be moored to the seabed by a suitably sized mooring structure

2.3.4 Ecology

Fisheries Survey:

Fisheries surveys identify fish species distribution within the Licence Area. Exact details of monitoring required will be determined through engagement with the relevant authorities including the SFPA, the Marine Institute and through local knowledge where appropriate.

Benthic Ecology:

Benthic surveys identify subtidal and intertidal benthic communities and habitats at the site. Subtidal sample locations may be subject to drop down video in advance of sampling, intertidal sample locations may be subject to walkover/drone survey in advance of sampling. There will be up to 300 sampling locations within the Licence Area and multiple samples may be taken at each location.

Marine Mammal Acoustic Monitoring:

Acoustic monitoring of marine mammals will be undertaken using passive acoustic monitoring equipment such as C-PODs deployed on the seabed. SoundTrap hydrophones may be deployed alongside the C-PODs for periods throughout the monitoring campaign. There will be a maximum of 5 C-POD sampling locations within the Licence Area. These will either

be 5 permanent sites or the 5 sites will be relocated every 3 months during battery change. This will be decided on in consultation with an experienced marine mammal ecologist.

2.3.5 Archaeological

The proposed archaeological survey will comprise of the identification and assessment of metallic and other targets recorded during the geophysical survey. Submarine archaeological surveys are also proposed including remote sensing, acoustic imaging, underwater photography and videography, and in-situ archaeological excavation.

All required archaeological work will be carried out by a suitably qualified archaeologist to determine the location of all known archaeological features in advance of the geotechnical and environmental survey.

2.3.6 Water Quality Monitoring

Water sampling will be conducted to collect data to inform assessment of water quality. Sample collection will be undertaken using water bottle rosettes and in situ sampling. There will be a maximum of 75 water quality sampling locations within the Licence Area.

3 Screening for Appropriate Assessment

3.1 Management of Natura 2000 sites

Under the Habitats Directive plans or projects that are directly connected with or necessary to the management of a Natura 2000 site do not require Appropriate Assessment. The proposed project is not directly connected with or necessary for the management of a Natura 2000 site so screening for appropriate assessment is required.

3.2 Identification of possible effects from the proposed site investigations

Possible effects from the above described site investigations could include the following:

- Underwater noise generated from survey vessels and the operation of survey equipment.
- Physical disturbance from increased suspended sediment concentrations from geophysical and benthic sampling.
- Habitat loss from removal of substrate due to geophysical and benthic sampling.
- Accidental events including hydrocarbon spillages.
- Visual and above water noise disturbance from inshore and intertidal surveys.
- Physical presence of survey vessels.

3.3 Identification of likely or possible significant effects on Natura sites

A European site is only at risk of likely or possible significant effects where the Source-Pathway-Receptor link exists between the proposed development and the European site (OPR 2021). Potential connectivity is considered if there is overlap with the Maritime Usage Licence Application Area and an SAC (direct effects) or if the SAC is within range of the effects of the proposed activity (indirect effect). It should be noted that candidate SACs were also considered and were given equal consideration to SACs.

3.3.1. Annex I Habitats

The potential environmental impacts on Annex I Habitats as a result of these site investigation works are habitat loss and physical disturbance. Physical disturbance from equipment used to sample sediments may lead to an increase in suspended sediment concentrations (SSC). Such increases can lead to the clogging of feeding apparatus of filter feeders, smothering of sessile species, increase in scouring and rendering hard surfaces unsuitable for epibenthic settlement. Physical disturbance from equipment can also lead to smothering of soft bottom species and altering of the sediment composition of the habitat.

Coastal and intertidal habitats experience disturbance through the occurrence of vehicular traffic from activities associated with archeological, intertidal and geotechnical surveys. Accidental hydrocarbon spillages can also occur during the operation of equipment associated with these surveys.

3.3.2 Annex II Species

Marine mammals:

In Ireland Annex II marine mammal species include the European otter, grey seal, harbour seal, harbour porpoise and bottlenose dolphin. As a result of site investigation surveys marine mammals may be adversely affected by visual disturbance, injury due to collision with survey vessels, above water noise disturbance and from the effects of underwater noise.

For otters there is potential for behavioural effects due to increased noise levels and visual stimuli from the proposed activities in the intertidal and shallow subtidal. Effects may include reduced foraging opportunities, reduced resting and breeding locations, and unfavourable commuting routes.

Vessel strikes are a known cause of mortality in marine mammals (Laist et al., 2001; Wilson et al., 2020). Injuries as a result of collision may also result in individuals becoming vulnerable to secondary infections. Slower vessels following a consistent trajectory allow animals the opportunity to avoid collisions. The risk of fatality is also reduced if vessels are moving slowly. The introduction of underwater noise through geotechnical and geophysical surveys has the potential to disturb and/or injure marine mammals if the frequency/frequencies of the sound emitted fall within their hearing range. Marine mammals rely on sound to navigate, to communicate with one another and to sense and interpret their surroundings.

Currently three groups of cetaceans are recognised depending on their known auditory ability and functional frequencies (Table 2). Seals have differing auditory ability depending on if they are in air or in water. They are therefore, from a functional point of view, divided into two groups, in water and in air.

	Cetaceans		Pinnipeds	
	Low frequency 7 Hz-35 kHz	Mid-frequency 150 Hz-160 kHz	High frequency 200 Hz–180 kHz	in water 5 Hz–86 kHz
Baleen whales	Most toothed whales, dolphins	Certain toothed whales, porpoise	All species	All species
Species- Ireland Humpback whale	Species– Ireland Sperm whale	Species– Ireland Pygmy sperm whale	Species– Ireland Grey seal	Species– Ireland Grey seal
Blue whale	Killer whale	*Harbour porpoise	Harbour seal	Harbour seal
Fin whale	Long-finned pilot whale			
Sei whale	Beaked whale species			
Minke whale	*Dolphin species			

Table 2 Known auditory ability and functional frequencies cetacean species and seals (from Southall *et al.*, 2007). *Southall *et al.*, 2019 updated the marine mammal hearing groups, adding a Very High-frequency cetacean group which includes Harbour porpoise and now including Bottlenose dolphin in the High frequency group.

Southall *et al.* (2007) identified thresholds of peak sound pressure (SPL) and sound exposure (SEL) from discrete sound events (single or multiple, within a 24-hr period) that would be expected to elicit Temporary Threshold Shift (TTS) and/or Permanent Threshold Shift (PTS) in receiving marine mammals. These thresholds were revised and the recognition of a very high frequency hearing group having a lower threshold than previously thought (Southall *et al.*, 2019) (Table 3).

Marine Mammal hearing group	TTS onset: SEL weighted	TTS onset: Peak SPL unweighted	PTS onset: SEL weighted	PTS onset: Peak SPL unweighted
Low frequency Cetaceans	168	213	183	219
High frequency Cetaceans	170	224	185	230
Very High frequency Cetaceans	140	196	155	202
Seals in water	188	226	203	218
Seals on land	146	161	161	144

Table 3 TTS- and PTS- onset thresholds for marine mammals exposed to impulsive noise SEL thresholds in dB re1μPa²s under water and dB re20μPa²s in air (for seals only) from Southall *et al.*, 2019.

Migratory fish:

A wide range of fish species, including many that are commercially valuable, emit sounds as part of their social behaviour (Tavolga 1976), and several species have been shown to be acutely sensitive to underwater sounds. Fish species such as Clupeiform species (e.g. shad, herring) which have anatomical specialisations between the swim bladder and the ear generally have lower thresholds and wider hearing bandwidths than species without such

specialisations. They may therefore have a greater ability to detect and therefore respond to sound pressure. The shad family (Alosinae) in particular have shown sensitivity to a range of frequencies that can extend to >100kHz (Mann *et al.*, 2001). Teague & Clough (2011) recorded positive significant reactions in juvenile twaite shad to sound frequencies of between 30kHz and 60kHz with a peak at 45kHz. Behavioural studies of the responses to ultrasound (Mann *et al.*, 2001; Popper *et al.*, 2004) have shown a graded series of responses depending on the sound level and, to a lesser degree, on the frequency of the stimulus. Low-intensity stimuli elicit a non-directional movement of the fish whereas somewhat higher sound levels elicit a directional movement away from the sound source and still higher-level sounds produce a “wild ”chaotic movement of the fish. This response it is speculated has evolved to avoid predation by its major predator, echolocating cetaceans.

Fish without such anatomical connections such as Atlantic salmon have poor hearing sensitivity and are only capable of detecting low frequency tones (below 380Hz) and particle motion rather than sound pressure (NOAA, 2016). However all fish have the capability to hear low-frequency sounds (500Hz) and consequently can be disturbed by noisy human activities (Popper *et al.*, 2014).

Sea lamprey detect noise of between 50 to 300Hz but not above 300Hz (Mickle *et al.*, 2019).

Increased levels of suspended sediments will also affect fish species where suspended sediments have been shown to affect salmonids by altering their physiology, behavior, and habitat, all of which may lead to physiological stress and reduced survival rates (Bash *et al.*, 2001)

3.3.3. Birds

These site investigation works may have effects on breeding seabirds; where by seabirds nesting on shorelines or structures in proximity to the works can be disturbed from their nests. Similarly other seabird aggregations or individual birds may be disturbed by the presence of a vessel or on its approach (Althouse *et al.*, 2019, Furness *loc. cit.*, Dierschke *loc. cit.*, Fleissbach *loc. cit.*).

Wildfowl differentially respond to visual disturbance depending on their activity, the species concerned and context of the stimulus (Cutts *et al.*, 2013). In particular foraging or roosting aggregations of dabbling ducks or geese may be sensitive to visual disturbance. Waders respond differentially to visual disturbance depending on factors that include the species involved, flock size and context of their location (i.e. industrialised areas) (Cutts *loc. cit.*, Goss-Custard *et al.* 2019).

Wintering estuarine species (waders and waterfowl) which are Special Conservation Interests (SCIs) for an SPA may move between estuarine areas and therefore utilise estuarine habitats outside of the SPAs in which they are listed as SCIs. This is likely to happen most frequently between estuarine areas that are within close proximity to the SPA for which they are designated. Any sites which have a source pathway receptor relationship between the proposed activities and the qualifying interest of the site were considered to be within the zone of influence.

Disturbance and displacement of species may have consequences at individual and population levels (Joint SNCB note 2017).

Underwater noise is likely to cause disturbance to some species of diving seabirds. It may affect prey acquisition, cause displacement from habitat or evoking an escape flight response (Black *loc. cit.*, Dierschke *loc. cit.*). Seabirds whose predominant method of foraging is shallow diving, dip diving or surface feeding are unlikely to be impacted by underwater noise due to

the brevity of exposure time and sensitivity to disturbance (Furness *loc. cit.*, Fleissbach *loc. cit.*).

The survey works may also have effects on the prey species of these birds, reducing their availability to prey which may then adversely affect survival and productivity.

3.4 Identification of the relevant European site/s

Special Area of Conservations (SAC) were screened on the potential for connectivity between the proposed project and their qualifying interests. Potential connectivity was considered if there was overlap with the Maritime Usage Licence Application Area and an SAC (direct effects) or if the SAC was within range of the effects of the proposed activity (indirect effects). Given the open nature of the marine environment SACs which have a source pathway receptor relationship between the proposed activities and the qualifying interest of the site were considered to be within the zone of influence.

3.4.1 Annex I habitats

Effects on Annex I habitats may be direct where the proposed project overlaps with habitats or SACs and indirect where the effects of the proposed project has effects on habitats which are at a distance from it. Therefore in the screening process those SAC which overlap with the proposed project and which have a source pathway receptor relationship between the proposed activities and the qualifying interest of the site were considered to be within the zone of influence.

As these works are being undertaken in the marine environment, using the Source-Pathway-Receptor model, only the marine and coastal Annex I habitats were considered in this screening process.

The Maritime Usage Licence Application Area does not overlap with any SAC and the following three SACs are considered to be within the Zone of Influence of the proposed project for annex I habitats:

- Rockabill to Dalkey Island SAC
- Boyne Coast and Estuary SAC
- Lambay Island SAC

3.4.2 Annex II species

Marine mammals

After breeding most grey seals disperse away from their haul-out sites, therefore their usage of a particular SAC is very time and location specific. On this basis and considering newly available data on grey seal movements (Carter et al, 2022) there is potential for interactions between grey seals and projects 448 km distant from the SAC for which they are designated. This is considered the Zone of Influence for this species.

In Ireland the foraging range for harbour seal can be as far as 273 km (Carter et al, 2022) using the precautionary principle that latter value was considered in the screening process and is taken as the Zone of Influence for this species.

Otters are a semi-aquatic species who use the marine environment for foraging. Otters that forage on the coast have flexible foraging times linked to the tides. Although otters are a mobile species, they have defined territories. Females have territories of 7.5 ± 1.5 km in length

along a riverine environment and 6.5 ± 1.0 km in coastal environments, while male otter territory along rivers is approximately 13.2 ± 5.3 km in length with a high degree of variability (Reid et al., 2013). Using the precautionary principal the Zone of Influence for this species is 15km along the shore.

In Ireland there are a number of SACs designated for the cetaceans, harbour porpoise and common bottlenose dolphin. As these species are highly mobile species specific Management Units (MU) are used to assess to the effect of an activity on them. The Zone of Influence of a project which has the potential to impact on a species is considered to be the MU for that species which overlaps with the project.

With respect to the proposed project the overlapping MU for harbour porpoise is the Celtic and Irish Seas; for the bottlenose dolphin it is the Irish Sea (IAMMWG, 2015).

Using the above criteria eight Irish sites, eight British and sixteen French sites were identified to be within the Zone of Influence of the proposed project. These are:

Rockabill to Dalkey SAC
Boyne Coast and Estuary SAC
Lambay Island SAC
River Boyne and River Blackwater SAC
Slaney River Valley SAC
Saltee Islands SAC
Roaringwater Bay and Islands SAC
Blasket Islands SAC
The Maidens SAC
Pembrokeshire Marine SAC
Lleyn Peninsula and the Sarnau SAC
Cardigan Bay SAC
North Anglesey Marine SAC
West Wales Marine SAC
North Channel SAC
Bristol Channel Approaches SAC
Récifs et landes de la Hague
Anse de Vauville
Banc et récifs de Surtainville
Chausey
Baie du Mont Saint-Michel
Estuaire de la Rance
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard
Cap d'Erquy-Cap Fréhel
Baie de Saint-Brieuc – Est
Tregor Goëlo Est
Côte de Granit rose-Sept-Iles
Nord Bretagne DH
Baie de Morlaix
Abers - Côte des legends
Ouessant-Molène
Côtes de Crozon

Migratory fish

Once they leave freshwater salmon migrate to their feeding grounds in the northern Atlantic. Recent studies have found that salmon populations migrate towards oceanographic fronts for feeding (Rikardsen *et al.*, 2021). Salmon from northwest Spain and southeast Ireland appear to move out to the shelf edge before crossing the Atlantic towards Greenland. Barry *et al.* (2020) found that individuals from Irish rivers in the northeast migrate out of the Irish Sea through the North Channel into deeper offshore waters further north. Therefore the Zone of Influence for salmon is considered to be the eastern seaboard north of Dublin Bay.

The Freshwater Pearl Mussel utilises Atlantic salmon at a certain stage in its life cycle, Sea lamprey is a predator of salmon (OSPAR 2009). Therefore it is considered that if the salmon is significantly impacted by an activity there is a possibility that these species may also be negatively affected. This logic was also applied to sea lamprey which is a predator of salmon (OSPAR 2009). The Zone of Influence for these species was considered the same as that for Atlantic salmon.

Recent information on Twaite Shad recorded movement of up to 950km from the River Severn with one individual detected in the Blackwater Estuary (Davies *et al.* 2020).

However given the spatial and temporal nature of the proposed works more distant SAC designated for shad species are considered to not have connectivity with the Application Area; more distant sites are considered too far for any significant interaction to occur. Similarly distant SACs designated for River lamprey were considered too far for any significant interaction to occur.

Using this criteria the River Boyne and River Blackwater SAC was identified as being within the Zone of Influence of the proposed project.

Table 4 Special Area of Conservation (SAC) and their qualifying interests to be considered further in the screening process. **The QIs in red are screened in for Stage 2 Appropriate Assessment.**

Site and Code	Distance from Survey Area	Qualifying Interests	Screened In/Out	Potential source of impact
Rockabill to Dalkey SAC [Site code IE003000]	2.6 km	Reefs [1170]	Out	No Source-Pathway-Receptor link to habitats
		<i>Phocoena phocoena</i> (Harbour Porpoise) [1351]	In	Disturbance from underwater noise
Boyne Coast and Estuary SAC [Site code IE001957]	9 km	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 (<i>Glauco-Puccinellietalia maritimae</i>) [1330] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	Out	No Source-Pathway-Receptor link to habitats
Lambay Island SAC [Site code IE000204]	14.8 km	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Out	No Source-Pathway-Receptor link to habitats
		<i>Halichoerus grypus</i> (Grey Seal) [1364] <i>Phoca vitulina</i> (Harbour Seal) [1365]	In	Disturbance from Underwater Noise
River Boyne and River Blackwater SAC [Site code 002299]	16 km	Alkaline fens [7230] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i>) [91E0] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]	Out In	No Source-Pathway-Receptor link Increased suspended sediment concentrations Disturbance from underwater Noise

Slaney River Valley SAC [Site code IE000781]	146 km	<p>Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) [1330] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation [3260] Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Petromyzon marinus</i> (Sea Lamprey) [1095] <i>Lampetra planeri</i> (Brook Lamprey) [1096] <i>Lampetra fluviatilis</i> (River Lamprey) [1099] <i>Alosa fallax fallax</i> (Twaites Shad) [1103] <i>Salmo salar</i> (Salmon) [1106] <i>Lutra lutra</i> (Otter) [1355]</p>	Out	No Source-Pathway-Receptor link to species or habitats
		<i>Phoca vitulina</i> (Harbour Seal) [1365]	In	Disturbance from underwater noise
Saltee Islands SAC [Site code IE0007071]	174 km	<p>Mudflats and sandflats not covered by seawater at low tide [1140] Large shallow inlets and bays [1160] Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Submerged or partially submerged sea caves [8330]</p>	Out	No Source-Pathway-Receptor link to habitats
		<i>Halichoerus grypus</i> (Grey Seal) [1364]	In	Disturbance from underwater noise

Roaringwater Bay and Islands SAC [Site code IE000101]	388 Km/Within MU for Harbour Porpoise	<p>Large shallow inlets and bays [1160] Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] Submerged or partially submerged sea caves [8330] Lutra lutra (Otter) [1355]</p> <p>Halichoerus grypus (Grey Seal) [1364] Phocoena phocoena (Harbour Porpoise) [1351]</p>	<p>Out</p> <p>In</p>	<p>No Source-Pathway-Receptor link to species or habitats</p> <p>Disturbance from underwater noise</p>
Blasket Islands SAC [Site code IE002172]	504 km/ Within MU for Harbour Porpoise	<p>Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030] Submerged or partially submerged sea caves [8330] Halichoerus grypus (Grey Seal) [1364]</p> <p>Phocoena phocoena (Harbour Porpoise) [1351]</p>	<p>Out</p> <p>In</p>	<p>No Source-Pathway-Receptor link to species or habitats</p> <p>Disturbance from underwater noise</p>
The Maidens [Site code UK0030384]	136 km	<p>Halichoerus grypus (Grey Seal) [1364]</p>	In	Disturbance from underwater noise

Pembrokeshire Marine/ Sir Benfro Forol SAC [UK0013116]	186 km	<p>Sandbanks which are slightly covered by sea water all the time [1110] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons [1150]*Priority feature Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Submerged or partially submerged sea caves [8330] Petromyzon marinus (Sea lamprey) [1095] Lampetra fluviatilis (River lamprey) [1099] Alosa alosa (Allis shad) [1102] Alosa fallax (Twaite shad) [1103] Lutra lutra (Otter) [1355] Rumex rupestris (Shore dock) [1441]</p>	Out	No Source-Pathway-Receptor link to habitats
		Halichoerus grypus (Grey Seal) [1364]	In	Disturbance from underwater noise
Lleyn Peninsula and the Sarnau / Pen Llyn a'r Sar [Site code UK0013117]	Within MU for Bottlenose Dolphin	<p>Mudflats and sandflats not covered by seawater at low tide [1140] Salicornia and other annuals colonizing mud and sand [1310] Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] Submerged or partially submerged sea caves [8330] Lutra lutra Otter [1355]</p>	Out	No Source-Pathway-Receptor link to species or habitats
		<p>Tursiops truncatus (Common Bottlenose Dolphin) [1349] Halichoerus grypus (Grey Seal) [1364]</p>	In	Disturbance from underwater noise
Cardigan Bay [UK0012712]	Within MU for Bottlenose dolphin	Tursiops truncatus (Common Bottlenose Dolphin) [1349]	In	Disturbance from underwater noise
North Anglesey Marine / Gogledd Môn Forol [UK 0030398]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.

West Wales Marine / Gorllewin Cymru Forol [UK 0030397]]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
North Channel [UK 0030399]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Bristol Channel Approaches / Dynesfeydd Môr Hafren [UK0030396]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Récifs et landes de la Hague [FR2500084]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Anse de Vauville [FR2502019]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Banc et récifs de Surtainville [FR2502018]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Chausey [FR2500079]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Baie du Mont Saint-Michel [FR2500077]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Estuaire de la Rance [FR5300061]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard [FR5300012]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.

Cap d'Erquy- Cap Fréhel [FR5300011]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Baie de Saint- Brieuc – Est [FR5300066]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Tregor Goëlo Est [FR5300010]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Côte de Granit rose-Sept-Iles [FR5300009]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Nord Bretagne DH [FR2502022]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Baie de Morlaix [FR5300015]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Abers - Côte des legends [FR5300017]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Ouessant- Molène [FR5300018]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.
Côtes de Crozon [FR5302006]	Within MU for Harbour Porpoise	Phocoena phocoena (Harbour Porpoise) [1351]	In	Disturbance from underwater noise.

3.4.3 Birds

A Special Protection Area (SPA) is considered in the screening process if there is potential for connectivity between their Special Conservation Interest (SCI), their wetlands and the proposed project. Possible connectivity is considered if the SPA either overlaps with the Maritime Usage Licence Application area or is within foraging range of the area. It is acknowledged that seabirds generally have large foraging ranges (Woodward *et al.* 2019) and may occasionally occur in the Maritime Usage Licence Application Area from more distant SPAs. If the site investigation survey area represents the outer extent of the foraging range of species, such as Manx Shearwater which have very large ranges, then the connectivity between it and SPAs for which the species is an SCI is considered to be insignificant.

While wintering SCIs do not forage as widely as seabird species, they may move between estuarine areas and utilise estuarine habitats outside of the SPA for which they are listed. Such movements are likely to happen most frequently between estuarine habitats which are in close proximity.

Using the above criteria the following SPAs (including candidate SPAs) were considered to be within the Zone of Influence of the proposed project:

North-West Irish Sea cSPA
Rockabill SPA
River Nanny Estuary and Shore SPA
Skerries Islands SPA
Boyne Estuary SPA
Lambay Island SPA
Rogerstown Estuary SPA

Table 5 Special Protection Areas (SPA) and their qualifying interests to be considered further in the screening process.

Site and Code	Distance from Survey Area	Qualifying Interests	Screened In/Out	Potential source of impact
North-west Irish Sea cSPA [IE004236]	0km	Wintering Red-throated Diver [A001] Great Northern Diver [A003] Fulmar [A009] Common Scoter [A065] Little Gull [A177] Black-headed Gull [A179] Common Gull [A182] Herring Gull [A184] Great Black-backed Gull [A187] Kittiwake [A188] Guillemot [A199] Razorbill [A200]	In	Visual & above water noise disturbance from Surveys and Physical disturbance & Habitat loss
		Breeding Manx Shearwater [A013] Cormorant [A017] Shag [A018] Lesser Black-backed Gull [A183] Roseate Tern [A192] Common Tern [A193] Arctic Tern [A194] Little Tern [A195] Puffin [A204]	In	Visual and above water noise disturbance from surveys and Physical disturbance & Habitat loss
		Diving Red-throated Diver [A001] Great Northern Diver [A003] Manx Shearwater [A013] Cormorant [A017] Shag [A018]	In	Visual and above water noise disturbance from surveys, Disturbance from underwater noise and Physical disturbance & Habitat loss
Rockabill SPA [IE004014]	0.2 km	Wintering Purple Sandpiper [A148]	In	Visual and above water noise disturbance from surveys
		Breeding Roseate Tern [A192] Common Tern [A193] Arctic Tern [A194]	In	Visual and above water noise disturbance from surveys

Site and Code	Distance from Survey Area	Qualifying Interests	Screened In/Out	Potential source of impact
River Nanny Estuary and Shore SPA [Site code IE004158]	3.5km	Wintering Oystercatcher [A130] Ringed Plover [A137] Golden Plover [A140] Knot [A143] Sanderling [A144] Herring Gull[A184] Wetland and Waterbirds [A999]	Out	No Source-Pathway-Receptor link to species
Skerries Islands SPA [Site code IE004122]	5.2 km	Wintering Cormorant [A017] Shag [A018] Light-bellied Brent Goose [A046] Purple Sandpiper [A148] Turnstone [A169] Herring Gull [A184]	Out	No Source-Pathway-Receptor link to species
		Breeding Cormorant [A017] Shag [A018]	Out	No Source-Pathway-Receptor link to species
		Diving Cormorant [A017] Shag [A018]	In	Disturbance from underwater noise
Boyne Estuary SPA [Site code IE004080]	10.6	Wintering Shelduck [A048] Oystercatcher [A130] Golden Plover [A140] Grey Plover [A141] Lapwing [A142] Knot [A143] Sanderling [A144] Black-tailed Godwit [A156] Redshank [A162] Turnstone [A169] Wetland and Waterbirds [A999]	Out	No Source-Pathway-Receptor link to species
		Breeding Little Tern [A195]	Out	No Source-Pathway-Receptor link to species

Site and Code	Distance from Survey Area	Qualifying Interests	Screened In/Out	Potential source of impact
Lambay Island SPA [Site code 004069]	14.5	Wintering Greylag Goose [A043] Herring Gull [A184]	Out	No Source-Pathway-Receptor link to species
		Breeding Fulmar [A009] Cormorant [A017] Shag [A018] Lesser Black-backed Gull [A183] Herring Gull [A184] Kittiwake [A188] Guillemot [A199] Razorbill [A200] Puffin [A204]	Out	No Source-Pathway-Receptor link to species
		Diving Cormorant [A017] Shag [A018]	In	Disturbance from underwater noise
Rogerstown Estuary SPA [Site code 004015]	14.7	Wintering Greylag Goose [A043] Light-bellied Brent Goose [A046] Shelduck [A048] Shoveler [A056] Oystercatcher [A130] Ringed Plover [A137] Grey Plover [A141] Knot [A143] Dunlin [A149] Black-tailed Godwit [A156] Redshank [A162] Herring Gull [A184]	Out	No Source-Pathway-Receptor link to species
		Wetland and Waterbirds [A999] Breeding Shelduck [A048]	Out	No Source-Pathway-Receptor link to species

3.5 Assessment of Likely or Possible Significant Effects

3.5.1 Annex I Habitats

The Emodnet habitat data shows the Maritime Usage Licence Application Area to be largely that of sandy mud and muddy sand (figure 3). Given the small area of sediment being sampled, increases in Suspended Sediment Concentrations will be slight, confined to a small area around the sampling station and will be temporary in nature. Similarly the placing of structures such as a Jack-up barge will have a localized effect. Therefore likely or possible significant effects on the subtidal Annex I habitats from these activities **can be excluded**.

3.5.2 Annex II species

In relation to Annex II migratory fish species the River Boyne and River Blackwater SAC is considered to be within the Zone of Influence of the proposed project. The proposed works could result in increased suspended sediments concentrations and disturbance from underwater noise to Annex II migratory fish species from these SACs. Therefore likely or possible significant effects as a result of increased suspended solids and underwater noise from the proposed project on migratory fish species **cannot be excluded**.

In relation to Otter the River Boyne and River Blackwater SAC is considered to be within the Zone of Influence of the proposed project. Likely or possible significant effects as a result of underwater noise from the proposed project on Otter **cannot be excluded**.

The potential sound pressure level from equipment proposed in these site investigations is within the range to cause Permanent Threshold Shift (PTS) in very high frequency cetaceans hearing group (this group includes Harbour porpoise) and Temporary Threshold Shift (TTS) in seals in water (table 1). Therefore, using the precautionary principal, likely or possible significant effects as a result of the proposed project on marine mammals within the Zone of Influence of the proposed project **cannot be excluded**.

3.5.3 Birds

While it is acknowledged that species which use the area for feeding, loafing and breeding may be disturbed by the activities of the survey vessel, any visual or above water noise disturbance from up to two additional vessels in this busy maritime area is unlikely to be felt against background levels. Given the short duration of the proposed site investigations the significance of effects on birds in the offshore environment from the proposed site investigations, including due to visual or overwater noise disturbance, will be temporary and has been assessed as imperceptible. Similarly the effects on prey species of SCIs as a result of the proposed works given the total available foraging area is limited, both spatially and temporally.

Information on the underwater hearing abilities of diving birds and evidence of the effects of underwater anthropogenic noise on them is very limited. However the great cormorant (*Phalacrocorax carbo*) has hearing thresholds comparable to seals and toothed whales (Hansen, *et al.*, 2017). Studies suggest that mortality occurs when in close proximity to the event (Danil & St Leger 2011) and flushing disturbance would be expected to displace most diving seabirds from close proximity to the survey vessel and any towed equipment, thereby limiting their exposure to the highest sound pressures generated. However seabird responses to approaching vessels are highly variable (e.g. Fliessbach *et al.* 2019) and in a busy shipping area such as the Irish Sea some species may be somewhat habituated to vessel noise.

The Maritime Usage Licence Application Area lies in close proximity to colonies of breeding and diving seabirds.

Therefore the possibility of likely significant effects as a result of the proposed project on bird species within the Zone of Influence of the proposed project **cannot be excluded**.

3.6 In-combination effects

Article 6(3) of the Habitats Directive requires that an Appropriate Assessment be carried out in respect of any plan or project which is likely to have a significant effect on one or more European sites, either individually or in combination with other plans or projects. Therefore, regardless of whether or not the likely or possible effects of a plan or project are significant when considered in isolation, the potential for the plan or project to significantly affect European sites in combination with other past, present or foreseeable future plans or projects must also be assessed.

In-combination screening for cumulative effects has been undertaken following the approach outlined in the European Commission Notice Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive (EC, 2021), has had regard to European and National guidance documents and is based on professional and scientific judgment.

Under Article 6(3) the ‘in combination’ provision applies both to Stage 1 Screening and Stage 2 Appropriate Assessment.

Some projects are unlikely to have significant effects on their own. However, the effects in-combination with other plans or projects could be significant. The cumulative effects assessment concentrates on projects/plans that could act in-combination with the project under application/consideration to affect the conservation objectives of the relevant Natura 2000 sites.

Relevant Plans/Projects

The cumulative effects provision applies to the following plan/project types:

- Projects that are completed,
- Projects approved but uncompleted,
- Proposed projects, (projects applied for and under consideration but not approved by the relevant consenting authority or projects known to MARA),
- Plans that are completed,
- Plans approved but uncompleted,
- Proposed plans,
- Proposals in adopted plans,
- Proposals in finalised draft plans formally published or submitted for consultation or adoption

As per European guidance it is recommended that plans and projects that are not yet proposed do not generally have to be taken into account in the assessment of in-combination effects, even if they are part of an overarching masterplan. The exception is where the project is considered to be functionally interdependent with the development before the competent

authority. An example of this is a site investigation for a proposed offshore windfarm which has received a MAC. The consideration of in-combination effects is not restricted to similar project/plan types covering the same sector of activity (e.g. a series of offshore wind farms). All types of plans or projects that could, in-combination with the project under consideration, have a significant effect, should be taken into account.

Although already completed plans and projects are themselves excluded from the assessment requirements of Article 6(3), it is still important to take them into consideration when assessing the effects of the current plan or project in order to determine whether there are any potential cumulative effects arising from the current project in combination with other completed plans and projects.

Using professional and scientific judgement, the key steps for assessing cumulative effects are as follows:

1. Defining the Cumulative Effects Spatial Scope (CESS)
2. Defining the Cumulative Effects Temporal Scope (CETS)
3. Impact identification
4. Pathway identification
5. Prediction
6. Identification of Plans or Projects that could act in combination
7. Screening Stage Cumulative Effects Assessment conclusion
8. Managing cumulative impacts - to be carried out as part of Stage 2 AA process

1. Defining the Cumulative Effects Spatial Scope (CESS):

Impacts of noise associated with the planned survey activities are considered to have the widest spatial reach, with Harbour porpoise the designated Natura 2000 site feature which is most sensitive to noise disturbance. The JNCC Guidance on Assessing the Significance of Noise Disturbance against Harbour Porpoise SACs Conservation Objectives (JNCC, 2020) has therefore been used to determine the boundary for examination of cumulative effects. The guidance uses published ranges for effects of noise from different noise producing activities to determine Effective Deterrence Ranges (EDRs).

Table 6 Survey equipment noise sources and associated Effective Deterrence Ranges (EDR).

Noise source	Operating frequency (kHz)	Sound Pressure Level (dB re 1µPa @ 1m)	EDR (JNCC 2020)
SBEC	50 - 300 kHz	160-175 dB	5km using EDR range for geophysical activity.
MBES	200 kHz	221 dB	5km using EDR range for geophysical activity.
SSS	400 kHz	198 dB	5km using EDR range for geophysical activity.
SBP - parametric	300 – 900 kHz	220 - 230 dB	5km using EDR range for geophysical activity.
SBP - boomer	2 - 115 kHz	232 dB	5km using EDR range for geophysical activity.
Acoustic Corer	0.5 - 5 kHz	205 – 211 dB	5km using EDR range for geophysical activity.
Sub-bottom Imager	1.5 – 12 kHz	195 dB	5km using EDR range for geophysical activity.
USBL	4.5 – 12.5 kHz	190 dB	5km using EDR range for geophysical activity.
Seismic CPT	0.001 – 0.12 kHz	145 dB	12km using EDR range for geophysical activity.

In line with Table 6 above, the EDR has been conservatively chosen as 12km (the EDR for Seismic CPTs – the largest EDR for the activities considered as part of this application), with projects within this range judged to be within the CESS.

2. Defining the Cumulative Effects Temporal Scope (CETS):

The temporal scope for examination of cumulative effects has been defined considering the period over which the licence activities would take place. A licence period of up to 7 years is being sought for this project. The Cumulative Effects Temporal Scope (CETS) is therefore 7 years.

3. Impact identification:

The impacts identified are:

- Disturbance from underwater noise
- Increased suspended sediment concentrations
- Visual and above water noise disturbance
- Physical disturbance and habitat loss (indirect impact on supporting birds habitats)

4. Pathway Identification:

Table 7 Pathway Identification

Impact	Potential Cumulative Pathway
Disturbance from underwater noise	Pathway possible via sound travelling through water with impacts possible within CESS where there is temporal overlap with other underwater noise producing projects.
Increased suspended sediment concentrations	Pathway possible via suspended sediment travelling through water with impacts possible within CESS where there is temporal overlap with other suspended sediment producing projects.
Visual and above water noise disturbance	Pathway possible via light and sound travelling through air with impacts possible within CESS where there is temporal overlap with other visual and above water noise producing projects.
Physical disturbance and habitat loss	Pathway requires direct spatial overlap. Potential pathway for physical disturbance and habitat loss impact where there is spatial and temporal overlap.

5. Prediction:

The magnitude and extent of identified likely cumulative effects have been predicted below following EC 2021 guidance.

Disturbance from underwater noise

There is the potential for increased underwater noise disturbance effects if geophysical activities with other projects were to take place at the same time. Therefore, significant likely cumulative effects will be considered further.

Increased suspended sediment concentrations

There is the potential for increased suspended solids effects if geotechnical activities with other projects were to take place at the same time. Therefore, significant likely cumulative effects will be considered further.

Visual and above water noise disturbance

There is the potential for increased Visual and above water noise disturbance if geotechnical activities with other projects were to take place at the same time. Therefore, significant likely cumulative effects will be considered further.

Physical disturbance and habitat loss

There is no overlap between the proposed Maritime Usage Licence area and any SACs designated for the protection of the Qualifying Interest Annex I Habitats.

However the North-west Irish Sea candidate SPA (cSPA) overlaps with the Licence Area. There is a possible indirect impact from the proposed works on the supporting habitats of the proposed bird features of the cSPA through disturbance to marine benthic communities and habitat loss impacting the ability of foraging grounds to provide food for foraging birds. Intrusive works undertaken by other projects may contribute to a possible indirect impact on the supporting habitats of the proposed bird features of the cSPA through disturbance to marine benthic communities and habitat loss impacting the ability of foraging grounds to provide food for foraging birds and will be considered further below.

There is the potential for increased physical disturbance and habitat loss if geotechnical activities with other projects were to take place at the same time. Therefore, significant likely cumulative effects will be considered further.

6. Identification of Plans or Projects that could act in combination:

Following the approach outlined by (EC, 2021), which suggests that information regarding “characteristics of other plans or projects (implemented, approved or proposed) that may cause in-combination or cumulative effects with the project being assessed on Natura 2000 sites” should be sourced from databases (e.g. on SEA, EIA, appropriate assessments of plans/projects, regional or municipal plans, local authority planning applications) available from Competent Authorities, all plans and projects within the CESS and CETS have been identified.

All consented activities/developments and applications for activities or development within the CESS and CETS have been considered for their potential to cause cumulative effects in combination with the site investigation activities proposed under this Maritime Usage Licence

Application, on the qualifying interests of Special Areas of Conservation and Special Protection Areas.

Searches were conducted of the following:

- Applications and lease/licence database of the Department of Housing, Local Government and Heritage
- Local Authority (Louth, Meath and Dublin County Councils) Planning lists
- An Bord Pleanála Planning Lists
- General internet search (for master plans etc)
- Department of Agriculture Food and the Marine Aquaculture Licence lists
- The Maritime Area Regulatory Authority’s databases
- EPA Website

Table 8 In-combination Projects

Application	Project	Project Status	Cumulative Effects
FS007635	Mares Connect Ltd Site Investigations for proposed Electricity Inter-Connector	Proposed – Foreshore licence submitted 03/03/23	Overlaps spatially with NISA Maritime Usage Licence Area and within CESS - therefore possible cumulative effects. Possible temporal overlap.
FS007392	LIR Offshore Array Ltd Site Investigations for proposed offshore wind farm	Proposed – Foreshore licence submitted 22/07/22	Overlaps spatially with NISA Maritime Usage Licence Area and within CESS - therefore possible cumulative effects. Possible temporal overlap.
FS007031	Statkraft North Irish Sea Array (NISA) Site Investigations Array Area	Proposed – Foreshore licence submitted 17/12/19	Overlaps spatially with NISA Maritime Usage Licence Area and within CESS - therefore possible cumulative effects. Possible temporal overlap.
FS007358	Statkraft North Irish Sea Array (NISA) Cable Route	Proposed – Foreshore licence submitted 31/03/21	Overlaps spatially with NISA Maritime Usage Licence Area and within CESS - therefore possible cumulative effects. Possible temporal overlap.
FS006973	SSE Renewables Ltd Site Investigations for proposed Braymore Point offshore wind farm	Proposed – Foreshore licence submitted 19/03/19	Overlaps spatially with NISA Maritime Usage Licence Area and within CESS - therefore possible cumulative effects. Possible temporal overlap.
na	Proposed future NISA windfarm array and cable construction phase	Proposed	Overlaps spatially with NISA Maritime Usage Licence Area

			and within CESS - therefore possible cumulative effects. Possible temporal overlap.
FS006852	Hibernian Wind Power Ltd Site Investigations for proposed Cooley Point offshore wind farm.	Approved but not completed - Foreshore licence granted 09/07/19	No Spatial overlap with NISA Maritime Usage Licence Area. Within the CESS. Possible temporal overlap.
FS006787	Hibernian Wind Power Ltd Site Investigations for proposed Clogher Head offshore wind farm.	Approved but not completed - Foreshore licence granted 14/12/18	No Spatial overlap with NISA Maritime Usage Licence Area. Within the CESS. Possible temporal overlap.
FS006602	Meath County Council – Laytown Beach Coastal Protection Works	Approved but not completed – foreshore licence granted 16/05/2018	No Spatial overlap with NISA Maritime Usage Licence Area. Within the CESS. Possible temporal overlap.
LIC230018	Microsoft Ireland Operations Ltd – subsea cable Portmarnock	Proposed – Maritime Usage Licence submitted 28/11/23	No Spatial overlap with NISA Maritime Usage Licence Area. Within the CESS. Possible temporal overlap.
FS007359	Drogheda Port Company – Maintenance Dredging	Approved but not completed - Foreshore licence granted 09/04/21	No Spatial overlap with NISA Maritime Usage Licence Area. Within the CESS. Possible temporal overlap.
Dump at Sea Permit 50015-03	Drogheda Port Company Dumping at Sea	Approved but not completed – Dumping at Sea Permit granted 11/02/21	

7. Screening Stage Cumulative Effects Assessment conclusion:

The projects outlined in the above table 8 have been identified in the CESS following a search undertaken on the 14th of February 2024.

Based on insufficient clarity on when projects will be carried out and using the precautionary principle the following projects are considered to have in-combination effects should there be temporary overlap with the proposed project:

- Mares Connect Electricity Interconnector Site Investigations
- Lir Offshore Array Ltd, ORE Site Investigations
- Statkraft North Irish Sea Array, ORE Site Investigations (Array Area)
- Statkraft North Irish Sea Array, ORE Site Investigations (Cable Route)
- SSE Renewables Braymore Point, ORE Site Investigations
- Cooley Point, ORE Site Investigations

- Clogher Head, ORE Site Investigations
- Meath County Council, Laytown Beach coastal protection works
- Microsoft Ireland Operations, subsea cable Site Investigations
- Drogheda Port Company, Maintenance Dredging

The following plans, related to the development of the maritime environment were also identified:

- The Climate Action Plan
- River Basin Management Plans (RBMP)
- Designated Maritime Area Plans (DMAPs)

These plans promote sustainable development in the maritime environment and particularly Ireland's Climate Action Plan's renewable electricity target of 80% of energy generated from renewable electricity sources by 2030.

Likely significant in-combination effects between this project and the above listed 10 projects and 3 plans on the conservation objectives of Natura 2000 sites considered in this report **cannot be excluded** at this stage.

4. Conclusion

4.1 Screening for Appropriate Assessment Conclusion

The qualifying interests of European sites which may experience likely significant effects as a result of the proposed project were identified using the Source-Pathway-Receptor approach.

Disturbance from underwater noise causing likely or possible significant effects could not be discounted for the following Special Areas of Conservation and Special Protection Areas:

- Rockabill to Dalkey SAC
- Lambay Island SAC
- River Boyne and River Blackwater SAC
- Slaney River Valley SAC
- Saltee Islands SAC
- Roaringwater Bay and Islands SAC
- Blasket Islands SAC
- North-west Irish Sea cSPA
- Skerries Islands SPA
- Lambay Island SPA
- The Maidens
- Pembrokeshire Marine/ Sir Benfro Forol SAC
- Llyn Peninsula and the Sarnau / Pen Llyn a`r Sar
- Cardigan Bay
- North Anglesey Marine / Gogledd Môn Forol
- West Wales Marine / Gorllewin Cymru Forol
- North Channel
- Bristol Channel Approaches / Dynesfeydd Môr Hafren
- Récifs et landes de la Hague
- Anse de Vauville
- Banc et récifs de Surtainville
- Chausey
- Baie du Mont Saint-Michel
- Estuaire de la Rance
- Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard
- Cap d'Erquy-Cap Fréhel
- Baie de Saint-Brieuc – Est
- Tregor Goëlo Est
- Côte de Granit rose-Sept-Iles
- Nord Bretagne DH
- Baie de Morlaix
- Abers - Côte des legends
- Ouessant-Molène
- Côtes de Crozon

Increased suspended sediment concentrations causing likely or possible significant effects could not be discounted for the following Special Area of Conservation:

- River Boyne and River Blackwater SAC

Visual and above water disturbance from inshore and intertidal surveys causing likely or possible significant effects could not be discounted for the following Special Protection Areas:

- North-west Irish Sea cSPA
- Rockabill SPA

Physical disturbance & Habitat loss inshore and intertidal surveys causing likely or possible significant effects could not be discounted for the following Special Protection Areas:

- North-west Irish Sea cSPA

It is concluded that likely or possible significant effects as a result of this projects, alone or in-combination with other plans and projects, on the conservation objectives of European sites cannot be excluded and therefore an Appropriate Assessment is required.

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6. Site Specific Conservation Objectives

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Rockabill to Dalkey SAC IE003000

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Boyne Coast and Estuary SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO001957.pdf

Lambay Island SAC 000204

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000204.pdf

Rogerstown Estuary SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000208.pdf

River Boyne and River Blackwater SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002299.pdf

Slaney River Valley SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000781.pdf

Saltee Islands SAC 000707

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000707.pdf

Roaringwater Bay and Islands SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO000101.pdf

Blasket Islands SAC

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002172.pdf

The Maidens

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North Anglesey Marine / Gogledd Môn Forol

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West Wales Marine / Gorllewin Cymru Forol

<https://data.jncc.gov.uk/data/029e40f3-5f67-4168-b10d-8730f2c40e0a/WWM-conservation-advice.pdf>

Lleyn Peninsula and the Sarnau / Pen Llyn a'r Sar SAC

<https://sac.jncc.gov.uk/site/UK0013117>

North Channel

<https://data.jncc.gov.uk/data/be0492aa-f1d6-4197-be22-e9a695227bdb/NorthChannel-conservationadvice.pdf>

Bristol Channel Approaches / Dynesfeydd Môr Hafren

<https://cdn.cyfoethnaturiol.cymru/media/679449/bristolchannelapproachesconservationobjectivesandadviceonactivities.pdf?mode=pad&rnd=13162576074000000>

Cardigan Bay SAC

<https://sac.jncc.gov.uk/site/UK0012712>

Pembrokeshire Marine/ Sir Benfro Forol SAC

<https://sac.jncc.gov.uk/site/UK001311>

North-west Irish Sea cSPA

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004236.pdf

Rockabill SPA

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004014.pdf

Skerries Islands SPA

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004122.pdf

Lambay Island SPA

https://www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO004069.pdf