

ATTACHMENT 4.3 NATURA IMPACT STATEMENT

Oriel Wind Farm Project

Oriel Windfarm Limited



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1.0 Introduction

1.1 Overview

The Oriel Wind Farm Project is a proposed offshore wind farm in the Irish Sea, off the coast of County Louth (approximately 22 km east of Dundalk town centre and 18 km east of Blackrock). The Project will have a maximum export capacity (MEC) of 375 MW and will consist of 25 offshore wind turbine generators (WTGs). The closest wind turbine will be approximately 6 km from the closest shore on the Cooley Peninsula. The offshore cable corridor extends approximately 11 km southwest from the offshore wind farm area to a landfall location south of Dunany Point. From the landfall, the underground onshore cable will connect the offshore wind farm to an onshore substation, located at Stickillin, east of Ardee, which will then connect to the existing National Electricity Grid at this point. The onshore cable route is approximately 20.1 km length and is predominantly routed along public roads. Oriel Windfarm Ltd (hereafter referred to as “the Applicant”) was granted a Maritime Area Consent (MAC) in December 2022 (Ref. MAC No. 2002-MAC 001).

This Maritime Usage Licence Application (MULA) is required to undertake site investigations (hereafter referred to as the SI works), within the MUL Area (defined as the Project planning application boundary below the high-water mark (HWM), plus a 4 km buffer around the array area) (See Figure 1-1). In May 2019, the Applicant obtained a Foreshore Licence (reference no. FS006840) for initial surveys in the offshore wind farm area and offshore cable corridor. Under this Foreshore Licence the Applicant undertook both intertidal and offshore surveys which informed the commencement of engineering design of the wind farm. The Applicant later obtained Foreshore Licence (reference no. FS007383) in May 2023 for further SI works in the offshore wind farm area and cable corridor. Under this foreshore Licence the Applicant undertook geotechnical, geophysical, ecological and metocean surveys in support of the overall Oriel Wind Farm Project. The Applicant now intends to undertake further site investigations of the offshore wind farm area and the export cable corridor to investigate the stability of the soil (seabed sediments) for the design of foundations and the detailed routeing of the inter array and export cables. These SI works, which are discussed in more detail in Section 2.0 below, are therefore required to support wind farm design.

Oriel Wind Farm Project

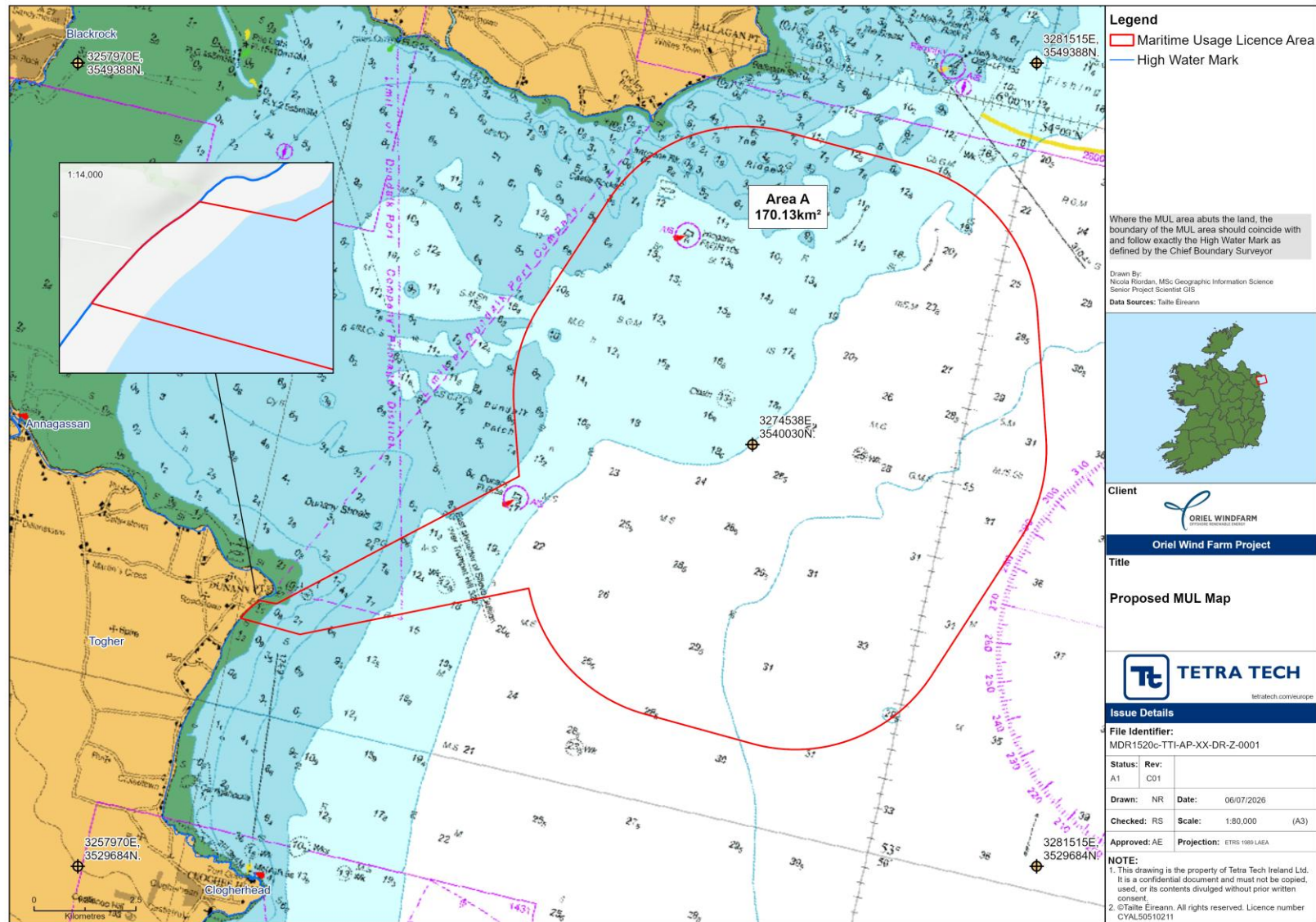


Figure 1-1 Proposed MUL Map

1.2 Purpose of this Report

This NIS has been prepared by Tetra Tech, on behalf of Oriel Windfarm Ltd, to provide an assessment of whether the SI works, alone or in combination with other plans or projects, is likely to have an adverse effect on the integrity of any European site(s) in view of best scientific knowledge and the Conservation Objectives of the site(s). This report provides all necessary information to the Maritime Area Regulatory Authority (MARA) to allow for their completion of a Stage 2 Appropriate Assessment.

1.3 Statement of Authority

The technical competence of the authors is outlined below.

Aoife Edgely is an Associate Marine Scientist in the Environmental Services Business Unit in Tetra Tech. She has over 15 years' experience in the marine science field and is a Chartered Environmentalist and a Full Member of the Institute of Environmental Sciences. Aoife holds an honours degree in Environmental Science from Trinity College Dublin and a Master's in Marine Environmental Protection from Bangor University, Wales. Aoife has delivered the environmental assessments for a wide range of marine and coastal projects, including environmental impact assessment, appropriate assessment and Annex IV species reports.

Rachael Shaw is a Project Scientist in the Environmental Services Business Unit in Tetra Tech. She holds a Bachelor's Degree in Marine Science from the University of Galway and Master's Degree in Climate Change and Managing the Marine Environment from Heriot-Watt University Edinburgh. She has five years' experience working in consultancy, assisting on a wide range of projects from offshore renewable energy projects to flood relief schemes, including marine and terrestrial surveys. She is a full member with Institute of Environmental Sciences (IES).

Róisín Murphy is a Scientist in the Environmental Services Business Unit in Tetra Tech. She holds an honours degree in Zoology (B.Sc.) and Master's degree in Marine Biology, both from University College Cork. She has two years' experience as a Project Manager at Cork Nature Network, responsible for marine and river surveys, and one years' experience in marine licensing and flood relief projects within Tetra Tech. She is a qualifying member with IES.

1.4 Legislation

1.4.1 European Legislation

Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (the Habitats Directive) provides protection for habitats and species of European importance; Council Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Wild Birds (codified version) (the Birds Directive) aims to protect all of the 500 wild bird species naturally occurring in the European Union (EU). Areas designated for protection under the Habitats Directive are described as Special Areas of Conservation (SAC) and those designated under the Birds Directive described as Special Protection Areas (SPA). These sites are known collectively as European sites within the Natura 2000 network (see Section 1.4.2.4). As each member of the EU is required to designate areas in their jurisdictions, the establishment of this Natura 2000 network of sites under Articles 3 to 9 of the Habitats Directive is the key measure to protect nature and biodiversity in the EU.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of European sites. Article 7 of the Habitats Directive extends the scope of its articles 6(3) and 6(4) to the Birds Directive.

Article 6(3) establishes the requirement for Appropriate Assessment (AA):

“Any plan or project not directly connected with or necessary to the management of the [Natura 2000] site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subjected to appropriate assessment of its implications for the site in view of the site’s conservation objectives. Considering 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 public.”

Further detail on the stages of AA is provided in Section 3.0 below.

In the context of the SI works to which this MULA relates, the Habitats and Birds Directives have been transposed into Irish Legislation under, amongst other things, the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended.

Each European site has assigned Conservation Objectives (COs) and a list of Qualifying Interests (QI) in the case of SACs or Special Conservation Interests (SCI) in the case of SPAs. The CO concept appears in the eighth recital of the Habitats Directive which reads: *“whereas it is appropriate, in each area designated, to implement the necessary measures having regard to the conservation objectives pursued”*. Article 1 then explains that *“conservation means a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status”*.

The National Parks and Wildlife Service (NPWS) has established COs for each European site in Ireland. These are published on their website. In the general introductory notes of their site-specific conservation objectives (SSCO) series publications, NPWS advise that an appropriate assessment based on their *“published conservation objectives will remain valid even if the CO targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out”*. NPWS advise that to assist in that regard, it is essential that the date and version are included when objectives are cited.

1.4.2 National Legislation

1.4.2.1 Maritime Area Planning Act

The Maritime Area Planning Act, 2021 (as amended) (the MAP Act) established MARA. One of the functions of MARA is to determine applications for the granting of licences to undertake any of the activities included in Schedule 7 of the MAP Act.

The following definitions in relation to Appropriate Assessment (AA) are included in Section 2(1) of the MAP Act:

“Screening for appropriate assessment” shall be construed in accordance with, as appropriate—

- (a) section 177U of the Act of 2000, or*
- (b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)*

“appropriate assessment” shall be construed in accordance with, as appropriate—

- (a) section 177V of the Act of 2000, or*
- (b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011);*

where the Act of 2000 refers to the Planning and Development Act 2000 (as amended).

Under Section 112 of the MAP Act, MARA has been designated as a competent authority for the purposes of Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011); and appropriate assessments to which that Part applies.

MARA is required to carry out a screening for Appropriate Assessment (AA) in accordance with Section 117(4)(a) of the MAP Act.

Where MARA determines that an AA is required it shall carry out the AA in accordance with Section 117(7)(a) of the MAP Act.

1.4.2.2 Screening Out for AA

Under Regulation 42(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the competent authority, in this case MARA, shall determine that an AA of a project is not required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it can be excluded on the basis of objective scientific information following screening that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

1.4.2.3 Screening In for AA

Under Regulation 42(6) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the competent authority shall determine that an AA of a plan or project is required where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site. Under Section 117(4) of the MAP Act the MARA shall, as soon as is practicable after it receives a MUL application and if it considers it necessary to do so in its capacity as the competent authority, carry out screening for Appropriate Assessment in respect of the proposed maritime usage the subject of the application.

Where the competent authority determines that an AA is required, they shall make a determination under Article 6(3) of the Habitats Directive as to whether or not the proposed development would adversely affect the integrity of a European site and an Appropriate Assessment shall be carried out by the competent authority before consent is given for the proposed development - see Regulation 42(11) European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

1.4.2.4 European Sites and Natura 2000 Sites

The term European site is defined in the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) as:

“European Site” means—

- (a) a candidate site of Community importance,*
- (b) a site of Community importance,*
- (c) a candidate special area of conservation,*
- (d) a special area of conservation,*
- (e) a candidate special protection area, or*
- (f) a special protection area.*

The term Natura 2000 is defined in the same Regulations as:

“Natura 2000” means the European network of special areas of conservation under the Habitats Directive and special protection areas under the Birds Directive, provided for by Article 3(1) of the Habitats Directive and, for the purposes of these Regulations, includes European Sites.

As such, and as adopted in this report, the term European site refers to one of the sites comprising the Natura 2000 network.

2.0 Proposed Maritime Usage

2.1.1 Overview

The proposed SI works are detailed in Table 2-1 below. The purpose of these SI works is to provide a reliable basis for detailed design of the Project. The aim of the SI works is to acquire data to a high quality and specification for the site as summarised below and described in the following sections.

The Applicant is seeking a MUL for a period of five years from the date of the granting of the licence.

The proposed SI works will build on the existing detailed knowledge of the site which was gained under previous SI works under foreshore licences (FS006840, awarded 10th May 2019 for two years and FS007383, awarded 17th May 2023 for three years). The proposed activities within the MUL Area are planned to take place across phases. Geophysical and geotechnical surveys and investigations will be sequential with the results of the geophysical campaign and previous geophysical data used to inform the geotechnical campaign. The remaining surveys and investigations (e.g., environmental, metocean etc.) can take place at any time during the operational period of the MUL.

It should be noted that the geophysical and geotechnical campaigns may be further sub-divided depending on the availability of suitable vessels and equipment and the location of the surveys, e.g. intertidal, nearshore and offshore areas. Therefore, geophysical and geotechnical investigations in some areas may be completed in advance of geophysical and geotechnical activities in other areas.

Environmental surveys will be undertaken within the MUL Area to provide further information on the baseline conditions. Depending on the specific requirements of these surveys and logistics, they may be undertaken simultaneously with and/or independently from the geophysical and geotechnical campaigns.

Proposed SI locations are provided in Appendix A. These proposed locations are subject to refinement based on the results of the geophysical and environmental surveys, informed by previous and current survey campaigns, e.g. avoidance of a potentially sensitive habitat. Similarly, a location may be moved due to the presence of obstructions/refusals at individual locations, i.e. where a physical object, e.g. a subsurface boulder, prevents the borehole, CPT, etc., from reaching its target depth. In such circumstances, the borehole will be moved to another nearby location away from the obstruction and drilled again to the target depth.

Following the assessment of the results of the SI works, it may be necessary to undertake further SI works in particular areas within the MUL Area, e.g., along routes for the export cable corridor and approaches to the landfall. The proposed SI works, including the quantities detailed and assessed in this MULA, include contingencies to cover any follow up investigations that may be undertaken at refined locations.

An overview of SI works is presented below in Table 2-1, followed by a more detailed breakdown of the proposed survey elements.

Table 2-1 Overview of Proposed SI Activities

Survey Type	Survey Elements (indicative equipment)	Indicative Equipment (where applicable)	Maximum Quantity (where relevant)
Marine Geophysical Surveys (undertaken from survey vessel)	Multi beam echosounder (MBES)	Kongsberg EM series, Kongsberg Geoswath series, R2 Sonic series & Reson Teledyne Seabat series	N/A
	Side scan sonar (SSS)	Edgetech FS-4200 series, C- Max CM2 series and Klein System 3900-5000	

Survey Type	Survey Elements (indicative equipment)	Indicative Equipment (where applicable)	Maximum Quantity (where relevant)
	Sub-bottom profiler (SBP) - parametric	Innomar smart, quattro (QBM) sixpack (HBM), Innomar SES 2000 compact light, Innomar standard quattro (DBM) sixpack (DBM), Innomar medium 100	
	SBP – Chirper/Pinger	Kongsberg Geopulse, Edgetech 424/512, Knudsen 3202, Klein K-Chirp	
	2D/3D Ultra-high-resolution seismic (UHRS)	Suitable Sparker / Boomer up to 1000 joules.	
	Magnetometer	G-882 Marine Magnetometer	
	Ultra short baseline (USBL) positioning system	Edgetech BATS, ORE offshore trackpoint, Sonardyne Fusion/Ranger/Scout, IxBlue GAPS, Kongberg HiPAP	
Intertidal Geophysical (land-based below HWM)	Seismic Refraction	Geophone Arrays: – Geosense 4.5 Hz Geophones; – Mark Products L-28LB Geophone; – Geospace GS-11D Geophone; or similar Digital Seismographs – Geometrics Geode Seismograph, – Seistronix RAS-24. – ABEM Terraloc Pro; or similar	N/A
	Ground Penetrating Radar (GPR)	IDS GeoRadar Stream DP GPR System Leica DS2000 GPR System; or similar.	
Marine Geotechnical Surveys (undertaken from survey vessel(s)/jack-up barge (JUB))	Vibrocore/gravity coring	Drill rig and JUB/drilling vessel	41
	Rotary core boreholes	Geobor-S	78
	Cone penetration testing (CPT) and standard penetration testing (SPT) at borehole locations	Push sampler/rotary core, hammer sampler	60
Intertidal Geotechnical surveys (land-based below HWM)	Trial pit/borehole	Bobcat, backhoe or excavator Drill rig and JUB / drilling vessel	6 boreholes (max. depth 10m) 12 trial pits (max. depth 5m, 2m ² in plan)

Survey Type	Survey Elements (indicative equipment)	Indicative Equipment (where applicable)	Maximum Quantity (where relevant)
Environmental Surveys (undertaken from survey vessel(s))	Marine mammal static acoustic monitoring (SAM)	CPODs/FPODs (incl. heavy weight mooring blocks of c. 250kg, clump chain and rope with either an acoustic release mechanism and benthic buoy or a robust mooring with a surface marker buoy).	12
	Water quality samples	Sondes (incl. surface or seabed buoy) Niskin bottle	12
	Grab sampling	Mini Hammond grab or Van Veen grab (0.1m ²)	60
	Fish and shellfish surveys	Sondes (incl. surface or seabed buoy) Potting and trawl survey	6 12 locations
Intertidal Environmental Surveys	Quadrat and dig over surveys	Refer to section 2.1.7.3	12
Metocean Survey (deployed by vessel and moored to seabed)	Metocean buoy	Refer to section 2.1.8.1	1 (for 12-month period)
	Acoustic doppler current profiler (ADCP)	Refer to section 2.1.8.2	8

2.1.2 Estimated Project Schedule/ Programme

The Applicant proposes a SI works schedule that will be phased over a five-year period. The intention is to begin the SI works as soon as feasible following license award with a phased programme of investigations, capitalising on suitable weather windows and vessel availability over this time period. This phased approach will progress the overall development towards detailed design stage. The exact survey schedule is dependent on the availability of the supply chain and therefore exact timelines for the surveys cannot be determined in advance of securing a MUL.

The exact dates for the surveys are to be determined pending the appointment of survey contractors but based on the estimated scope of works to be conducted the likely timeframe for each project phase has been estimated in Table 2-2 below. Contingencies have been built into the quantities to allow for future SI works within the MUL five-year period as more information becomes available. The estimated timeframes are subject to change based on variables such as weather conditions, unforeseen seabed conditions, unforeseen obstructions, vessel availability etc.

Geophysical site-specific surveys were conducted for the Oriel Wind Farm Project in 2019 and 2022 and information is available to inform geotechnical investigations. Geophysical surveys are also proposed under this MUL.

Mobilisation location will be dependent on the survey contractor, who may choose to mobilise from their home port, port of previous job or local port. The local port options for mobilisation, for example, could include Dundalk Port or Dublin Port depending on vessel size and marine traffic restrictions.

The SI survey works will be carried out on a 24-hour and 7 days per week basis, subject to sea state and tidal conditions, except for environmental surveys, which are expected to take place during daylight hours.

Table 2-2 Estimated Project Schedule

	Year 1 (2027)				Year 2 (2028)				Year 3 (2029)				Year 4 (2030)				Year 5 (2031)			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Geotechnical (Marine and Intertidal)																				
Geophysical (Marine and Intertidal)																				
Marine and Intertidal Environmental Surveys																				
Metoccean																				

2.1.3 Marine Geophysical Survey

The purpose of the geophysical survey is to characterise the seabed and sub-surface geology and geotechnical parameters within the survey area in order to supplement the information gathered in the 2019 and 2022 site-specific geophysical surveys and previous INFOMAR surveys of the site. This additional data will be used to better understand the surface and sub-surface structure and stratigraphy, including seabed sedimentation, morphology and mobility and sub-surface stratigraphy and geohazards. This will support the wind farm design, inter-array and offshore cable corridor and determine the design and installation methodology.

The objectives of the geophysical survey are to:

- Produce detailed bathymetric mapping;
- Obtain detailed seabed features, morphology and sediment;
- Obtain detailed sub-surface structure and stratigraphy;
- Acquire both shallow and deep geological cross-sections of the wind farm site; and
- Support cable design and installation including cable routing.

The geophysical survey will include bathymetric, side scan sonar, magnetometry and seismic sounding of the proposed site. Details of the exact survey equipment will be made available prior to commencement of the works; however, it is envisaged that the geophysical data acquisition will involve the following acoustic-based techniques:

- Multi beam echosounder (MBES) system for detailed bathymetric mapping;
- Side scan sonar (SSS) for detailed seabed sediment and morphological mapping;
- Magnetometer for detecting geomorphological anomalies and ferrous objects;
- Sub-bottom profiling (SBP), both single and multi-sourcings, to identify and characterise the layers of sediment/rock underneath the seafloor along the cable route corridors;

- Ultra-high-resolution seismic (UHRS) to identify and characterise the layers of sediment/rock underneath the seafloor within the windfarm site; and
- Intertidal geophysical surveys including seismic, electrical resistivity and electromagnetic methods.

An ultra-short baseline (USBL) positioning system will be utilised where required to monitor the position of towed equipment. The USBL system consists of a multi-element transducer mounted on the hull of the vessel and a transponder attached to the towed equipment (e.g. side-scan sonar). Triangulation is achieved using acoustic signals transmitted and detected at regular intervals from which bearing, depth and distance can be calculated. The USBL is coincident with towfish surveys (e.g. SSS, magnetometer).

USBL equipment is widely used by offshore commercial and research vessels where positional accuracy of towed survey equipment is critical. The emitted pulses will be short pulse width 'pings', approximately in the range of 20-35kHz and with a source level of up to ~200dB re 1µPa @1m (peak).

The geophysical survey will comprise transects with a total length of circa 84 km and a line spacing distance from tens of metres up to 1km between each transect. The seismic source will detect the geological strata to a depth of 40 m below the seabed (bsb).

A suitably qualified archaeologist will review the geophysical survey outputs for anomalies. The findings will be compiled and presented in an archaeological assessment report. Where deemed necessary by the project archaeologist and as agreed with the National Monuments Service (NMS), an archaeologist/ geoarchaeologist may be required to be present during geotechnical investigations to take samples for archaeological inspection. Samples will be removed from the investigation location, properly stored and transported from site for more detailed assessment and appraisal.

2.1.3.1 Multibeam Echosounder Survey

The MBES system will be used to provide detailed bathymetric mapping throughout the survey area. An MBES is a type of sonar (acoustic surveying) used in seabed mapping wherein acoustic waves are used to indicate depth-to-seabed. The device is typically affixed to a vessel's hull or towed in its wake. The process is non-intrusive, and the device will not make contact with the seabed at any point. The Norbit Winghead B51S is an indicative example of a MBES system to be used in the completion of these works. The equipment will operate at a nominal frequency of 400kHz.

2.1.3.2 Side-Scan Sonar Survey

The side scan sonar will be used to achieve detailed seabed morphology and seafloor mapping of the survey area. The survey is carried out using a sonar device attached to a vessel that emits fan-shaped pulses down towards the sea floor across a wide-angle perpendicular to the path of the sensor through the water. The intensity of the acoustic reflections from the seafloor of this fan shaped beam is recorded in a series of cross-track slices.

When stitched together along the direction of motion, these slices form an image of the sea bottom within the swath (coverage width) of the beam. The equipment will operate within a frequency range of 100-500kHz with source levels at 235dB Lpk re 1µPa at 1 metre range. The Edgetech FS-4200 series, Klein System 3900 or similar is an indicative example.

2.1.3.3 Magnetometer Survey

A magnetometer detects ferrous objects and as such is used to locate and identify ferrous objects on or buried in the seabed within the range of the magnetometer. The device precisely measures the earth's magnetic field and detects any anomalies, which represent ferrous objects such as lost anchors, sunken ships and buried pipes. The magnetometer is typically towed behind a survey vessel or affixed to a vessel's hull. The process is non-intrusive, and the device will not make any physical contact with the seabed at any point. The G-882 Marine Magnetometer is an indicative example.

2.1.3.4 Sub-Bottom Profiling Survey

This device uses reflection seismology to give a 2D image of the sub-seabed geology. It is typically towed behind the vessel during survey works or affixed to the vessel's hull. The process is non-intrusive, and the device will not make any physical contact with the seabed at any point.

The Innomar SES-2000 Quattro Parametric SBP is an indicative example of a parametric type SBP while a Kongsberg Geopulse or Edgetech 424 is an indicative example of a chirper/pinger type SBP. The shallow SBP system will be used within the cable route corridor and will have the following general specifications:

- A vertical resolution better than 0.2 metres; and
- Penetration of at least 5 metres.

The profiler will be supplied with the following recorders and peripheral processing equipment:

- Fire control unit;
- Time varied gain;
- Swell filter; and
- Bandpass or Time Varying Filters (TVF).

2.1.3.5 Ultra-high Resolution Seismic (UHRs)

Commonly used variants of this technology are known as "Sparkers" and "Boomers". It will have the following characteristics as a minimum:

- Repeatable source;
- Main output at frequencies between 1kHz and 5kHz;
- Broadband width in excess of 2.5kHz at -10dB;
- Vertical resolution better than 0.5 metres;
- Penetration of at least 50 metres; and
- Variable energy levels 100-1000 joules;

One or more hydrophone streamers will be supplied. The streamer should be neutrally buoyant or controlled, well maintained and free of air bubbles. The hydrophone will have a response appropriate to the source used but will generally have a flat response between 500Hz and 10kHz. The streamer will have at least 100 channels and be at least 100m long. A tail buoy with a radar reflector will be used to mark the streamer.

The survey may be conducted in either a 2D (single streamer) or 3D (dual streamer) format.

2.1.4 Intertidal Geophysical Survey

Conventional land-based geophysical surveys will be undertaken below the HWM. These surveys will include seismic refraction and ground penetrating radar (GPR). Those elements of the land-based survey that occur within the MUL Area are activities included in this MULA. This MULA is not seeking a licence for any land-based works which will take place outside of the maritime area.

Where required, prior to intrusive surveys in the intertidal zone, a suitably qualified archaeologist will undertake a walkover inspection of the intertidal area at low tide, during daylight hours. The inspection will include the use of handheld metal-detectors, photographic survey and drone survey, where applicable. Investigations involving handheld metal-detectors will include a series of transects at 10 m intervals across the accessible intertidal area. Where deemed necessary by the project archaeologist, and as agreed through consultation with the National Monuments Service, an archaeologist/ geoarchaeologist may be required to be present at the location of geotechnical investigations, to take samples for archaeological inspection. Samples may be removed from the investigation location, properly stored and transported from site for more detailed assessment and appraisal.

2.1.4.1 Seismic Refraction

The seismic refraction method utilises the refraction of seismic waves as they pass through various rock or soil layers to analyse underground geological conditions and structures.

Seismic refraction profiles will be conducted using onshore survey tools during low tide in the intertidal zone. A sound source (typically a sledgehammer striking a metal plate) will generate compressional wave energy. These refracted waves will be captured by a series of geophones and logged on a digital seismograph. The locations and elevations of the geophones will be documented using GPS technology.

Indicative Equipment:

- Geophone Arrays:
 - Geosense 4.5 Hz Geophones;
 - Mark Products L-28LB Geophone;
 - Geospace GS-11D Geophone; or similar.
- Digital Seismographs:
 - Geometrics Geode Seismograph,
 - Seistronix RAS-24;
 - ABEM Terraloc Pro; or similar.

2.1.4.2 Ground Penetrating Radar

GPR utilises the reflection of electromagnetic waves as they are returned by rock or soil layers to analyse underground geological conditions and structures.

GPR will be completed during low tide in the intertidal zone. A GPR trolley will be pushed over the area to be scanned and the results analysed by a technician to determine subsurface characteristics. Indicative equipment such as the IDS GeoRadar Stream DP GPR System, Leica DS2000 GPR System or similar will be utilised.

2.1.5 Marine Geotechnical Surveys

The purpose of the geotechnical survey is to provide relevant information about the stability of the soil to a depth below which possible existence of weak formations will not influence the safety or performance of the wind turbine and its support structure.

The geotechnical survey will include 26 no. deep investigation locations (boreholes) and 41 no. shallow investigation locations (vibrocores).

2.1.5.1 Rotary Core Boreholes

Deep investigations will be carried out at 26 proposed structure locations (25 wind turbine locations and one offshore substation location). Each deep investigation location may require up to 3 drilled boreholes with a target depth of 40 m below the seabed. Thus, up to 78 geotechnical boreholes may be drilled. See Appendix A for proposed borehole location.

The equipment used to drill the boreholes will follow the ISO and API technical specifications for drilling equipment and at a minimum will have:

- A heave motion compensator system on board (seabed frame and/or drill string) with a minimum heave compensation of 1.5m;
- Capability of mud production to different densities (when mud production is required for the works). The mud shall be water or bio-degradable organic polymer.

A detailed description of the soil types, and the in situ geotechnical properties determined for the boreholes will be recorded in the boring log to characterise the strata.

Coring and sampling will be done in general accordance with EN ISO22475-1 Geotechnical Investigation and Testing. Rotary coring equipment, such as Geobor-S is expected to be utilised.

In situ testing will include the option of either down-hole wireline piezocone penetration testing (PCPT) associated to PS logging or down-hole wireline seismic cone penetration testing (SCPT) over full length of borehole.

The boreholes are to be advanced by alternating PCPT/SCPT and push/core sampling; requirements will depend on the material type encountered. Within a granular deposit, the boreholes are to be advanced by alternating PCPT/SCPT and push sample. Where the sample recovery is poor using the push sampler, a hammer sampler will be used instead. Blow counts measured during hammer sampling will be recorded and presented on the Borehole Logs.

Within the cohesive deposits, the boreholes are to be advanced by PCPT/SCPT followed by two push samples (repeat cycle). Rotary coring may be used instead of push sampling in suitable materials, in which case the CPT and cores will be alternated.

The samples/cores will be recovered in liners or in Shelby tubes for all soil types and the appropriate technique should be selected to minimise soil disturbance and maximize recovery.

SCPT tests will be executed at a minimum of four of the locations, which will be confirmed in consultation with geophysical survey results. Two seismic measurements will be carried out during each SCPT stroke at a depth interval of 1m; the envisaged volume is 40-60 SCPT tests in total.

2.1.5.2 Standard Penetration Tests (SPTs)

SI works will include Standard Penetration Tests (SPTs) using a 50mm split spoon sampler and occasional jacking operations to deploy, stabilise, or demobilise the drill barge and associated equipment. Both SPTs and jacking of barge piles generate noise and low-frequency vibration including hammer impacts during SPTs and hydraulic jacking or driving systems used to set or adjust the position of the JUB.

2.1.5.3 Vibrocore/ Gravity Core Investigations

The inter-array cable routes and offshore cable corridor will be surveyed with up to 41 vibrocores/gravity cores within the inter-array area and offshore cable corridor. The cores will be carried out along the line of the cable routes, which are still to be defined. See Appendix A for proposed vibrocore/gravity core locations.

Vibrocoreing will be performed where cohesionless soil is expected. The rig will be fitted with a PVC liner, core catcher and cutting shoe. The vibrocorer will be lowered onto the seabed, position and depth will be noted, after which the vibrocoreing process will start. Upon refusal or at the target depth, the stop condition will be recorded and the vibrocorer will be recovered on deck where the recovery rate will be measured. If required, a core catcher will be used to prevent the sample dropping out of the PVC liner.

All cores will be examined and tested offshore before any sealing of the sample. Soil found in the vibrocoreing shoe will be stored in a bag.

Gravity coring (wireline self-weight penetration sampler) will be performed where cohesive soil is expected. The rig will be equipped with a PVC liner. The gravity corer will be lowered on the seabed and penetrates in the seabed under its own weight. Upon refusal or at target depth, the gravity core will be recovered on deck where the recovery rate will be measured.

All cores will be examined and tested offshore before any sealing of samples.

2.1.6 Intertidal Geotechnical Survey

2.1.6.1 Trial Pit/ Borehole Investigations

Trial pits will be excavated across intertidal locations (below the HWM) along the proposed offshore cable corridor. Trial pits will be excavated, logged, backfilled and reinstated during a single tidal cycle. Excavated material will be temporarily stored and replaced following the sequence in which it was removed. Subject to access and anticipated ground conditions, trial pits will be excavated manually or using a mechanical backhoe. Existing land access routes to investigation locations will be used to the extent practicable.

Up to 12 no. trial pit investigation locations are proposed in the intertidal area. Trial pits will be excavated to a depth of up to 5 m and will be 2 m² in plan. Up to 6 boreholes will be drilled in the intertidal area using a drilling rig with a target depth of up to 10m. All excavated locations to be backfilled immediately on completion of the investigation. Cores and CPTs may be taken from the boreholes or trial pits.

2.1.7 Environmental Surveys

The purpose of the environmental surveys is to update the baseline data collected from earlier environmental surveys and to ensure that the environmental data for the Project remains up to date. The proposed surveys are set out in the following sections.

2.1.7.1 CPODs

It is proposed to deploy up to twelve (12) FPOD or CPOD devices for static acoustic monitoring (SAM) of cetaceans. The devices will provide acoustic assessment of the presence/absence and species types of cetaceans (whales and dolphins) to i) allow for the recording of species difficult to detect visually such as harbour porpoise, ii) provide data on other factors such as diel and tidal presence at the site and iii) to create a dataset with which to determine any effects of future construction or operation of a windfarm at a resolution which is relevant to managers.

A FPOD or CPOD is a self-contained computer and hydrophone in a sealed sonde approximately 1m in length. The FPOD or CPOD can log the times and duration of click trains which resemble the echo-location clicks produced by porpoises and dolphins. SAM is independent of weather conditions once deployed and thus ensures high quality data is collected. Data collection will be at a small spatial scale (typical detection distances of 250m (porpoises) to 800m (dolphins)). Each FPOD or CPOD will have a robust, heavy weight mooring blocks of c. 250kg, clump chain and rope with either an acoustic release mechanism and benthic buoy or a robust mooring with a surface marker buoy. Batteries will be replaced and data downloaded every 3/4 months. Deployment and servicing will be undertaken from a survey vessel.

2.1.7.2 Water Quality Sampling and Monitoring

It is proposed to sample water quality at different depths and locations throughout the offshore wind farm area. A Niskin bottle (or similar) will be used to obtain a sufficient sample of water at the surface (< 1m depth) and a second sample just above the seabed (~1m) for the subsequent chemical analysis. This will be lowered and retrieved from a survey vessel.

It is proposed to deploy up to 12 sondes for water quality monitoring through the water column – these will be used to monitor a range of parameters including turbidity, salinity, temperature, pH, dissolved oxygen and electrical conductivity. Sondes will be either suspended from a surface marker buoy or a benthic buoy with acoustic release at a range of depths dependent on survey requirements. Each buoy will have a robust mooring on the seabed similar to the CPOD mooring described above.

2.1.7.3 Subtidal and Intertidal Sampling

Subtidal surveys will comprise drop down video (DDV) and/or remote operated vehicle (ROV) inspection and the taking of grab samples as required in order to identify benthic habitats and sediment characteristics. DDV/ROV activity will be passive and non-intrusive and will not interact with the seabed.

At locations determined suitable for grab sampling effort by the DDV analysis or geophysical data review, a 0.1 m² Day grab, mini-Hamon or Van Veen grab will be deployed from a suitable vessel to collect sediment

samples. Each sample will be 1-5kg in mass. Up to 60 grab samples will be collected within the offshore wind farm area and along the offshore cable corridor.

A walkover transect survey will be undertaken. Quadrat sampling and manual digging will be undertaken by hand at 12 locations in the intertidal zone to collect sediment samples. Samples will be analysed to determine the benthic faunal community present and sediment geochemistry.

2.1.7.4 Fish and Shellfish Surveys

Up to 6 sondes will be deployed for the tracking of fish or shellfish within the wind farm and export cable corridor. Similar to the CPODs and water quality sondes, these sondes for the tracking of fish or shellfish will be attached to a robust mooring with either a benthic buoy and acoustic release and/or a surface marker buoy.

A potting survey and trawl survey will be conducted. Surveys will be designed to undertake investigative sampling. Indicatively it may include twelve locations for potting and trawl surveys within the proposed offshore wind farm area and/or along the proposed offshore cable corridor. The surveys may be conducted over several weeks.

2.1.8 Metocean Survey

The purpose of the metocean survey is to obtain site specific atmospheric, wave and wind data over a minimum period of 12 months. All metocean survey works will occur at one location within the marine survey area. The location will be determined following the appointment of a contractor.

2.1.8.1 Floating LiDAR

The data will be collected via a floating weather station, which will include a wave rider and a wind measurement LiDAR current profiler. The wave rider will be used to collect wave height and current data across the site, while the LiDAR system will be used to measure the wind characteristics within the site. This equipment will be mounted on specifically designed floating buoys which are moored to the seabed using an anchor chain and clump weights. All equipment including the moorings will be removed following completion of the survey.

2.1.8.2 Acoustic Doppler Current Profilers

Up to eight Acoustic Doppler Current Profilers (ADCPs) will be moored to the seabed using an anchor chain and clump weights at varying heights above the seabed. These will be periodically recovered by either acoustic release systems or surface buoys. All equipment including the moorings will be removed following completion of the survey.

An ADCP 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. ADCP units containing both wave and current sensors, and turbidity and total suspended solids sensors will be deployed for no less than one continuous year with a maximum deployment period of up to 36 months at each location (servicing is anticipated every 12 weeks in order to replace ADCP batteries).

2.1.9 Survey Vessels

The proposed marine survey works will be carried out by dedicated marine vessels, suitable for the scope of the work required, the water depth and the anticipated conditions of the survey area and the transit routes. The exact equipment to be used will be confirmed following a tender process to procure the site investigation contractor.

Separate survey vessels will be used for each activity and are outlined in the following sections. A larger vessel or jack-up barge (JUB) will be required to complete the offshore geotechnical works with smaller vessels for the geophysical, metocean and ecological surveys. A smaller Rigid Hulled Inflatable Boat (RHIB) type vessel may be used for works in shallow waters. Unmanned survey vessels (USVs) may be used for

geophysical surveys across the site. USVs will be fully licenced to operate in Irish waters. Up to three vessels may be required to operate concurrently in the MUL area under coordinated simultaneous operations (SIMOPS). This will allow for flexibility to conduct proposed geotechnical and geophysical works within the MUL Area to ensure that the Applicant can act on available weather windows and sub-contractor availability. Land based drilling and excavators will be used for the investigations and surveys within the intertidal zone. The types of vessels proposed to be employed are described in the sections below.

These vessels will be comparable and of a similar size to those typically used in the industry for carrying out similar technical work and will possess all relevant classification certificates.

The vessels will conform to the following minimum requirements as appropriate:

1. Station-keeping and sea keeping capabilities required by the specified work at the proposed time of year; the appointed contractor may provide supplemental tug assistance if such assistance benefits the operation;
2. Endurance (e.g. fuel, water, stores, etc.) to undertake the required survey works;
3. Staffing to allow all planned work to be carried out as a continuous operation (on a 24 hour per day basis for the offshore activities and on a 12 hour per day basis for the inshore activities);
4. Equipment and spares with necessary tools for all specified works;
5. Appropriate accommodation and messing facilities on board; and
6. Adequate soil laboratory testing facility, as required.

The vessels used for the offshore surveys will be sound and capable of remaining safely at sea for a minimum of 30 days under weather conditions typically encountered in the MUL Area at the time of year that the operations are to take place. The appointed contractor will be responsible for all shipboard systems and equipment calibration and re-calibration, including spares. For every 30 days of operations the vessels will accrue at least one day of maintenance time.

Vessels will have breadth and draft of suitable proportions to provide adequate stability for the duration of the intended operation. The vessels will be capable of passage speeds in excess of 10 knots and extended survey operations at speeds 4 knots or less.

In addition to AIS-A and Active Radar Enhancing Systems, the manned vessels will have the following communications equipment as a minimum:

- Multi-channel VHF and HF radio capable of working at all marine frequencies and with a dual watch facility;
- Mobile phone;
- Hand-held radios;
- Frame and winch for the deployment of equipment and sensors, sized for the required equipment/sensors loads and pulling force. The winch speed and size must be compatible with planned surveys;
- Gyro-compass;
- SATCOM (satellite communication) facilities (phone/fax and e-mail); and
- Two independent Differential Global Positioning Systems (DGPS), a primary and secondary system (DGPS has a greater degree of accuracy than GPS).

All drilling survey vessels and marine support vessels will conform to the relevant ISO (International Organization for Standardization) and API (American Petroleum Institute) technical specifications for drilling equipment.

2.1.9.1 Offshore Vessels

The survey vessels used for offshore works will be either a JUB and/or a Dynamic Positioning (DP) vessel configuration.

JUBs utilise a fixed anchoring system in order to maintain the required position within the site. The vessel consists of a self-elevating platform and several “legs”, which are deployed to the ocean floor mooring the vessel in place.

The survey works are carried out from the self-elevating platform, which is raised above the water’s surface. If used, the jack-up barge will meet with the following minimum requirements:

- The vessel will have at least four mooring points;
- The self-elevating platform must be permanently manned (i.e. off-shift personnel to stay onboard even if the accommodation is not a permanent equipment of the JUB);
- The platform must be provided with a class certificate verifying the provision of adequate safety equipment for the type of vessel and the number of on-board personnel; and

The platform should be certified in compliance with the MODU Code and the BWEA guideline.

DP vessels maintain station through thruster and propeller systems which use satellite DGPS signals, allowing the vessels to be positioned over any point on the seabed and maintain position without employing a fixed anchoring system. Using thrusters or propellers, a DP vessel can maintain position within a 2m to 0.5m window depending on the sea state/weather conditions and available power. The vessel may also transit under DP control along a given pre-determined path.

If used, a DP vessel will meet the following minimum requirements:

- The vessel must be fully equipped with a Class II DP system as a minimum; and
- Two DP certified operators with the necessary experience must be members of the crew.

The offshore works will be carried out on a 24-hour shift basis, with personnel working two 12-hour shifts. This will allow the works to be continuous. If the survey works are delayed through weather constraints or other matters, then a second vessel may be used to ensure that the works are completed within the required time period. Full assessment of all SIMOPS will be carried out if a second vessel is used.

2.1.9.2 Nearshore Vessel

The smaller, nearshore vessel e.g., rib, will be used in locations where the water depth is too shallow for the larger, offshore vessel to carry out the works. This vessel does not need to have a dynamic positioning system, however, must have full DGPS capability. The vessel is usually held on station by joy-stick control and will deploy an anchor to assist in maintaining station (depending on sea state and weather conditions). The smaller vessel will use similar equipment to the larger vessel to carry out the required survey works.

2.1.9.3 Unmanned Survey Vessels

An unmanned surface vessel (USV) may be used. The vessel would not carry any surveyors on board and would be controlled from the land. The USV would be escorted out to the survey area with a manned vessel and a pre-watch MMO survey completed prior to commencement of the survey.

2.1.9.4 Survey Navigation

All navigation equipment and instrumentation will be calibrated and used correctly. Calibration and/or verification will be repeated in the event of any equipment malfunction, which may nullify earlier calibrations and/or verifications.

Qualified surveyors will be used to operate the navigation and positioning equipment continuously throughout the survey while maintaining a continuous log of all navigation activities throughout the survey.

Sufficient survey and positioning spares and consumables will be provided to enable the survey to be completed without any degradation of navigation and positioning quality and effectiveness and without the need to return to port to acquire additional equipment.

2.1.10 General Requirements

2.1.10.1 Quality Assurance

The marine survey Contractor will:

- Operate Quality and Environmental Management Systems (EMS) based on and conforming to ISO9001:2008;
- Provide a Quality Management Plan (QMP) to Oriel for all the marine operations; and
- Provide operational procedures to Oriel for all the marine operations.

2.1.10.2 Operating Permits

The marine survey Contractor will obtain and comply with all necessary marine operational permits including routine and customary vessel/crew/equipment clearances from Customs Agencies, Port Authorities, Marine Survey Office (MSO), etc.

2.1.10.3 Health and Safety

Health, Safety and Environmental protection will be given foremost consideration in the execution of the work and will be promoted in a proactive and highly visible manner throughout the workforce. The marine survey Contractor will operate International Safety Management (ISM) and Health Environmental and Safety (HES) systems based on legislation relevant to the proposed activities. The marine survey Contractor will have an overall Health, Safety, Security and Environmental (HSSE) plan for each stage of all marine operations. The plan will cover all parties and operations.

The Applicant's Health and Safety Protocols will be followed by both survey and ship's crew. Care will be taken to maintain contact with fishing vessels operating within the area of operations. The Applicant will not knowingly damage or interfere with the property of any fishers while carrying out SI activities. The contractor will ensure notifications of the intended work and timelines are posted in the relevant press well ahead of schedule and a fisheries liaison officer (FLO) will be employed.

All vessels will operate under a certificated Safety Management System (SMS) that provides policies, procedures, and a framework for continuous improvement to ensure the safety of personnel onboard.

2.1.10.4 PSDP/ PSCS

The appointed contractor will designate a competent Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) under the relevant legislation. Method Statements and Risk Assessments will be prepared prior to any works commencing.

2.1.10.5 Environmental Protocols

The Applicant will implement a number of general environmental protocols to address potential environmental impacts during the survey works.

Environmental factors will be taken into account in all decisions during the survey campaign. Environmental efforts will be preventative and where required as a condition of permitting, the Contractor shall form and comply with the obligations of an appropriate Environmental Management Plan (EMP) and those conditions of the MUL relating to environmental protection, if granted.

All vessels will comply with the latest International Maritime Organization (IMO) and Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in. All vessels will be operated and comply with the

requirements of the Marine Co-ordination Management System operated by the Applicant for all its offshore wind farm project sites. This system includes the vetting and tracking of all vessels and personnel working offshore.

The appointed contractor will take particular care when handling or storing hazardous materials, radiation sources and chemicals. All storage and handling must be carried out in accordance with the Dangerous Substances Act (1972) and supporting regulations, appropriate safety precautions must be taken, and safety clothing must be worn as necessary. Liquid or non-liquid pollutants or waste material will not be dumped, thrown or otherwise disposed of into the sea. All refuse and materials will be kept onboard the vessel and safely disposed of onshore according to the MARPOL (International Convention for the Prevention of Pollution from Ships) convention. All substances handled and/or used whilst undertaking the works will be handled, used, stored and documented in compliance with the Dangerous Substances Act 1972 as amended and relevant supporting Regulations. The works will also be carried out in accordance with assessments and recommendations of international best practice including the UK Control of Substances Hazardous to Health (COSHH) Regulations 1994. Where fuels, oils and lubes are required to be stowed on boats, suitable containers will be used and stowed to allow ventilation and safe dissipation of any accidental leaked gas and retention of any leaked liquid. No liquid will be discharged into the water at any stage of the work on site. No smoking will be permitted in the vicinity of fuel in storage or when in use.

All geophysical survey works that involve the use of acoustic instrumentation will follow the *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (2014) (as outlined in Section 6.1.2 of Attachment 4.3 - Natura Impact Statement (Report ref: MDR1520C-TTI-00-XX-RP-Z-0004)). Although published in 2014, this guidance remains relevant in Ireland and is listed by NPWS as best-practice guidance¹ and it provides the mitigation framework used in underwater-noise risk assessments in Ireland to date. This makes it directly applicable to the SI works, particularly geophysical and geotechnical surveys. Furthermore, the risk minimisation measures proposed in this guidance remain appropriate today as these measures continue to be recommended as mitigation by marine mammal experts.

Measures to be implemented include but are not limited to:

- A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms;
- Pre-start monitoring: If marine mammal species are detected within 500m distance of the sound source, seismic survey shall not commence;
- Periods of peak sensitivity to survey operations for marine mammals will be avoided where possible; and
- Ramp-up Procedures will be used - a controlled build-up of acoustic energy output shall occur in consistent stages to provide a steady and gradual increase over the ramp-up period.

2.1.10.6 Access and Egress Arrangements

All offshore works will be carried out from a vessel or JUB. The offshore survey vessel may mobilise directly to site from its base or from a suitable port in the Irish Sea close to the site.

Access to the intertidal zone may be made from the landward side down an existing lane (Legg Lane) at the southern boundary of Dunany Demesne as shown on Figure 2-1.

¹ [Underwater sound guidance Jan 2014.pdf](#) accessed July 2026

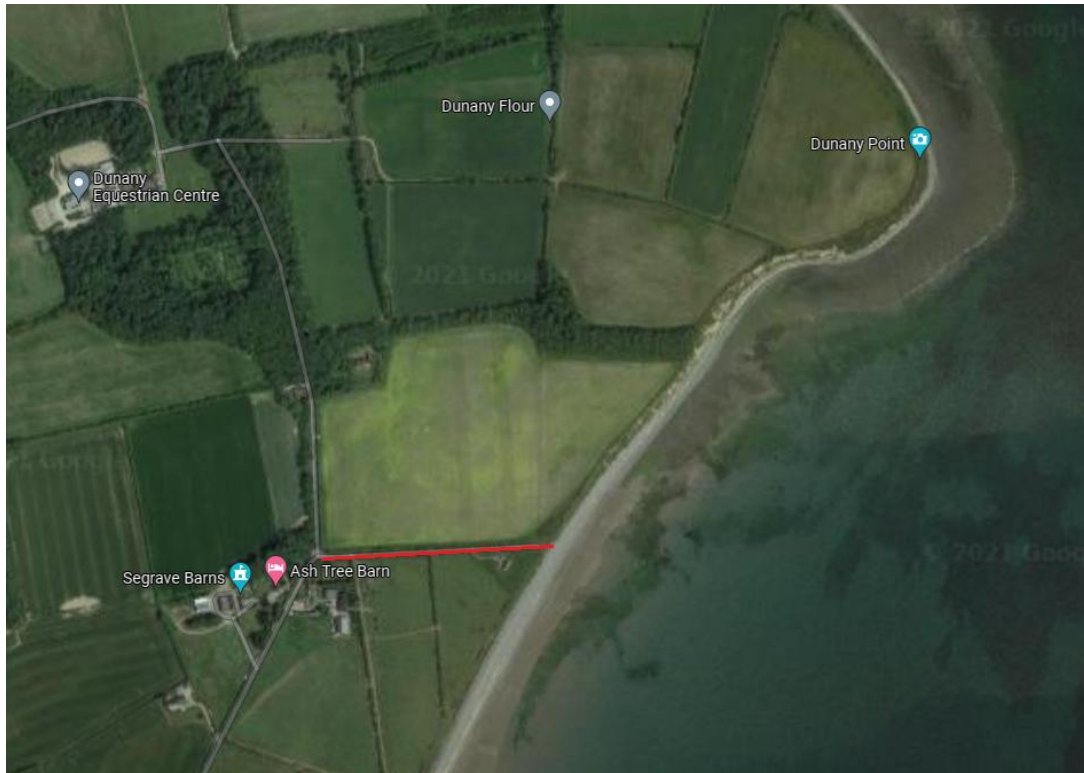


Figure 2-1 Intertidal zone access via Legg Lane

3.0 Methodology

3.1 Appropriate Assessment Guidance

This NIS report has been completed in accordance with the EU and national guidance documents that pertain to Member States' fulfilling their requirements under the EU Habitats Directive, with particular reference to Article 6(3) and 6(4) of that Directive. The methodology followed in relation to this NIS has complied with the following guidance:

- EC (2000). Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg;
- EC (2002). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission;
- EC (2007). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. European Commission;
- DoEHLG (2009a, rev. 2010). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government;
- EC (2013). Interpretation Manual of European Union Habitats. Version EUR 28. European Commission, Luxembourg;
- EC (2018). European Commission Notice C (2018) 7621 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg;
- EC (2021). European Commission Notice C (2021) 6913 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

3.2 Stages of Appropriate Assessment

Appropriate Assessment (AA) is a four-stage process with tests at each stage. The four stages are summarised diagrammatically in Figure 3-1 below. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

Stages 1-2 deal with the main requirements for assessment under Article 6(3) of the Habitats Directive. Stage 3 is a precursor to Stage 4 which is the main derogation step of Article 6(4).

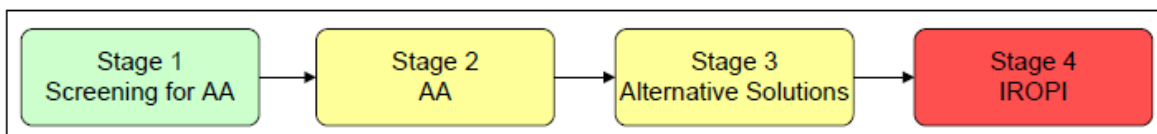


Figure 3-1 Four Stages of Appropriate Assessment

The screening for AA carried out by the competent authority (Stage 1), will determine whether an AA (Stage 2) for this MULA for the Oriel Wind Farm project is required. The purpose of the screening stage is to determine, on the basis of a preliminary assessment and objective criteria, whether a plan or project, alone and in combination with other plans or projects, could have significant effects on a European site in view of the site's conservation objectives.

There is no requirement to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this first stage is a very low one and operates as a trigger in order to determine whether a Stage Two AA must be undertaken by the competent authority on the implications of the proposed development for the conservation objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, a second stage AA will be required.

Stage 2 is required if it cannot be excluded, on the basis of the objective information provided at Stage 1, that the SI Works, individually or in combination with other projects or plans, will have a significant effect on a European site, in view of the site's conservation objectives. In this case, a Natura Impact Statement (NIS) must be prepared to assist the competent authority to conduct the Stage 2 AA. Stage 2 AA is a focused and detailed examination, analysis and evaluation carried out by the competent authority of the implications of the plan or project, alone and in-combination with other plans and projects, on the integrity of a European site in view of that site's conservation objectives. Case law has established that such an Appropriate Assessment, to be lawfully conducted, in summary:

- (i) must identify, in the light of the best scientific knowledge in the field, all aspects of the proposed development which can, by itself or in-combination with other plans or projects, affect the conservation objectives of the European site;
- (ii) must contain complete, precise and definitive findings and conclusions and may not have lacunae or gaps; and
- (iii) may only include a determination that the proposed development will not adversely affect the integrity of any relevant European site where the competent authority decides (on the basis of complete, precise and definitive findings and conclusions) that no reasonable scientific doubt remains as to the absence of the identified potential effects. If adverse impacts can be satisfactorily avoided or successfully mitigated at this stage, so that no reasonable doubt remains as to the absence of the identified potential effects, then the process is complete. 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 three and, if necessary, stage four.

If it is not possible during Stage 2 to avoid adverse effects on the integrity of one or more European sites through avoidance and/or mitigation, Stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. If it can be demonstrated that there are no reasonable alternative solutions, the AA progresses to Stage 4. This final stage is undertaken when it has been determined that negative impacts on the integrity of a European site will result from a plan or project and there are no alternative solutions. At Stage 4 of the AA process, the competent authority must determine if, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, the project must nevertheless be carried out for imperative reasons of overriding public interest, or 'IROPI', including those of a social or economic nature. In such circumstances, the Member State is required to take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected.

While there is no prescribed form or content for reporting (DoEHLG, 2009a) the methodology and format adopted in this report has been in accordance with the European Commission Methodological Guidance on the provision of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (EC, 2021) and the European Commission Guidance 'Managing Natura 2000 sites' (EC, 2018), guidance prepared by the NPWS (DoEHLG, 2009a) and by the Office of the Planning Regulator (OPR, 2021).

As per DoEHLG (2009a):

The first test is to establish whether, in relation to a particular plan or project, appropriate assessment is required.

In summary, the test for the screening for AA is to determine on the basis of a preliminary assessment and objective scientific information could there be effects in view of the site's conservation objectives. There is no necessity to establish such an effect; it is merely necessary for the competent authority to determine that there may be such an effect. The need to apply the precautionary principle in making any key decisions in relation to the tests of Appropriate Assessment (AA) has been confirmed by the case law of the Court of Justice of the European Union (CJEU). Plans or projects that have no appreciable effect on a European site may be excluded. The threshold at this screening stage is a very low one and operates as a trigger in order to determine whether an AA must be undertaken by the competent authority on the implications of the proposed development for the conservation objectives of a European site. Therefore, where significant effects are likely, uncertain or unknown at screening stage, an AA and NIS will be required.

3.3 Identification of Relevant European Sites

3.3.1 Source-Pathway Receptor Model

The identification of relevant European sites to be included in this report was based on the identification of the 'zone of influence (Zol)' of the SI works using a Source-Pathway-Receptor (S-P-R) model where:

- A 'source' is defined as the individual element of the proposed works that has the potential to impact on a European site, its qualifying features, and its COs;
- A 'pathway' is defined as the means or route by which a source can affect the ecological receptor; and
- A 'receptor' is defined as a QI of SACs or SPAs for which COs have been set for the European site(s) being assessed.

An S-P-R model is a standard tool used in environmental assessment. In order for an effect to be likely, all three elements of this mechanism must be in place. The absence or removal of one of the elements of the mechanism results in no likelihood for the effect to occur. The S-P-R model was used to identify a list of European sites, and their QIs, to which the SI works are potentially linked. These are termed as 'relevant' sites/QIs throughout this report.

3.3.2 Zone of Influence

Determination of the SI works' Zol was achieved by assessing the SI works against the ecological receptors within the MUL Area, in addition to the ecological receptors that could be connected to and subsequently impacted by the project through abiotic and biotic vectors.

The proximity of the SI works to European sites, and more importantly, QIs and SCIs of the European sites, is of importance when identifying potentially likely significant effects. In accordance with the OPR AA Screening Guidelines (2021), the S-P-R model has been used to identify the Zol to ensure that relevant European sites are identified. The S-P-R model minimises the risk of overlooking distant or obscure effect pathways, while also avoiding an over reliance on buffer zones (e.g., 15 km), within which all European sites should be considered. This approach follows the DoEHLG 2009 guidance on AA which states that:

"For projects, the distance could be much less than 15 km, and in some cases less than 100m, but this must be evaluated on a case-by-case basis with reference to the nature, size and location of the project, and the sensitivities of the ecological receptors, and the potential for in combination effects" (DoEHLG, 2009a; p.32, para 1).

The Zol of the SI works on mobile species (e.g., birds, mammals, and fish), and static species and habitats (e.g., saltmarshes, woodlands, and flora) is considered differently. Mobile species have 'range' outside of the European sites in which they are QI. The range of mobile QI species varies considerably, from several metres (e.g., in the case of whorl snails *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). A project's Zol may extend well beyond the project boundary and can impact or have an effect on static

species and habitats remote from the SI works; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source. In particular, hydrological linkages between the SI works and European sites (and their QIs) can occur over significant distances; however, any effect will be site-specific depending on the receiving water environment and nature of the potential impact.

To this end, the ZoI for this project extends outside of the immediate SI works MUL Area to include ecological receptors connected to the project through proximity and connectivity through features such as watercourses and waterbodies in addition to potential connectivity through land and air. See Section 4.1 for the identification of relevant European sites.

3.3.3 Adverse Effects on the Integrity of European Sites

The European Commission's 2018 Notice (EC, 2019) advises that the purpose of the AA is to assess the implications of the plan or project in respect of the site's COs, either individually or in-combination with other plans or projects. The conclusions should enable the competent authorities to ascertain whether the plan or project will adversely affect the integrity of the site concerned. The focus of the AA is therefore specifically on the species and/or the habitats for which the European sites is designated.

EC (2019) also emphasises the importance of using the best scientific knowledge when carrying out the AA in order to enable the competent authority to conclude with certainty that there will be no adverse effects on the integrity of the site. This guidance notes that it is at the time of adoption of the decision authorising implementation of the project that there must be no reasonable scientific doubt remaining as to the absence of adverse effects on the integrity of the site in question.

As regards the meaning of 'integrity,' this relates to ecological integrity. This can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation.

The 'integrity of the site' can be usefully defined as (EC, 2019):

"The coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated."

EC (2019) notes that if the competent authority considers the mitigation measures are sufficient to avoid the adverse effects on site integrity identified in the AA, they will become an integral part of the specification of the final plan or project or may be listed as a condition for project approval.

EC (2019) advises that it is for the competent authority, in the light of the conclusions made in the appropriate assessment on the implications of a plan or project for the European sites concerned, to approve the plan or project. This decision can only be taken after they have made certain that the plan or project will not adversely affect the integrity of the site. That is the case where no reasonable scientific doubt remains as to the absence of such effects.

EC (2019) also reaffirms that the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle and makes it possible effectively to prevent the protected sites from suffering adverse effects on their integrity as the result of the plans or projects. A less stringent authorisation criterion could not as effectively ensure the fulfilment of the objective of site protection intended under that provision. The onus is therefore on demonstrating the absence of adverse effects rather than their presence, reflecting the precautionary principle. It follows that the appropriate assessment must be sufficiently detailed and reasoned to demonstrate the absence of adverse effects, in light of the best scientific knowledge in the field.

3.3.4 Consideration of ex-situ effects

EC (2019) advises that Member States, both in their legislation and in their practice, allow for the Article 6(3) safeguards to be applied to any development pressures, including those which are external to European sites, but which are likely to have significant effects on any of them.

The CJEU developed this point when it issued a ruling in case C-461/17 *Holohan v. An Bord Pleanála* (renamed *An Coimisiún Pleanála* in 2025), that determined *inter alia* that Article 6(3) of the Habitats Directive must be interpreted as meaning that an appropriate assessment must on the one hand, catalogue the entirety of habitat types and species for which a site is protected, and, on the other, identify and examine both the implications of the proposed project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that those implications are liable to affect the COs of the site.

In that regard, consideration has been given in this NIS to inform AA to implications for habitats and species located both inside and outside of the European sites considered in the AA Screening Report with reference to those sites' COs where effects upon those habitats and/or species are liable to affect the COs of the sites concerned.

3.3.5 Conservation Objectives

The COs for each European site are to maintain or restore the favourable conservation condition of the qualifying interest (QI) habitat(s) and/or the QI (or SCI for SPAs) species for which the site has been selected.

The favourable conservation status of a habitat is achieved when:

- Its natural range, and area it covers within that range, are stable or increasing;
- 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.

The favourable conservation status (or condition, at a site level) of a species is achieved when:

- Population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- 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.

The COs of European sites published by the National Parks and Wildlife Service (NPWS) note that an AA based on the most up to date COs (which are defined by a list of attributes and targets) will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out.

The most up-to-date COs for the European sites being considered have been used in this NIS. These were accessed at <https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives> on 02/07/2026.

3.3.6 In-combination effects

Article 6(3) of the Habitats Directive requires that in-combination effects with other plans or projects are also considered. As set out in EC (2018), significance will vary depending on factors such as magnitude of impact, type, extent, duration, intensity, timing, probability, cumulative effects and the vulnerability of the habitats and species concerned.

EC (2021) notes that cumulative environmental effects can be defined as effects on the environment caused by the combined action of past, current, and future activities. Although the effects of one development may not be significant, the combined effects of several developments together can be significant.

EC (p.14, 2021) also notes that the “in-combination provision concerns other plans or projects that have been already completed, approved but uncompleted, or proposed (i.e., for which an application for approval or consent has been submitted).” And furthermore (p.31, *ibid*): “In addition to the effects of the plans or projects that are the main subject of the assessment, it may be appropriate to consider the effects of already completed plans and projects, including those preceding the date of transposition of the directive or the date of designation of the site. The effects of such completed plans and projects would typically form part of the site’s baseline conditions which are considered at this stage.”

Plans and projects that have been approved in the past but have not yet been implemented or completed should be included in the in-combination provision. As regards other proposed plans or projects, on grounds of legal certainty it would seem appropriate to restrict the ‘in-combination’ provision to plans that have been proposed, (i.e., for which an application for approval or consent has been submitted) (EC, 2021).

This mirrors the advice contained in EC (2018) which advises that other plans or projects which are completed, approved but uncompleted, or proposed should be considered. EC (2018) specifically advises that “as regards other proposed plans or projects (i.e., other projects not proposed by the Applicant), on grounds of legal certainty it would seem appropriate to restrict the in-combination provision to those which have been actually proposed, i.e., for which an application for approval or consent has been introduced”.

The ability for impacts arising from the proposed project to overlap with those from other projects, plans and activities to result in adverse effects are considered. This means that, in most examples, an overlap of the physical extents of the impacts arising from the two (or more) projects, plans or activities must be established for an in-combination effect to arise. For example, for a cumulative sedimentation effect to be established between the proposed project and another project, it must be established that the extent of sediment release from both projects has the potential to overlap and may affect a receptor at the same location.

Exceptions to this exist for certain mobile receptors that may move between, and be subject to, two or more separate physical extents of impact from two or more projects. For example, species such as otter may be affected by water quality impacts from the project, as well as those from other projects where the extent of another area affecting water quality does not directly overlap with that of the project. Where relevant, mitigation will be imposed as necessary to prevent adverse in-combination effects.

3.4 Ecological Desk Study

Attachment 4.3 AA Screening Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0006) details the results of the ecological desk study undertaken to describe the receiving environment of the SI works. Those details are not reiterated here to avoid repetition. A description of each European site taken forward to this NIS is provided in Section 5.0.

4.0 Stage 1 Screening for Appropriate Assessment

4.1 AA Screening Report

Through an assessment of the S-P-R model, which considered the Zol of effects from the SI works, the following findings were reported by Tetra Tech in Attachment 4.3 AA Screening Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0006):

1. The SI works are not connected with or necessary to the management of the nature conservation interest of any European site.
2. In the absence of mitigation and/or further detailed consideration against site-specific conservation objectives, the AA Screening Report concluded that likely significant effects due to underwater noise disturbance could not be ruled out for relevant Annex II QI species at the following European sites:
 - River Boyne and River Blackwater SAC (otter *Lutra lutra*)
 - Rockabill to Dalkey Island SAC (harbour porpoise *Phocoena phocoena*)
 - Lambay Island SAC (harbour porpoise, grey seal *Halichoerus grypus* and harbour seal *Phoca vitulina*)
 - Codling Fault Zone SAC (harbour porpoise)
 - Slaney River Valley SAC (harbour seal)
 - Strangford Lough SAC (harbour seal)
 - Murlough SAC (harbour seal)
 - North Channel SAC (harbour porpoise)
 - North Anglesey Marine / Gogledd Mrn Forol SAC (harbour porpoise)
3. In the absence of mitigation and/or further detailed consideration against site-specific conservation objectives, the AA Screening Report concluded that likely significant effects due to above-water noise disturbance could not be ruled out for seabird and wintering birds at the following European sites:
 - North-west Irish Sea SPA
 - Dundalk Bay SPA
 - Carlingford Lough SPA
 - Stabannan-Braganstown SPA
4. The potential for in-combination effects with other plans and projects was assessed, however, there is no spatial or temporal interaction with other plans or projects and, therefore, in-combination effects were screened out from further assessment.

The AA Screening Report concluded that it cannot be excluded, on the basis of objective information, that the SI works, individually, will have a significant effect(s) on European sites. The following NIS has therefore been prepared in order to assist MARA in conducting an Appropriate Assessment should they agree with the findings of the AA Screening Report.

5.0 Assessment Of Adverse Effects

5.1 Introduction

The connectivity between the proposed SI works and relevant European sites has been assessed in Attachment 4.3 AA Screening Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0006). Nine SACs and four SPAs have been identified as relevant European sites for this NIS (see Section 5.2, 5.3, 5.4). This NIS only assesses QIs and SCIs in relation to which likely significant effects could not be excluded, based on objective information.

As the AA Screening Report considered likely significant effects in line with the precautionary principle, interactions between the proposed SI works and the European sites identified in the AA Screening Report will be investigated in more detail to establish whether there is a credible risk of interaction with the proposed SI works. Where no such interaction with a European site (or relevant QIs) occurs, no further assessment will be undertaken. Where there is a credible interaction between the SI works and a European site, an assessment against the site's Conservation Objectives (COs) will be undertaken. Where appropriate, mitigation measures will also be considered.

5.2 Marine Mammals

5.2.1 Overview of impacts to Marine Mammals (underwater noise)

In line with the precautionary principle, marine mammals at the following SACs were screened in for AA, due to the likelihood for significant effects as a result of underwater noise impacts:

- Rockabill to Dalkey Island SAC;
- Lambay Island SAC;
- Codling Fault Zone SAC;
- Slaney River Valley SAC;
- Strangford Lough SAC;
- Murlough SAC;
- North Channel SAC; and
- North Anglesey Marine / Gogledd Mrn Forol SAC.

Site-specific conservation objectives for relevant marine mammal species at the above SACs are provided in Table 5-3.

A subsea noise assessment was undertaken to inform this NIS. The assessment and results are presented in the accompanying Subsea Noise Technical Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0003).

When assessing the potential impact of underwater noise sources on the marine environment a range of variables such as source level, frequency, duration, and directivity were considered. Increasing the distance from the sound source usually results in attenuation with distance. The factors that affect the way noise propagates underwater include water column depth, pressure, temperature gradients, salinity, as well as water surface and seabed type and thickness. When sound encounters the seabed the amount of noise/sound reflected back depends on the composition of the seabed, i.e., mud or other soft sediment will reflect less than rock. The sediment types within the MUL Area reported by INFOMAR are “sand” and “coarse sediment” closer to shore, and “coarse sediment”, “rock” and “sand” further offshore (INFOMAR, 2026).

The active acoustic instruments, such as those proposed for this survey, operate by emitting extremely short pulses and are highly directional with narrow beams (Ruppell et al., 2022). Many of the sources used for this

survey, such as side-scan sonar and sub-bottom profilers (SBP) operate at high frequency and attenuate quickly as they spread from the source.

Marine mammal species can be split into functional hearing groupings, according to their frequency-specific hearing sensitivity (Southall et al., 2019). Minke, fin and humpback whales are considered low frequency cetaceans (LF), common, bottlenose and Risso's dolphin are considered high frequency cetaceans (HF), harbour porpoise a very high frequency cetacean (VHF), seals are considered as phocid carnivores in water (PCW) and otters are included as Other Marine Carnivores in Water (OCW). See Table 5-1 below for a list of relevant species contained within each functional hearing group.

Table 5-1 Functional Hearing Groups for Marine Mammal Species

NMFS (2024) Hearing Group Name	Species Included in Group
Low-frequency cetaceans (LF)	Baleen whales (minke, fin and humpback whale).
High-frequency cetaceans (HF)	Most toothed whales and dolphins (bottlenose, common and Risso's dolphin, killer, and pilot whales).
Very high-frequency cetaceans (VHF)	Certain toothed whales and porpoises (harbour porpoise).
Other marine carnivores in water (OCW)	Includes sea lions, walrus, otters.
Phocid carnivores in water (PCW)	Earless seals (including harbour and grey seal).

5.2.1.1 Assessment Methodology

The DAHG "Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters" 2014 (Department of Arts, Heritage and the Gaeltacht (DAHG), 2014) contains the following statement:

"It is therefore considered that anthropogenic sound sources with the potential to induce Temporary Threshold Shift (TTS) in a receiving marine mammal contain the potential for both (a) disturbance, and (b) injury to the animal."

This states that TTS constitutes an injury and should thus be the main assessment criteria². However, the guidance goes on to specify the use of thresholds from a 2007 publication (Southall et al., 2007) which has since been superseded (Southall, et al., 2019; National Oceanic and Atmospheric Administration, 2024) and no longer represents best available science, nor reflects best practice internationally. Thus, the following excerpt from the guidance is relevant:

"The document will be subject to periodic review to allow its efficacy to be reassessed, to consider new scientific findings and incorporate further developments in best practice."

As there has been no such update to date, but the guidance clearly states its intention to consider new scientific findings, we have applied the latest guidance (NMFS,2024) reflecting the current best available method for assessing impact from noise on marine mammals. This means that it is auditory injury "AUD INJ" (previously "PTS") that is the criteria for injury, not "TTS".

² Injury being the qualifying limit in the Irish Wildlife Act 1976, section 23, 5c:

<https://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/print#sec23>

Auditory impacts in cetaceans can be defined as AUD INJ leading to non-reversible auditory injury, or as a TTS in hearing sensitivity, which can have negative effects on the ability to use natural sounds (e.g., to communicate, navigate, locate prey) for a period of minutes, hours, or days. With increasing distance from the sound source, where it is audible to the animal, the effect is expected to diminish through identifiable stages (i.e., AUD INJ or TTS in hearing, avoidance, masking, reduced vocalisation) to a point where no significant response occurs. Factors such as local propagation and individual hearing ability can influence the actual effect (DAHG, 2014).

A summary of the equipment to be used in the SI Works is presented in Table 2-1 in this report and in Table 4.1 of the accompanying Subsea Noise Technical Report.

Should the noise levels from sources provided in the accompanying Subsea Noise Technical Report exceed the thresholds set out for hearing groups (see Table 5-2), there is the potential for underwater noise generated during the geophysical and geotechnical surveys to result in injury and/or disturbance to QI Annex II marine mammal species in the vicinity of the SI works.

Both the criteria for impulsive and non-impulsive sound are relevant given the nature of the sound sources used during the SI Works. The relevant AUD INJ and TTS criteria proposed by NMFS (2024) are summarised in Table 5-2 which addresses peak pressure levels (L_p) and sound exposure levels (SEL).

Table 5-2 AUD INJ and TTS thresholds for cetaceans (NMFS, 2024)

Hearing Group	Parameter	Impulsive [dB]		Non-impulsive [dB]	
		AUD INJ	TTS	AUD INJ	TTS
Low frequency (LF) cetaceans	L_{pk} , (unweighted)	222	216	Low frequency (LF) cetaceans	L_{pk} , (unweighted)
	SEL, (weighted)	183	168	197	SEL, (weighted)
High frequency (HF) cetaceans	L_{pk} , (unweighted)	230	224	High frequency (HF) cetaceans	L_{pk} , (unweighted)
	SEL, (weighted)	193	178	201	SEL, (weighted)
Very high frequency (VHF) cetaceans	L_{pk} , (unweighted)	202	196	Very high frequency (VHF) cetaceans	L_{pk} , (unweighted)
	SEL, (weighted)	159	144	181	SEL, (weighted)

5.2.1.2 Underwater Noise Assessment Results

As is standard practise, the DAHG (2014) “Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters” will be followed during the geophysical and geotechnical surveys. The guidance refers to “ramp-up procedures” or “soft starts”, “*whereby sound energy input to the marine environment is gradually or incrementally increased from levels unlikely to cause significant behavioural impact on marine mammals to the full output necessary for completion of the activity*”. This will ensure that initial noise emissions are at a level below that where permanent injury can occur, allowing time for marine mammals to move outside the area of ensonification before noise levels reach a level where they may cause injury.

To assess the impacts of the geophysical and geotechnical surveys four scenarios were modelled. Each scenario assumed that all sound sources were active including the vessel, as a 'worst-case scenario'. An appropriate soft-start was incorporated into the modelling, following DAHG (2014) guidance (20 minutes for geophysical sound sources, 40 minutes for sparker/boomer). These scenarios are as follows:

1. Geophysical survey (MBES, SSS, parametric SBP), USV.
2. Geophysical survey (MBES, SSS, USBL, sparker, boomer), large vessel with parametric SBP.
3. Geophysical survey (MBES, SSS, USBL, sparker, boomer), large vessel with chirper/pinger SBP.
4. Geotechnical survey (rotary core boreholes and vibrocoreing, SPT, USBL).

The results have been summarised below to present each modelled scenario with the inclusion of an appropriate soft start, with respect to injury and/or disturbance to each relevant species (harbour seal, grey seal and harbour porpoise).

Geophysical survey, USV (MBES, SSS, parametric SBP) – 20-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury and TTS to grey and harbour seals within <10 m of the sound source, and behavioural disturbance within 740 m of the sound source.
- The geophysical surveys under this scenario have the potential to cause auditory injury to harbour porpoise within 90 m of the sound source, TTS within 510 m of the sound source and behavioural disturbance within 1.8 km of the sound source.

Geophysical survey, large vessel (MBES, SSS, USBL, sparker, boomer, parametric SBP) – 40-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury to grey and harbour seals within <10 m of the sound source, TTS within 590 m of the sound source and behavioural disturbance within 20 km of the sound source.
- The geophysical surveys under this scenario have the potential to cause auditory injury to harbour porpoise within 650 m of the sound source, TTS within 2.9 km of the sound source and behavioural disturbance within 20 km of the sound source.

Geophysical survey, large vessel (MBES, SSS, USBL, sparker, boomer, chirper/pinger SBP) – 40-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury to grey and harbour seals within <10 m of the sound source, TTS within 600 m of the sound source and behavioural disturbance within 20 km of the sound source.
- The geophysical surveys under this scenario have the potential to cause auditory injury to harbour porpoise within 650 m of the sound source, TTS within 3 km of the sound source and behavioural disturbance within 20 km of the sound source.

Geotechnical survey (rotary core boreholes, vibrocoreing, SPT, USBL) – soft start not applicable

- The geotechnical surveys have the potential to cause auditory injury to grey and harbour seals within <10 m of the sound source, TTS within 730 m of the sound source and behavioural disturbance within 20 km of the sound source.
- The geotechnical surveys have the potential to cause auditory injury to harbour porpoise within 40 m of the sound source, TTS within 3 km of the sound source and behavioural disturbance within 20 km of the sound source.

5.2.1.3 Auditory Injury

For seals, both geophysical and geotechnical surveys represent minimal risk for auditory injury (auditory injury within only <10 m of the sound source). For harbour porpoises, the maximum zone of impact for potential auditory injury extends to 650m of the larger geophysical surveys undertaking boomer/sparker surveys. USV and geotechnical surveys represent lower impact ranges for harbour porpoise, of 90 m and 40 m, respectively. Mitigation adhering to DAHG (2014) is proposed as follows.

Proposed Mitigation

In addition to the implementation of a soft-start for geophysical and sparker/boomer sources, in line with DAHG (2014), as outlined above, pre-start monitoring will be undertaken for all marine mammals. This will allow any mammals observed within the monitored zone (500 m for geophysical and geotechnical surveys and 1,000 m for sparker/boomer surveys) to exit the zone of impact before soft start is commenced.

As part of the standard application of DAHG (2014) guidance, a qualified and experienced MMO will be appointed during geophysical and geotechnical surveys. The MMO will search for marine mammals (and otter) within the monitored zone, which is a 500 m or 1,000 m radial distance of the sound source intended for use. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals (or otters) detected within the monitored zone by the MMO. In commencing sound producing activities using the equipment listed above, a soft-start procedure (i.e. 20 or 40 minute soft-start depending on the activity) must be used. Once the soft-start procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500 m/1,000 m radial distance, of the sound source. Breaks in sound output and line turns will be addressed as outlined in DAHG (2014).

Given the impact ranges modelled for auditory injury, the above mitigation will ensure avoidance of injury to marine mammal species.

5.2.1.4 Temporary Threshold Shift

For seals, the maximum modelled zone of impact for TTS extends to 730 m, from the geotechnical surveys. For harbour porpoise, the maximum modelled zone of impact for TTS extends to 3 km from the larger geophysical vessel undertaking boomer/sparker and chirper/pinger surveys, and from geotechnical surveys. These TTS ranges are largely driven by the use of a USBL for equipment positioning information and the active seismic impulsive equipment (sparker/boomer).

The Subsea Noise Technical Report provides detailed explanation of the TTS threshold, however, it is worth noting that the DAHG (2014) guidance's reliance on Southall et al. (2007) TTS thresholds mean that for most scenarios, the impact ranges are comparable to the AUD INJ threshold from the NMFS (2024) guidance. Where DAHG (2014) is more conservative, it is often the result of including noise at frequencies where the relevant species group is not very sensitive (the weightings from Southall et al. (2007) were very broad, "letting in" a lot of energy not audibly to the animal). The Southall et al. (2007) thresholds and weightings were based on very little evidence compared to the NMFS (2024) weightings). Please note that a new iteration of the DAHG (2014) guidance document is imminent, expected to align further with NMFS (2024) and Southall et al. (2019).

TTS onset ranges can often seem large and the following should be kept in mind:

1. TTS onset thresholds are often exceeded by ambient conditions: TTS onset ranges are based on the cumulative received noise, strictly specified by the guidance to be over a 24-hour period- this means that very low received levels can exceed the TTS onset threshold, and that animals routinely have this threshold exceeded during "normal" life, with noise from other marine mammals and anthropogenic noise. For e.g. the harbour porpoise noise as low as c. 120 dB over a few hours can exceed the TTS onset threshold.
2. The TTS onset thresholds assumed no auditory recovery: Where the TTS onset threshold is exceeded, normal hearing will return in a matter of minutes to hours depending on the amount of TTS

that was induced and the amount of noise in the environment. Thus, while the guidance states to accumulate noise for 24 hours, the animals can recover fully from TTS multiple times during this time period, with breaks in the noisy activity, "acoustic shade" provided by the environment (sandbars, other animals, variation in sound level with depth).

Therefore, there will be no lasting impact due to TTS on marine mammals.

5.2.1.5 Behavioural Disturbance

For all marine mammals, risk ranges for behavioural disturbance were modelled applying the criterion strictly (unweighted for marine mammal hearing frequency), providing overly precautionary results. This means that, while risk ranges appear large in some instances (within > 20 km for the geotechnical and geophysical surveys) the main energy will often be outside of the hearing range of the receiving marine mammal.

In the JNCC (2025) guidance document for assessing noise disturbance against the conservation objectives of harbour porpoise SACs, where the findings were based on evidence gathered through monitoring and research through Brown et al., (2025) and Majewska et al., (2025). They advise that fixed distances should be applied to assess behavioural disturbance, based on empirical evidence. For geophysical surveys, the JNCC's 'effective deterrence range' is 3 km. Therefore, a Cumulative Effects Spatial Scope (CESS) of 3 km from the boundary of the MUL Area was applied. While the JNCC document focuses on harbour porpoise, this is precautionary for all other marine mammal hearing groups, as harbour porpoise is considered to be the most sensitive. Behavioural disturbance includes avoidance and changes in behaviour, and will be temporary and short term in duration, with rapid recovery once the survey vessel has left the area. No adverse effects due to behavioural disturbance are predicted.

Considering the above mitigation, the potential for adverse effects to QI marine mammals of the eight screened-in SACs due to underwater noise impacts is assessed against each site-specific conservation objective below.

Table 5-3 Site-specific conservation objectives for relevant qualifying interests of SACs (marine mammals).³

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attributes Potentially Affected by the Project
Rockabill to Dalkey Island SAC (IE003000) (NPWS, 2013a, Version 1 07/05/2013)		
Harbour porpoise [1351]	To maintain the favourable conservation condition	Access to suitable habitat Disturbance
Lambay Island SAC (IE000204) (NPWS, 2024a, Version 2, 17/12/2024)		
Grey seal [1364]	To maintain the favourable conservation condition	Access to suitable habitat Breeding behaviour Moulting behaviour Resting behaviour Disturbance
Harbour Seal [1365]	To maintain the favourable conservation condition	Access to suitable habitat Breeding behaviour Moulting behaviour Resting behaviour Disturbance

³ It is noted in NPWS's *The Status of EU Protected Habitats and Species in Ireland 2025* (NPWS, 2025a) that the overall status and trend of harbour porpoise in Ireland changed from favourable in 2019 to unfavourable/inadequate in 2025. The assessment of adverse effects for the proposed SI works is based on the most recent published conservation objectives for Rockabill to Dalkey Island SAC (May 2013) and Lambay Island SAC (December 2024). While the conservation status of harbour porpoise has changed in 2025, the conclusions of the assessments in Sections 5.2.2.1 and 5.2.3.1 indicate that the proposed SI works would not preclude the future restoration or recovery of the species, should the conservation objectives be updated from maintaining to restoring the favourable conservation conditions.

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attributes Potentially Affected by the Project
Harbour porpoise [1351]	To maintain the favourable conservation condition	Access to suitable habitat Disturbance
Codling Fault Zone SAC (IE003015) (NPWS, 2025b, Version 2, 14/01/2025)		
Harbour porpoise [1351]	To maintain the favourable conservation condition	Access to suitable habitat Disturbance
Slaney River Valley SAC (IE000781) (NPWS, 2011a, Version 1, 21/10/2011)		
Harbour seal [1365]	To maintain the favourable conservation condition	Access to suitable habitat Breeding behaviour Moulting behaviour Resting behaviour Disturbance
Strangford Lough SAC (UK0016618) (DAERA, 2018a, Version 4)		
Harbour seal [1365]	To maintain (or restore where appropriate) the Harbour (Common) Seal <i>Phoca vitulina</i> to favourable condition	Population Number of pups Haul outs Disturbance
Murlough SAC (UK0016612) (DAERA, 2018b, Version 4)		
Harbour seal [1365]	To maintain (or restore where appropriate) the Harbour (Common) Seal <i>Phoca vitulina</i> to favourable condition	Population Number of pups Haul outs Disturbance
North Channel SAC (UK0030399) (NRW, 2019a)		
Harbour porpoise [1351]	To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS)	Harbour porpoise is a viable component of the site There is no significant disturbance of the species The condition of supporting habitats and processes, and the availability of prey is maintained
North Anglesey Marine / Gogledd Mrn Forol SAC (NRW, 2019b)		
Harbour porpoise [1351]	To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS)	Harbour porpoise is a viable component of the site There is no significant disturbance of the species The condition of supporting habitats and processes, and the availability of prey is maintained

5.2.2 Rockabill to Dalkey Island SAC

Rockabill to Dalkey Island SAC is designated for harbour porpoise. The SAC 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 (NPWS, 2014a). The MUL Area within the Irish Sea is located 27 km north of Rockabill to Dalkey Island SAC. The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with harbour porpoise for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.2.1 Assessment against conservation objectives

Qualifying Interest: Harbour porpoise

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict harbour porpoises' access to suitable habitat.

Disturbance: As outlined above, the worst-case scenario with respect to harbour porpoise is an impact range of 650 m for auditory injury (larger geophysical vessel with sparker/boomer), and an impact range of 3 km for TTS (larger geophysical vessel with sparker/boomer and geotechnical surveys). Mitigation will be applied in line with DAHG (2014), comprising soft-starts of equipment, where possible, and MMO monitoring of a 500 m, or 1,000 m zone around the geophysical/geotechnical and seismic sound sources, respectively. Auditory injury ranges for all noise scenarios are within the monitored zone for the respective activity, and as such, there will be no risk of injury to harbour porpoises.

Behavioural disturbance was modelled out to a maximum distance of 20 km, however, as explained above, this is a highly conservative and unrealistic scenario. Realistic behavioural impacts are likely to be within a much lower range, i.e. until the next closest source of disturbance, such as a shipping vessel. Other factors to consider are habituation of harbour porpoises to vessels in the region and the temporary duration of the SI works. Underwater noise will not be introduced at levels that could result in significant negative impacts on individuals or the population of harbour porpoises at the SAC.

Therefore, it can be concluded that the favourable conservation condition of harbour porpoise will be maintained at Rockabill to Dalkey Island SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.3 Lambay Island SAC

Lambay Island SAC is designated for grey seal, harbour seal and harbour porpoise. The SAC is located off the coast of north Dublin 39 km south of the MUL Area and has notable steep cliffs around its coastline. A gently sloping shore on the western side of the island is used by grey seal and harbour seal as haul out sites, along with coves and caves (NPWS, 2024b). While not within the MUL Area, the underwater noise produced from the marine geophysical and geotechnical SI works have the potential to interact with harbour porpoise, grey seal and harbour seal for which the SAC is designated. Therefore, these species are assessed in more detail against the conservation objectives below.

5.2.3.1 Assessment against conservation objectives

Qualifying Interest: Grey seal

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict grey seals' access to suitable habitat.

Breeding behaviour: The proposed SI works will not alter breeding sites of grey seal at Lambay Island SAC. The island is over 39 km from the MUL Area. Breeding behaviour and breeding sites will be maintained in a natural condition.

Moulting behaviour: The proposed SI works do not overlap the Lambay Island SAC or associated moulting haul-out sites for grey seal therefore no interaction will occur, and haul-out sites will be maintained in a natural condition.

Resting behaviour: As stated above, the MUL Area does not spatially overlap the Lambay Island SAC and is 39 km from the MUL Area boundary. Therefore, the proposed SI works will not interact with the resting haul-out sites, and these will be maintained in a natural condition.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical surveys. There may be some low-level disturbance to grey seal while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which result in a maximum auditory injury range of <10 m of the sound source and TTS range of within 730 m of the sound source for grey seal. Having regard to the fact that the SAC is also located 39 km from the MUL Area and the surveys will be of limited scale and duration, the proposed SI works will not adversely affect the grey seal population at the site.

Qualifying Interest: Harbour seal

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict harbour seal access to suitable habitat.

Breeding behaviour: The proposed SI works will not alter breeding sites of harbour seal at Lambay Island SAC. As stated above, the MUL Area does not overlap spatially with the SAC which is located 39 km away. Therefore, breeding behaviour and breeding sites will be maintained in a natural condition.

Moulting behaviour: The proposed SI works do not overlap the Lambay Island SAC or associated moulting haul-out sites for harbour seal therefore no interaction will occur, and haul-out sites will be maintained in a natural condition.

Resting behaviour: As stated above, the MUL Area does not spatially overlap Lambay Island SAC. Therefore, the proposed SI works will not interact with the resting haul-out sites, and these will be maintained in a natural condition.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical surveys. There may be some low-level disturbance to harbour seal while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of <10 m of the sound source and TTS range of within 730 m of the sound source for harbour seal. Having regard to the fact that the SAC is also located 39 km from the MUL Area and the surveys will be of limited scale and duration, the proposed SI works will not adversely affect the harbour seal population at the site.

Qualifying Interest: Harbour porpoise

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict harbour porpoise access to suitable habitat.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical, geotechnical, environmental and metocean surveys. There may be some low-level disturbance to harbour porpoise while the surveys are ongoing resulting in potential avoidance behaviour. However, as stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. Having regard to the fact that the SAC is also located 39 km from the MUL Area and the surveys will be of limited scale and duration the proposed SI works will not adversely affect the harbour porpoise population at the site.

Therefore, it can be concluded that the favourable conservation condition of grey, harbour seal and harbour porpoise will be maintained at Lambay Islands SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.4 Codling Fault Zone SAC

Codling Fault Zone SAC is designated for harbour porpoise, located 59 km from the MUL Area within the Irish Sea. The length of the site is approximately 7 km and 5 km wide at its greatest extent. The water depth at the site ranges from approximately 80 to 100 m (NPWS, 2024c). The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with harbour porpoise for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.4.1 Assessment against conservation objectives

Qualifying Interest: Harbour porpoise

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict harbour porpoises' access to suitable habitat.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical surveys. There may be some low-level disturbance to harbour porpoise while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. Having regard to the fact that the SAC is also located 59 km from the MUL Area and the surveys will be of limited scale and duration the proposed SI works will not adversely affect the harbour porpoise population at the site.

Therefore, it can be concluded that the favourable conservation condition of harbour porpoise will be maintained at Codling Fault Zone SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.5 Slaney River Valley SAC

Slaney River Valley SAC is designated for harbour seal. This SAC meets the sea at Wexford Harbour 96 km south of the MUL Area, while the inland riverine portion of the SAC spans as far upstream as the Wicklow Mountains. This site supports regionally significant numbers of harbour seal, which are present all year in the harbour. The estuary contains widely spanning tidal mudflats and sandflats, including sandbanks where harbour seal regularly haul out for moulting, breeding and resting at lower tides (NPWS, 2015a). While not within the MUL Area, the underwater noise produced from the marine geophysical and geotechnical SI works have the potential to interact with harbour seal for which the SAC is designated. Therefore, this species are assessed in more detail against the conservation objectives below.

5.2.5.1 Assessment against conservation objectives

Qualifying Interest: Harbour seal

Access to suitable habitat: The proposed SI works will not introduce any artificial barriers within the MUL Area which would restrict harbour seal access to suitable habitat.

Breeding behaviour: The proposed SI works will not alter breeding sites of harbour seal at Slaney River Valley SAC. As stated above, the MUL Area does not overlap spatially with the SAC which is located 96 km away. Therefore, breeding behaviour and breeding sites will be maintained in a natural condition.

Moulting behaviour: The proposed SI works do not overlap the Slaney River Valley SAC or associated moulting haul-out sites for harbour seal therefore no interaction will occur, and haul-out sites will be maintained in a natural condition.

Resting behaviour: As stated above, the MUL Area does not spatially overlap Slaney River Valley SAC. Therefore, the proposed SI works will not interact with the resting haul-out sites, and these will be maintained in a natural condition.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical surveys. There may be some low-level disturbance to harbour seal while the

surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of <10 m of the sound source and TTS range of within 730 m of the sound source for harbour seal. Having regard to the fact that the SAC is also located 96 km from the MUL Area and the surveys will be of limited scale and duration, the proposed SI works will not adversely affect the harbour seal population at the site.

Therefore, it can be concluded that the favourable conservation condition of harbour seal will be maintained at Slaney River Valley SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.6 Strangford Lough SAC

Strangford Lough SAC is designated for harbour seal. This SAC is within a large marine inlet on the east coast of Co. Down 47 km north of the MUL Area. Almost land-locked, Strangford Lough is separated from the Irish Sea by the Ards Peninsula to the east and is bounded to the south by the Lecale coast. This site supports a population of harbour seal that frequently utilise the rocky intertidal areas of the SAC to haul out (DAERA, 2018a). While not within the MUL Area, the underwater noise produced from the marine geophysical and geotechnical SI works have the potential to interact with harbour seal for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.6.1 Assessment against conservation objectives

Qualifying Interest: Harbour seal

Population: The proposed SI works do not spatially overlap the Strangford Lough SAC. The proposed SI works have the potential to cause low levels of disturbance to harbour seal resulting in potential avoidance behaviour. However, the proposed SI works will be temporary and given that there is no spatial overlap with the SAC, there will be no implications for the populations of harbour seals at this site. The SI works will not result in the decline of the number of harbour seals counted during the autumn period.

Number of Pups: The proposed SI works will not alter breeding sites of harbour seal at Strangford Lough SAC. As stated above, the MUL Area does not overlap spatially with the SAC which is located 47 km away. Therefore, breeding behaviour and breeding sites will be maintained in a natural condition and the percentage of pups counted during haul-out counts during the moulting period will remain at least 25%.

Haul-outs: The proposed SI works do not overlap the Strangford Lough SAC or associated haul-out sites for harbour seal therefore no interaction will occur, and haul-out sites will be maintained in a natural condition.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical, surveys. There may be some low-level disturbance to harbour seal while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of <10 m of the sound source and TTS range of within 730 m of the sound source for harbour seal. Having regard to the fact that the SAC is located 47 km from the MUL Area and the surveys will be of limited scale and duration, the proposed SI works will not adversely affect the harbour seal population at the site.

Therefore, it can be concluded that the favourable conservation condition of harbour seal will be maintained at Strangford Lough SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.7 Murlough SAC

Murlough SAC is located off the southeast coast of Northern Ireland, 18 km north of the MUL Area, designated for harbour seal. The site is a known haul out site for harbour seal. The site includes the shallow bay as well as offshore shallow sub littoral sandbanks (DAERA, 2018b). The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with harbour seal for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.7.1 Assessment against conservation objectives

Qualifying Interest: Harbour seal

Population: The proposed SI works do not spatially overlap the Murlough SAC. The proposed SI works have the potential to cause low levels of disturbance to harbour seal resulting in potential avoidance behaviour. However, the proposed SI works will be temporary and given that there is no spatial overlap with the SAC, there will be no implications for the populations of harbour seals at this site. The SI works will not result in the decline of the number of harbour seals counted during the autumn period.

Number of Pups: The proposed SI works will not alter breeding sites of harbour seal at Murlough SAC. As stated above, the MUL Area does not overlap spatially with the SAC which is located 18 km away. Therefore, breeding behaviour and breeding sites will be maintained in a natural condition and the percentage of pups counted during haul-out counts during the moulting period will remain at least 25%.

Haul-outs: The proposed SI works do not overlap the Murlough SAC or associated haul-out sites for harbour seal therefore no interaction will occur, and haul-out sites will be maintained in a natural condition.

Disturbance: The proposed SI works have the potential to introduce underwater noise due to the marine geophysical and geotechnical surveys. There may be some low-level disturbance to harbour seal while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of <10 m of the sound source and TTS range of within 730 m of the sound source for harbour seal. Having regard to the fact that the SAC is also located 18 km from the MUL Area and the surveys will be of limited scale and duration, the proposed SI works will not adversely affect the harbour seal population at the site.

Therefore, it can be concluded that the favourable conservation condition of harbour seal will be maintained at Murlough SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.8 North Channel SAC

The North Channel SAC is located 44 km from the MUL Area boundary off the eastern coast of Northern Ireland. It is designated as a SAC for harbour porpoise (NRW, 2019a). The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with harbour porpoise for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.8.1 Assessment against conservation objectives

Qualifying Interest: Harbour porpoise

Harbour porpoise is a viable component of the site: the MUL Area does not spatially overlap the North Channel SAC. The proposed SI works will not interact with the harbour porpoise directly at the site or cause injury, killing or other factors that would restrict the survivability and reproductive potential of harbour porpoise using the SAC. No unacceptable levels of impacts on harbour porpoise within their natural range will occur. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. As the proposed SI works are 44 km from the SAC, there is no likelihood of the proposed SI works contributing to unacceptable levels of impacts to harbour porpoise which use the SAC.

There is no significant disturbance of the species: The proposed SI works have the potential to introduce underwater noise from the geophysical and geotechnical surveys within the Irish Sea. There may be some low-level disturbance to harbour porpoise while the surveys are ongoing resulting in potential avoidance behaviour. As stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. As harbour porpoise are transient there is a possibility that they could be utilising the MUL Area. The risk of auditory injury will be mitigated through the application of MMOs and soft

starting equipment, as outlined in DAHG (2014) guidance. The MMO will conduct a pre-activity search for 30 minutes within a 500 m/1,000 m monitored zone, which will ensure that no marine mammals are within the range for auditory injury prior to equipment start-up. Large TTS ranges are partially due to the precautionary modelling and assumes that no other vessels are present in the area, which is extremely unlikely. Given the nature of the surveys and limited scale and duration, the proposed SI works will not adversely disturb the harbour porpoise population at the site.

The condition of supporting habitats and processes, and the availability of prey is maintained: As stated above the MUL Area does not spatially overlap with the North Channel SAC. The underwater noise produced by the proposed SI works will not affect the characteristics of the seabed or water column of the SAC. The availability of prey species will be maintained.

Therefore, it can be concluded that the favourable conservation condition of harbour porpoise will be maintained at North Channel SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.2.9 North Anglesey Marine / Gogledd Mrn Forol SAC

North Anglesey Marine SAC is located off the northwest coast of Wales, 52 km from the MUL Area boundary, and is designated for harbour porpoise (NRW, 2019b). The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with harbour porpoise for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.2.9.1 Assessment against conservation objectives

Qualifying Interest: Harbour porpoise

Harbour porpoise is a viable component of the site: the MUL Area does not spatially overlap the North Anglesey Marine/Gogledd Mrn Forol SAC. The proposed SI works will not interact with the harbour porpoise directly at the site or cause injury, killing or other factors that would restrict the survivability and reproductive potential of harbour porpoise using the SAC. No unacceptable levels of impacts on harbour porpoise within their natural range will occur. However, as stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. As the proposed SI works are 52 km east of the SAC, there is no likelihood of the proposed SI works contributing to unacceptable levels of impacts to harbour porpoise which use the SAC.

There is no significant disturbance of the species: The proposed SI works have the potential to introduce underwater noise from the geophysical and geotechnical surveys within the Irish Sea. There may be some low-level disturbance to harbour porpoise while the surveys are ongoing resulting in potential avoidance behaviour. However, as stated above, project specific mitigation will be implemented which will result in a maximum auditory injury range of within 650 m of the sound source for harbour porpoise and a maximum TTS range of within 3 km of the sound source. As harbour porpoise are transient there is a possibility that they could be utilising the MUL Area. The risk of auditory injury will be mitigated through the application of MMOs and soft starting equipment, as outlined in DAHG (2014) guidance. The MMO will conduct a pre-activity search for 30 minutes within a 500 m/1,000 m monitored zone, which will ensure that no marine mammals are within the range for auditory injury prior to equipment start-up. Large TTS ranges are partially due to the precautionary modelling and assumes that no other vessels are present in the area, which is extremely unlikely. Given the nature of the surveys and limited scale and duration, the proposed SI works will not adversely disturb the harbour porpoise population at the site.

The condition of supporting habitats and processes, and the availability of prey is maintained: As stated above the MUL Area does not spatially overlap with the North Anglesey Marine SAC. The underwater noise produced by the proposed SI works will not affect the characteristics of the seabed or water column of the SAC. The availability of prey species will be maintained.

Therefore, it can be concluded that the favourable conservation condition of harbour porpoise will be maintained at North Anglesey Marine SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.3 Otter

5.3.1 Overview of impacts to otter (underwater noise)

In line with the precautionary principle, QI otter of the River Boyne and River Blackwater SAC was screened in for AA, due to the likelihood for significant effects as a result of underwater noise. Site-specific conservation objectives for otter at the relevant SACs are provided in Table 5-4.

Desk-based and site-specific survey data show that otter activity is rare within the areas adjacent to the MUL, however, as otters can forage within 80 m of the shoreline (NPWS, 2009), there is potential for interaction between otters and underwater noise generated during nearshore geophysical and geotechnical surveys being undertaken within this zone. Taking into account the width of the MUL Area at Dunany Beach, this equates to a potential otter marine foraging zone of approximately 0.052 km². In the context of the overall MUL Area, this equates to <0.5% of the available survey area. It is therefore highly unlikely that survey operations would overlap with a foraging otter, however, underwater noise impacts were considered in the Subsea Noise Technical Report.

While there are no published underwater noise injury criteria for Eurasian otter, Southall et al. (2019) has provided injury criteria for the 'Other marine carnivores in water (OCW)' hearing group, which includes sea otters. The OCW criteria is extended to Eurasian otter in the current assessment in the absence of more suitable criteria.

To assess the impacts of the geophysical and geotechnical surveys, four scenarios were modelled. Each scenario assumed that all sound sources were active including the vessel, as a 'worst-case scenario'. An appropriate soft-start was incorporated into the modelling, following DAHG (2014) guidance (20 minutes for geophysical sound sources, 40 minutes for sparker/boomer). These scenarios are as follows:

1. Geophysical survey (MBES, SSS, parametric SBP), USV.
2. Geophysical survey (MBES, SSS, USBL, sparker, boomer), large vessel with parametric SBP.
3. Geophysical survey (MBES, SSS, USBL, sparker, boomer), large vessel with chirper/pinger SBP.
4. Geotechnical survey (rotary core boreholes and vibrocoring, SPT, USBL).

Geophysical survey, USV (MBES, SSS, parametric SBP) – 20-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury and TTS to otter within <10 m of the sound source, and behavioural disturbance within 420 m of the sound source.

Geophysical survey, large vessel (MBES, SSS, USBL, sparker, boomer, parametric SBP) – 40-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury to otter within <10 m of the sound source, TTS within 360 m of the sound source and behavioural disturbance within 16 km of the sound source.

Geophysical survey, large vessel (MBES, SSS, USBL, sparker, boomer, chirper/pinger SBP) – 40-minute soft start

- The geophysical surveys under this scenario have the potential to cause auditory injury to otter within <10 m of the sound source, TTS within 360 m of the sound source and behavioural disturbance within 16 km of the sound source.

Geotechnical survey (rotary core boreholes, vibrocoring, SPT, USBL) – soft start not applicable

- The geotechnical surveys have the potential to cause auditory injury to otter within <10 m of the sound source, TTS within 130 m of the sound source and behavioural disturbance within 16 km of the sound source.

For all modelled scenarios, the distance within which otter could experience auditory injury is limited to <10 m. It is likely that, in addition to this much reduced risk range, the physical presence of a survey vessel or JUB will cause otters to avoid the immediate vicinity of the surveys, and therefore, they will not come within 10 m of the sound source. TTS could occur within 360 m of the larger geophysical surveys under both scenarios and within 130 m of the geotechnical survey. Any interaction between otters and geophysical and/or geotechnical surveys will be within 80 m of the landfall location.

Proposed Mitigation

In addition to the implementation of a soft-start for geophysical and sparker/boomer sources, in line with DAHG (2014), as outlined above, as a precautionary measure it is proposed to include foraging otters in the pre-start monitoring to be undertaken for marine mammals. This will allow any otters observed within the monitored zone (500 m for geophysical and geotechnical surveys and 1,000 m for sparker/boomer surveys) to exit the zone of impact before soft start is commenced.

As part of the standard application of DAHG (2014) guidance, a qualified and experienced MMO will be appointed during geophysical and geotechnical surveys. The MMO will search for marine mammals (and otter) within the monitored zone, which is a 500 m or 1,000 m radial distance of the sound source intended for use. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals (or otters) detected within the monitored zone by the MMO. In commencing sound producing activities using the equipment listed above, a soft-start procedure (i.e. 20 or 40 minute soft-start depending on the activity) must be used. Once the soft-start procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500 m/1,000 m radial distance, of the sound source. Breaks in sound output and line turns must be addressed as outlined in DAHG (2014).

Considering the above mitigation, the potential for adverse effects to QI otter of the River Boyne and River Blackwater SAC due to underwater noise impacts is assessed against each site-specific conservation objective below.

Table 5-4 Site-specific conservation objectives for relevant qualifying interests of SACs (otter)

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attribute
River Boyne and River Blackwater SAC (IE002299) (NPWS, 2021, Version 1 03/12/2021)		
Otter [1355]	To maintain the favourable conservation condition	Distribution
		Extent of terrestrial habitat
		Extent of freshwater (river) habitat
		Extent of freshwater (lake) habitat
		Couching sites and holts
		Fish biomass available
		Barriers to connectivity

5.3.2 River Boyne and River Blackwater SAC

The River Boyne and River Blackwater SAC is designated for otter, the 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 (NPWS, 2014b). The MUL Area is located 15 km north of the mouth of the SAC. The underwater noise produced from the geophysical and geotechnical SI works have the potential to interact with otter for which the SAC is designated. Therefore, this species is assessed in more detail against the conservation objectives below.

5.3.2.1 Assessment against conservation objectives

Qualifying Interest: Harbour porpoise

Distribution: It is possible for otters from the SAC to utilise the nearshore areas of the MUL Area, however, mitigation measures will be put in place to ensure noise-producing activities do not commence until otters have left the impact zone. Given the wider foraging areas readily available and the temporary nature and limited scale of the proposed SI works, there will be no impact to the distribution of otter from the River Boyne and River Blackwater SAC.

Extent of terrestrial habitat: The proposed SI works do not overlap spatially with the SAC, or with any habitat above the HWM, therefore there will be no decline in the extent of terrestrial habitats.

Extent of freshwater (river) habitat: The proposed SI works do not overlap spatially with the SAC, or any freshwater habitat, therefore there will be no significant decline in the extent of freshwater (river) habitats.

Extent of freshwater (lake) habitat: The proposed SI works do not overlap spatially with the SAC, or any freshwater lakes, therefore there will be no significant decline in the extent of freshwater (lake) habitats.

Couching sites and holts: The proposed SI works do not overlap spatially with the SAC, and no couches or holts have been observed within the vicinity of the MUL Area. Therefore, there will be no significant decline to otter couches or holts within the SAC.

Fish biomass available: The SI works will overlap with approximately 0.052 km² of potential otter marine foraging habitat. Given that the MUL Area is located 15 km from the SAC, any otter commuting this far would have ample alternative foraging opportunities. Therefore, there will be no significant decline in fish biomass available.

Barriers to connectivity: The proposed SI works will not introduce any permanent barriers to connectivity. While there is potential for foraging otters to overlap with nearshore surveys, mitigation measures will be put in place to ensure noise-producing activities do not commence until otters have left the impact zone. Therefore, there will be no obstruction or displacement to foraging otters.

Therefore, it can be concluded that the favourable conservation condition of otter will be maintained at River Boyne and River Blackwater SAC, and as such, there will be no adverse effect on site integrity as a result of the SI works.

5.4 Birds

5.4.1 Overview of impacts to Birds

In line with the precautionary principle, the following SPAs were screened in for AA, as likely significant effects due to above-water disturbance could not be excluded at the screening stage:

- North-west Irish Sea SPA (seabirds foraging within MUL Area)
- Dundalk Bay SPA (wintering waterbirds and gull)
- Carlingford Lough SPA (wintering geese)
- Stabannan-Braganstown SPA (wintering geese)

Likely significant effects due to habitat loss, alteration or fragmentation and underwater noise effects were ruled out for all SPAs.

The interaction between the proposed SI works and the above SPAs will be investigated in more detail to establish whether there is a credible risk from the proposed SI works. Where no such risk to SCI birds exists, no further assessment will be undertaken. Where there is a risk of impact from the SI works to SCI birds, a detailed assessment against the conservation objectives will be undertaken.

5.4.2 Seabirds

5.4.2.1 Overview of seabird SPAs

As outlined in the AA Screening Report, the North-west Irish Sea SPA provides additional supporting habitats for foraging and maintenance behaviours for those seabirds that breed at colonies on the North-west Irish Sea's islands and coastal headlands (NPWS, 2023a). As the MUL Area overlaps with the SPA, the SCI species will be foraging within the MUL Area. The North-west Irish Sea SPA has been brought forward to NIS for the assessment of above-water disturbance effects to the following bird species: red-throated diver (*Gavia stellata*), great northern diver (*Gavia immer*), fulmar (*Fulmaris glacialis*), Manx shearwater (*Puffinus puffinus*), cormorant (*Phalacrocorax carbo*), shag (*Phalacrocorax aristotelis*), common scoter (*Melanitta nigra*), black-headed gull (*Chroicocephalus ridibundus*), common gull (*Larus canus*), lesser black-backed gull (*Larus fuscus*), herring gull (*Larus argentatus*), kittiwake (*Rissa tridactyla*), roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), arctic tern (*Sterna paradisaea*), little tern, guillemot (*Uria aalge*), razorbill (*Alca torda*), puffin (*Fratercula arctica*), and little gull (*Hydrocoloeus minutus*) (NPWS, 2023b).

Dundalk Bay SPA is also designated for the presence of seabird species (gull species) and impacts to the relevant seabird SCIs of this site are considered below.

The North-west Irish SPA spans from intertidal coastal zones out to the offshore Irish Sea and is ecologically connected to multiple other SPAs in the area. The shallow intertidal habitats provide shelter and food for overwintering birds while the pelagic zone offers resources to seabirds both in and out of seasonal breeding periods. It is important to note that the North-west Irish Sea SPA does not protect breeding seabirds at the nest, but rather supporting foraging habitat. Colonies for those breeding species have already been designated at SPAs along the east coast of Ireland. The SCIs along with their conservation objectives for North-west Irish Sea SPA are provided in Table 5-5.

Dundalk Bay SPA has been designated primarily for wintering water birds, however, also protects the following wintering seabirds: black-headed gull, common gull and herring gull. It is assumed that these birds will also utilise the North-west Irish Sea SPA, and are also listed as SCIs for that site, with more comprehensive conservation objectives. Therefore, no further assessment of gulls at Dundalk Bay SPA will be undertaken.

Table 5-5 Site-specific conservation objectives for North-west Irish Sea SPA

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attributes Potentially Affected by the Project
North-west Irish Sea SPA (IE004236) (NPWS, 2023b; Version 1, 19/09/2023)		
<i>Gavia stellata</i> (red-throated diver) [A001] <i>Gavia immer</i> (great northern diver) [A003] <i>Melanitta nigra</i> (common scoter) [A065] <i>Chroicocephalus ridibundus</i> (black-headed gull) [A179] <i>Larus canus</i> (common gull) [A182] <i>Larus marinus</i> (great black-backed gull) [A187] <i>Hydrocoloeus minutus</i> (little gull) [A862]	To maintain the favourable conservation condition	Non-breeding population size Spatial distribution Forage spatial distribution, extent and abundance Disturbance across the site Barriers to connectivity and site use
<i>Fulmaris glacialis</i> (fulmar) [A009] <i>Larus argentatus</i> (herring gull) [A184] <i>Rissa tridactyla</i> (kittiwake) [A188] <i>Uria aalge</i> (guillemot) [A199] <i>Alca torda</i> (razorbill) [A200]	To maintain the favourable conservation condition	Population size Spatial distribution Forage spatial distribution, extent, abundance and availability Disturbance across the site Barriers to connectivity
<i>Puffinus puffinus</i> (Manx shearwater) [A013] <i>Phalacrocorax carbo</i> (cormorant) [A017] <i>Phalacrocorax aristotelis</i> (shag) [A018] <i>Larus fuscus</i> (lesser black-backed gull) [A183] <i>Sterna dougallii</i> (roseate tern) [A192] <i>Sterna Hirundo</i> (common tern) A193] <i>Sterna Paradisaea</i> (arctic tern) [A194] <i>Sterna albifrons</i> (little tern) [A885] <i>Fratercula arctica</i> (puffin) [A204]	To maintain the favourable conservation condition	Breeding population size Spatial distribution Forage spatial distribution, extent, abundance and availability Disturbance across the site Barriers to connectivity

5.4.2.2 North-west Irish Sea SPA

The physical presence of survey vessels in the marine environment, and the noise associated with the operation of survey equipment, could result in a limited degree of disturbance to seabirds in the vicinity of

survey vessels and/or JUB. Birds present on the surface waters near the survey vessel could be temporarily displaced from their chosen feeding/resting locations. For all surveys, vessel activity in any one location will be of short duration with the vessels moving steadily forward along the transect lines (e.g. during geophysical surveys) or remaining stationary at sample locations for short durations (e.g. during geotechnical, benthic sampling and metocean deployment etc) before transitioning to the next location. This activity will not differ considerably to existing vessel activity in the region. There is a regular baseline of vessel traffic within the MUL Area, while commercial and fishing vessels transverse the MUL Area to access nearby ports i.e. Warrenpoint Port in Co. Down, Kilkeel Harbour Co. Down, Greenore Port Co. Louth, Dundalk Port, Co. Louth, Port Oriel Co. Louth and Drogheda Port Co. Louth. A shipping and navigational risk assessment conducted as part of the wider project showed that the MUL Area is used primarily by fishing vessels, with some cargo vessel routes passing through the eastern and northeastern region of the MUL Area. (RPS, 2024d). It is not anticipated that above-water noise emitted by the survey vessels and equipment will differ significantly from that emitted by vessels already using the area. Birds using the area are likely to be habituated to the baseline levels of activity and are unlikely to be significantly disturbed by the presence of vessels.

It is expected that any temporary displacement will be comparable to that experienced in response to routine shipping traffic (Hartley Anderson Limited, 2020) and when the survey vessel has left the area, birds can resume foraging activities. Therefore, impacts on bird fitness will not lead to population-level effects at the SPA.

There will be no change in the long-term population trend or distribution of any species and no reduction in foraging or breeding habitat area due to the proposed temporary SI works, **therefore favourable conservation condition will be maintained and there will be no adverse effect on the integrity of North-west Irish Sea SPA.**

5.4.2.3 Ex-situ Effects

This section assesses ex-situ effects on wintering waterbirds including shorebirds, waders, geese and swans. In terms of sites designated for wintering shorebirds, the SI works does not overlap any SPA designated for wintering shorebirds. Therefore, there will be no spatial overlap with any SPAs designated for waterbirds and the proposed SI works. The closest SPA to the MUL Area, designated for wintering waterbirds is the Dundalk Bay SPA located 300 m from the MUL Area and Carlingford Lough SPA located 4 km north of the MUL Area. There is, however, potential for wintering birds from nearby SPAs to utilise the intertidal zone at Dunany Beach. Although some waterbird species will be faithful to specific habitats within their wintering SPAs, many will at times also use habitats situated within the immediate hinterland of the site or in areas ecologically connected to the SPA (NPWS, 2014c). There is therefore a potential pathway for ex-situ effects as several bird species may at times use habitats outside of but ecologically connected to their SPA. Significant habitat change or increased levels of disturbance within these areas could result in the displacement of one or more of the listed waterbird species and/or a reduction on their numbers (NPWS, 2014c). In particular, wintering swan and goose species can have foraging ranges of up to 20 km from their night roosts (SNH, 2016). Therefore, the following SPAs designated for swan and goose species and within 20 km were screened in for ex situ effects:

- Dundalk Bay SPA
- Carlingford Lough SPA
- Stabannan-Braganstown SPA

Table 5-6 Site specific conservation objectives for Dundalk Bay, Carlingford Lough and Stabannan-Braganstown SPA

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attributes Potentially Affected by the SI Works
Dundalk Bay SPA (IE004026) (NPWS, 2011b, Version 1 19/07/2011)		
Great crested grebe (<i>Podiceps cristatus</i>) [A005] Greylag goose (<i>Anser anser</i>) [A043] Light-bellied brent goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Mallard (<i>Anas platyrhynchos</i>) [A053] Pintail (<i>Anas acuta</i>) [A054] Common scoter (<i>Melanitta nigra</i>) [A065] Red-breasted merganser (<i>Mergus serrator</i>) [A069] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed plover (<i>Charadrius hiaticula</i>) [A137] Golden plover (<i>Pluvialis apricaria</i>) [A140] Grey plover (<i>Pluvialis squatarola</i>) [A141] Lapwing (<i>Vanellus vanellus</i>) [A142] Knot (<i>Calidris canutus</i>) [A143] Dunlin (<i>Calidris alpina</i>) [A149] Black-tailed godwit (<i>Limosa limosa</i>) [A156] Bar-tailed godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Black-headed gull (<i>Chroicocephalus ridibundus</i>) [A179] Common gull (<i>Larus canus</i>) [A182] Herring gull (<i>Larus argentatus</i>) [A184]	To maintain the favourable conservation condition	Population trend Distribution
Carlingford Lough SPA (IE004078) (NPWS, 2013b, Version 1 22/08/2013)		
Light-bellied brent goose (<i>Branta bernicla hrota</i>) [A046]		Population trend Distribution
Stabannan-Braganstown SPA (IE004091) (NPWS, 2022, Version 1 15/11/2022)		
Greylag goose (<i>Anser anser</i>) [A043]		Winter population trend Winter spatial distribution Disturbance at wintering site Barriers to connectivity and site use

Relevant Qualifying Interests	Site Specific Conservation Objective	Site Specific Attributes Potentially Affected by the SI Works
		Forage spatial distribution, extent and abundance Roost spatial distribution and extent Supporting habitat: area and quality

The MUL Area is 300 m from Dundalk Bay, all other SPAs for wintering waterbirds are a minimum of 4 km away from the MUL Area. Therefore, above-water disturbance to SCI species at their respective SPAs can be ruled out due to the intervening distance and topography.

There remains the possibility that ex situ birds from the sites listed in Table 5-6 will be present within the MUL Area during intertidal geotechnical sampling. SI works in the intertidal zone capable of producing noise beyond background levels will consist of the excavation of a maximum of 12 trial pits and drilling of a maximum of six boreholes. Existing land access routes will be used. The marine survey activities, including borehole drilling from the JUB, will be located too far from intertidal habitats to interact with wading waterbirds.

Given the availability of extensive alternative foraging and roosting habitat along this stretch of coastline and the temporary nature and short duration of the works on the beach, it is considered highly unlikely that the SI works will lead to levels of disturbance capable of resulting in long-term displacement or a reduction in population of any bird species.

There will be no change in the long-term population trend or distribution of any species and no reduction in wetland habitat area due to the proposed temporary SI works, therefore favourable conservation condition will be maintained and there will be no adverse effect on the integrity of the following SPAs:

- Dundalk Bay SPA
- Carlingford Lough SPA
- Stabanann-Braganstown SPA

Therefore, the favourable conservation condition of the populations and distributions of SCI waterbird species at Dundalk Bay SPA, Carlingford Lough SPA, Stabanann-Braganstown SPA, will be maintained.

5.5 In-combination effects

Even if projects are unlikely to have adverse effects on their own, the effects in-combination with those of other plans or projects could be adverse. An in-combination assessment must be carried out to identify projects/plans that could act in-combination to affect site conservation objectives (OPR, 2021).

In the AA Screening Report, an assessment of in-combination effects was carried out following MARA's stepwise approach outlined in their Technical Guidance document. A search was undertaken for other plans and projects that could act in-combination with the SI works, taking into account a Cumulative Effects Spatial Scope (CESS) of 3 km and a Cumulative Effects Temporal Scope (CETS) of plans or project likely to occur within the next six years. Impact pathways and predictions were considered and then relevant plans or project were identified. Full details of this assessment are provided in Section 7.3 of Attachment 4.3 AA Screening Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0006).

5.5.1 Plans

It was concluded that there are no current plans capable of overlapping with the CESS and CETS of the proposed SI works identified, thus, there is no potential for in-combination effects with other plans. Therefore, no plans were screened in for further assessment.

5.5.2 Projects

Tetra Tech undertook a desk study using internet searches, planning databases and other available sources, as outlined below, to identify other projects and activities likely to overlap with the CESS and CETS of the proposed SI works, which have the potential to give rise to in-combination effects (July 2026). Full details of this assessment are provided in Section 7.3 of Attachment 4.3 AA Screening Report (Report ref: MDR1520C-TTI-00-XX-RP-Z-0006). Based on the review of other projects occurring within the CESS and CETS of the proposed SI works, there is potential that the following projects could act in combination with the proposed SI works:

- Oriel Wind Farm Project (ACP ref: ABP-319799-24)
- Oriel Wind Farm Project Dumping at Sea application (DaS).

5.5.2.1 Oriel Wind Farm Project (ABP-319799) and DaS

There is potential for overlap between the construction of the Oriel Wind Farm Project and the proposed SI works as the two projects overlap temporally. However, the Applicant commits to ensuring all surveys granted under this MUL will not overlap with the construction of the Oriel Wind Farm Project. This commitment also applies to the DaS permit, which covers the deposition of drill arisings associated with the drilling of the monopile foundations.

5.5.2.2 In-combination conclusion

Any potential for cumulative effects between the SI works and the construction of the Oriel Wind Farm Project (including any Dumping at Sea activities) will be avoided by the Applicant's commitment to ensure there is no temporal overlap between the construction and these proposed SI works. Therefore, there will be no adverse in-combination effects on European sites.

6.0 Mitigation Measures

6.1 Mitigation of Adverse Effects

6.1.1 Standard water quality measures

As is standard procedure onboard vessels operating in the marine environment, the following standard measures will be implemented:

- All vessels will comply with international standards according to the MARPOL (maritime pollution) Convention and the Sea Pollution Acts with respect to wastewater and food waste discharges. Hazardous materials, radiation sources or chemicals will be stored, handled, used and documented in accordance with those legal provisions and also the Safety Health and Welfare at Work Act 2005, as amended, and associated regulations, which apply to vessels as places of work, and the Chemicals Act 2008, as amended, and associated regulations, accepted guidelines, and technical standards and requirements.
- An oil pollution emergency plan will be implemented onboard all survey vessels. This plan will specify:
 - Information on the location and detail of spill response resources on board;
 - Information on crew training in relation to oil pollution response; and
 - How crew will interface with other vessel operators, where applicable.
- Spill kits will be stored on board all vessels and will also be available where machinery is operating in the intertidal zone. Any fluid leaks or spills will be cleaned up immediately. All machinery or vehicles on the intertidal area will be fuelled on the hard-standing surface of a car park or road and at least 10 m from a drain or gully.

6.1.2 Avoidance of underwater noise impacts

Standard risk avoidance and/or risk reduction measures will be in place on geophysical and geotechnical survey vessels (including JUB), as required under *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* (DAHG, 2014). These measures will comprise visual observation during daylight hours and the use of soft start procedures, where appropriate. Note that a soft-start is not required under guidance for the geotechnical drilling. The incorporation of these measures will avoid auditory injury and reduce disturbance to marine mammals. The relevant sections of the DAHG (2014) guidance are as follows:

- **4.3.2 Drilling**
- **4.3.4 (i) Seismic surveys (including sparkers and boomers)**
- **4.3.4 (ii) Multibeam, single beam, side-scan sonar & sub-bottom profiler surveys**

In the interests of brevity, the detailed text from DAHG (2014) has not been repeated in full below. MMOs will review the source material prior to undertaking mitigation and a Marine Mammal Mitigation Plan (MMMP) will be drawn up prior to survey commencement. For geophysical, seismic and geotechnical surveys a qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms.

1. For surveys utilising geophysical techniques (no sparker/boomer), acoustic surveying shall not commence if marine mammals (or otters) are detected within a 500m radial distance of the sound source intended for use, i.e., within the Monitored Zone. The same applies for geotechnical investigations.

2. For surveys utilising sparker/boomer, surveying shall not commence if marine mammals (or otters) are detected within a 1,000m radial distance of the sound source intended for use.
3. Sound producing activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.
4. An agreed and clear on-site communication signal must be used between the MMO and the Works Superintendent as to whether the relevant activity may or may not proceed, or resume following a break (see below). It shall only proceed on positive confirmation with the MMO.
5. As the surveys will be undertaken entirely in waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO.
6. The prescribed Pre-Start Monitoring shall subsequently be followed by a ramp-up/soft-start procedure which should include continued monitoring by the MMO. Soft-start must be used in advance of all sound-producing activities, including during testing of acoustic sources. Please refer to the relevant section of the guidance for detailed information on soft-starts for different equipment. Please note that no soft-start is required under DAHG (2014) for geotechnical survey/drilling.
7. Soft-start procedures must be undertaken for a period of 20 minutes for geophysical surveys, and for a period of 40 minutes for seismic survey (including sparker and boomer surveys).
8. In all cases where a Ramp-Up Procedure is employed the delay between the end of ramp-up and the necessary full output must be minimised to prevent unnecessary high-level sound introduction into the environment.
9. Once the Ramp-Up Procedure commences, there is no requirement to halt or discontinue the procedure at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within the Monitored Zone.
10. Please refer to the relevant section of the guidance for detailed information on dealing with breaks in sound output and line turns.
11. Full reporting on MMO operations and mitigation undertaken must be provided to the Regulatory Authority.

7.0 Conclusion

This NIS has examined the potential implications of the SI Works, alone and in combination with other plans and projects, on the integrity of the SACs and SPAs identified below, considering each European site's structure, function, and conservation objectives.

- River Boyne and River Blackwater SAC
- Rockabill to Dalkey Island SAC
- Lambay Island SAC
- Codling Fault Zone SAC
- Slaney River Valley SAC
- Strangford Lough SAC
- Murlough SAC
- North Channel SAC
- North Anglesey Marine / Gogledd Mrn Forol SAC
- North-west Irish Sea SPA
- Dundalk Bay SPA
- Carlingford Lough SPA
- Stabannan-Braganstown SPA

MARA may use the information contained in this NIS for establishing its own complete, precise, and definitive findings and conclusions to ensure all reasonable scientific doubt has been removed regarding the effects of the proposed site investigations on relevant European sites. As stated above, no construction works associated with the overall Oriel Wind Farm Project are included as part of this MUL application.

Following a comprehensive evaluation of the potential direct, indirect, and in-combination effects on the conservation objectives of relevant SACs and SPAs, mitigation measures were prescribed where necessary. Consequently, it has been concluded in this NIS that the proposed SI works, either alone or in-combination with any other plan or project, will not adversely affect the integrity of any European Site.

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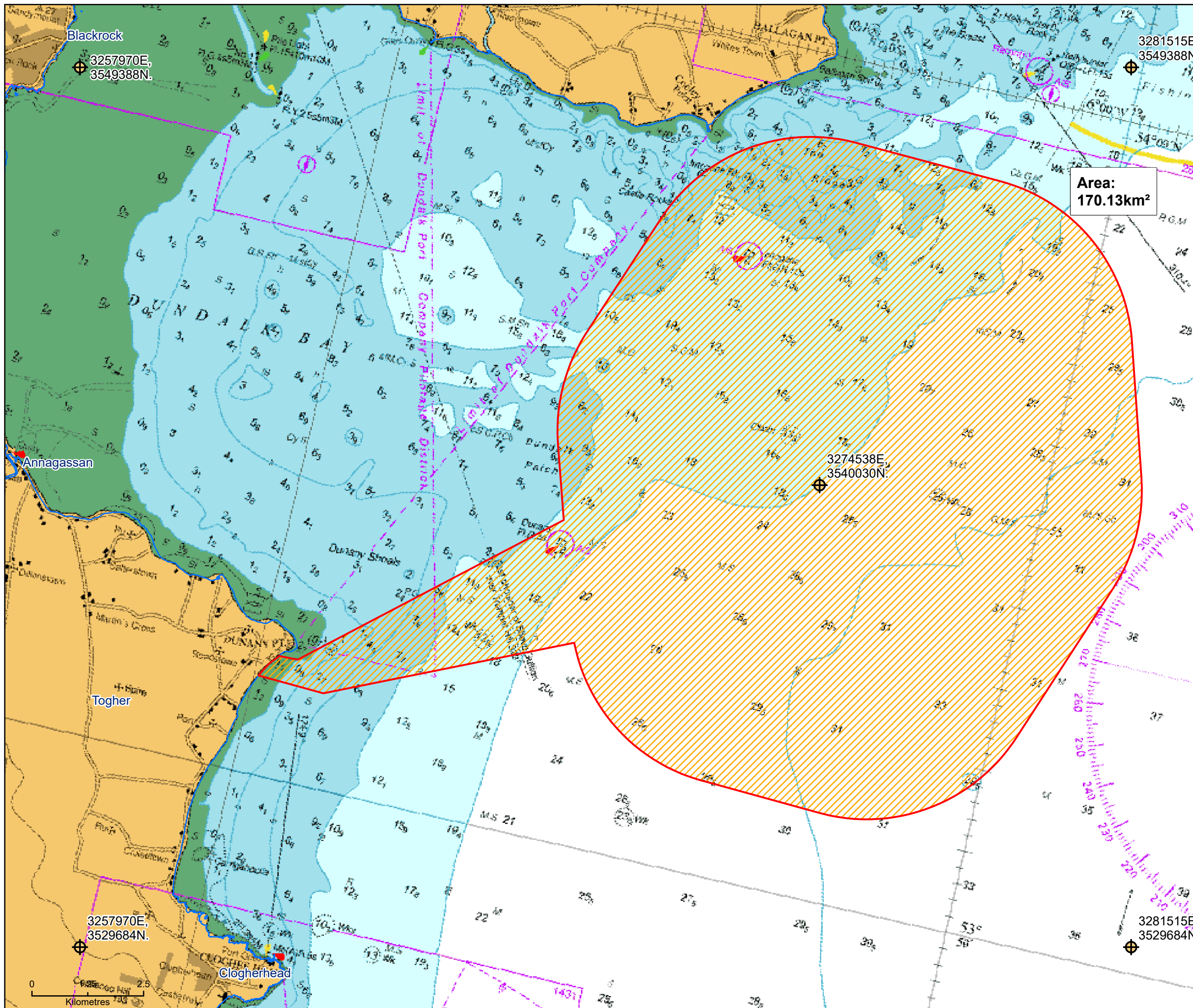
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Appendix A Drawings



Legend

- Maritime Usage Licence Area
- High Water Mark
- Proposed Geophysical Survey Location

Area: 170.13km²

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann

Client

Oriel Windfarm
Offshore Renewable Energy

Oriel Wind Farm Project

Title

Proposed geophysical
survey location

TETRA TECH
tetratech.com/europe

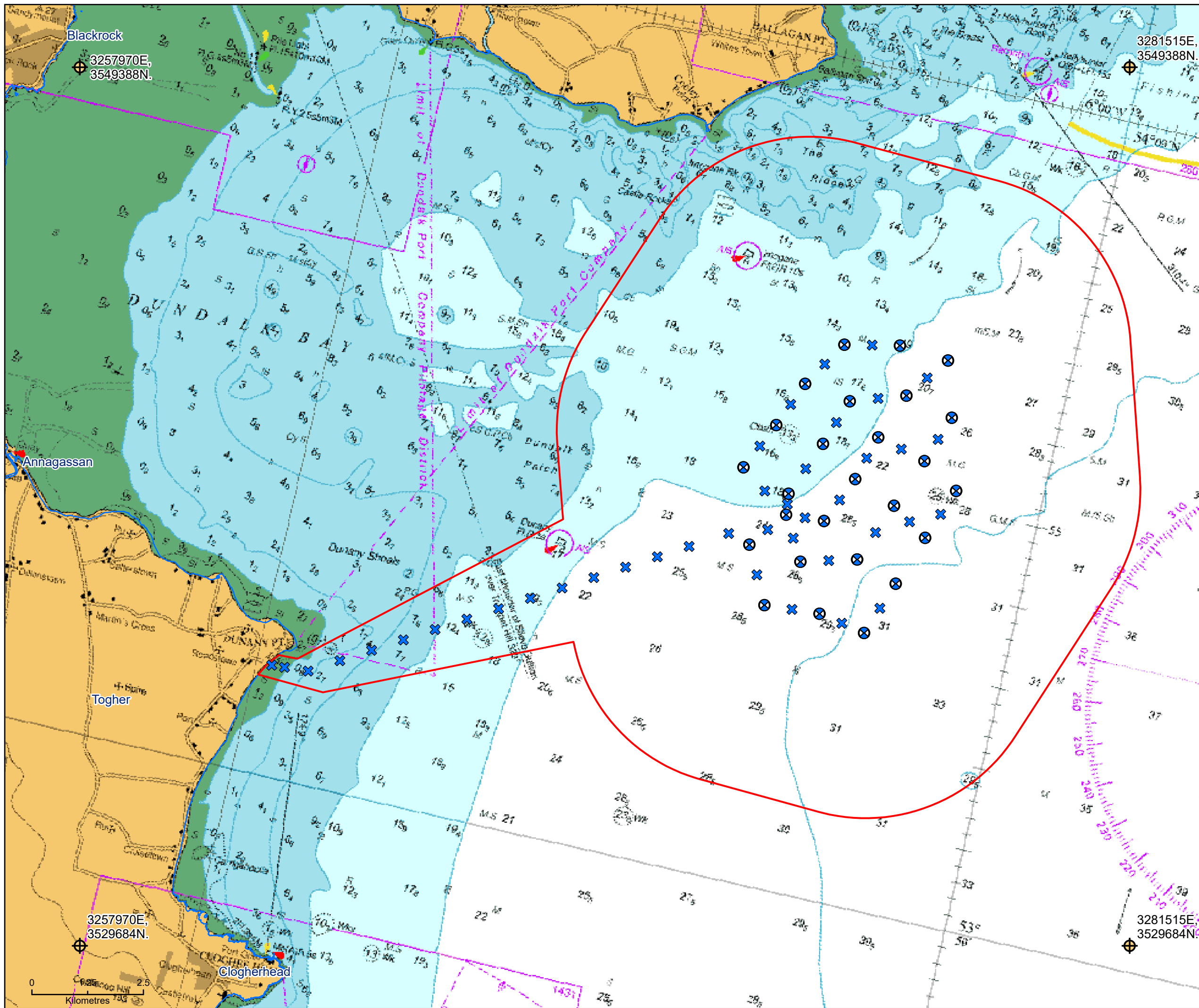
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Status: A1	Rev: C01
Drawn: NR	Date: 06/07/2026
Checked: RS	Scale: 1:80,000 (A3)
Approved: AE	Projection: ETRS 1989 LAEA

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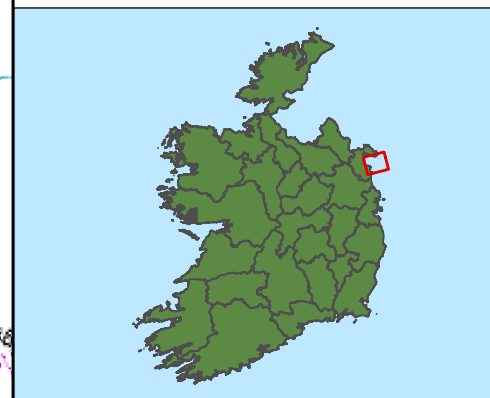


Legend

- Maritime Usage Licence Area
- High Water Mark
- Vibrocore/gravity coring
- Rotary core boreholes (3 replicates taken at each location)

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann



Client



Oriell Wind Farm Project

Title

Proposed marine geotechnical survey locations rotary core boreholes and vibrocores



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Issue Details

File Identifier:

MDR1520c-TTI-AP-XX-DR-Z-0004

Status:

A1

Rev:

C01

Drawn:

NR

Date:

06/07/2026

Checked:

RS

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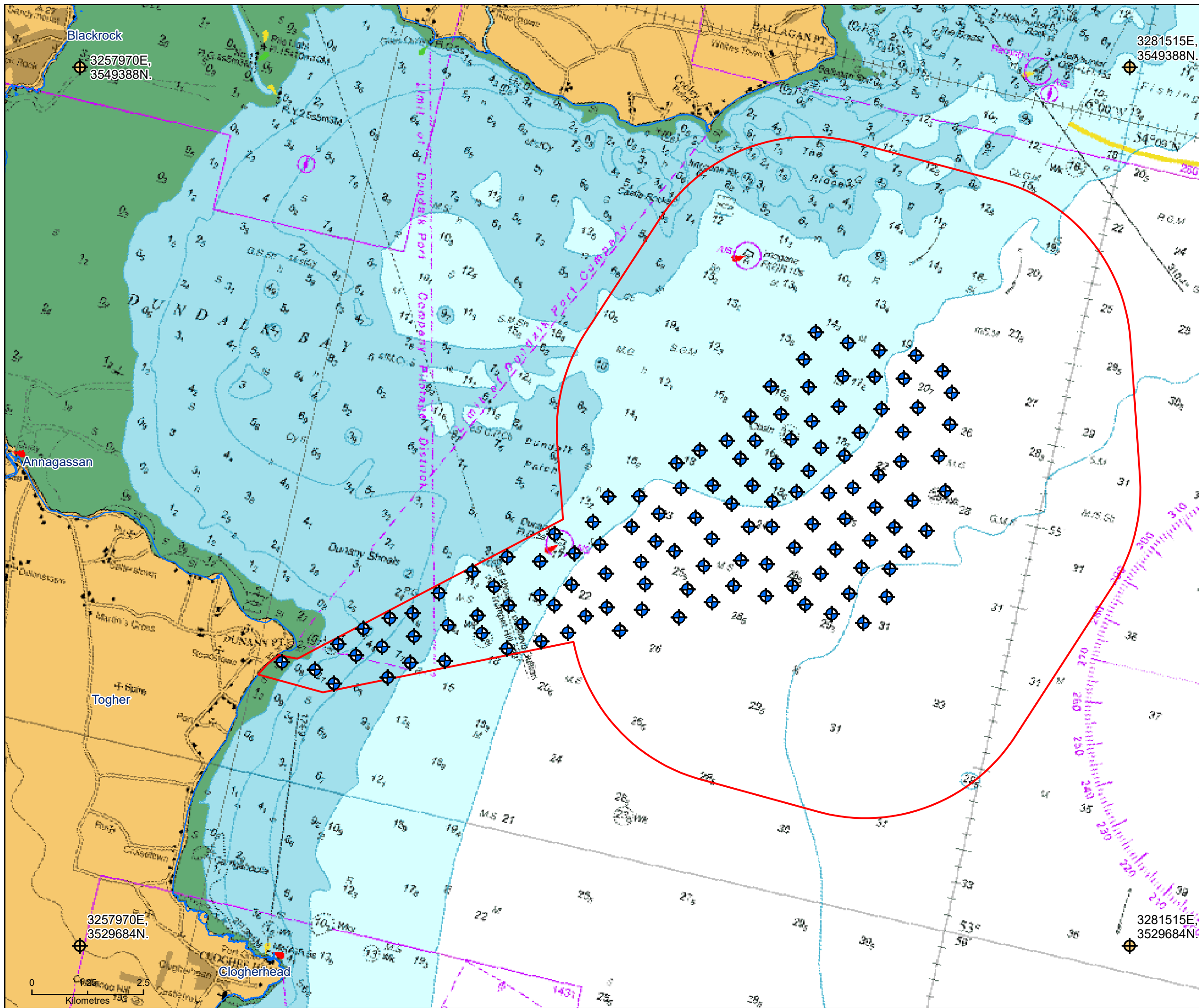
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Projection:

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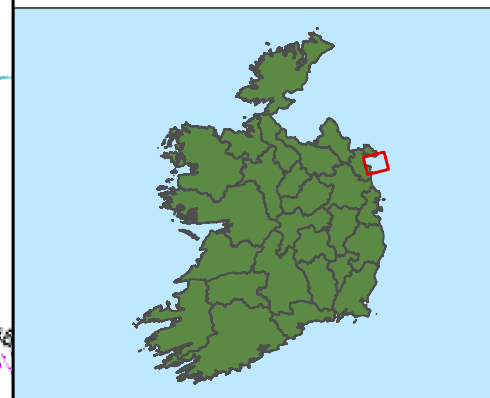


Legend

- Maritime Usage Licence Area
- High Water Mark
- CPT and SPT

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann



Client



Oriel Wind Farm Project

Title

Proposed marine geotechnical
survey locations-
CPT and SPT



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Issue Details

File Identifier:

MDR1520c-TTI-AP-XX-DR-Z-0006

Status:

A1

Rev:

C01

Drawn:

NR

Date:

06/07/2026

Checked:

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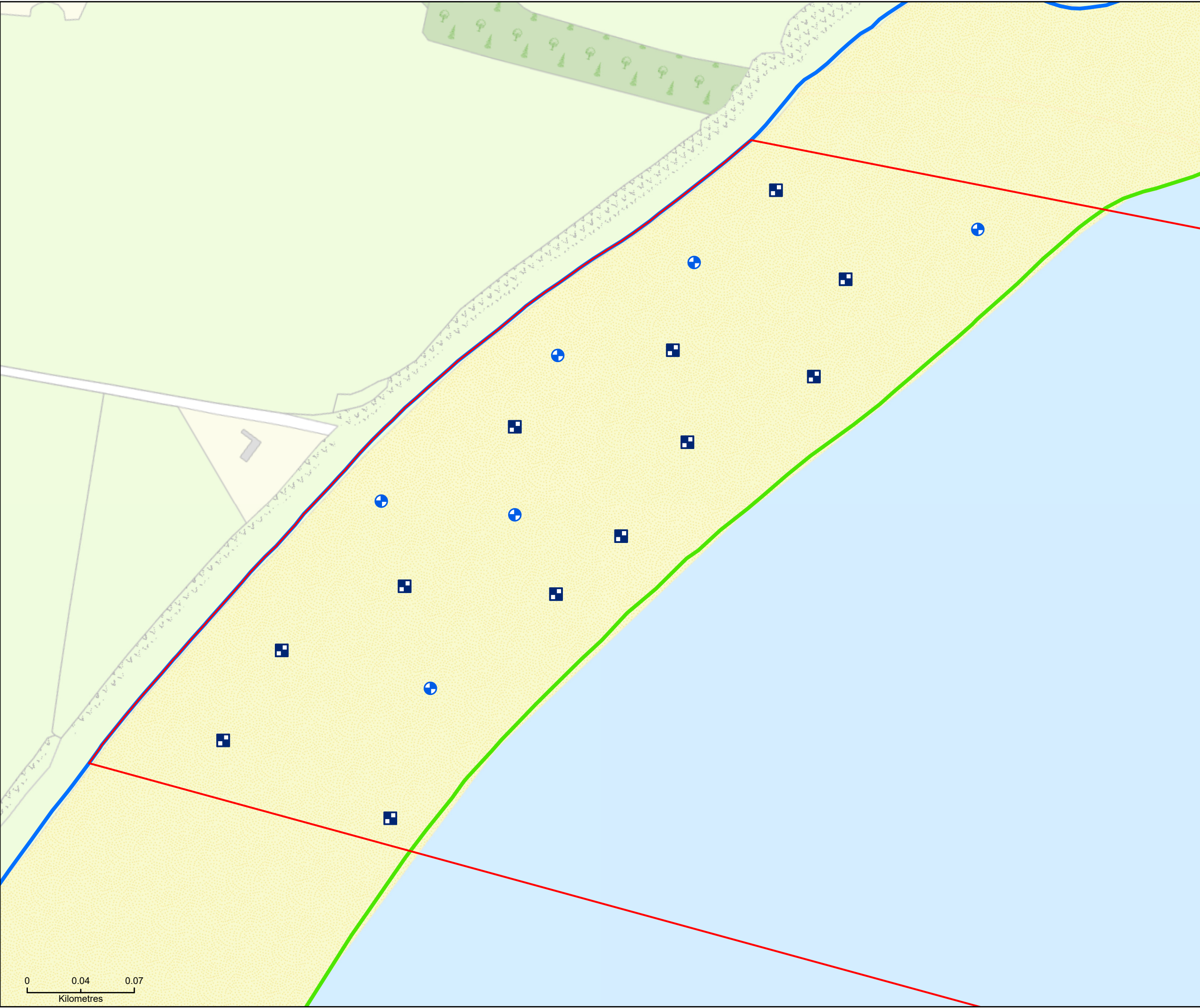
Approved: AE

Projection:

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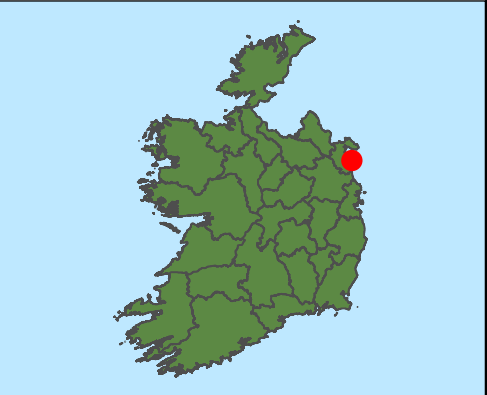


Legend

- Maritime Usage Licence Area
- High Water Mark
- Low Water Mark
- Borehole
- Trial Pit

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann



Client



Oriel Wind Farm Project

Title

Proposed intertidal geotechnical
survey locations-
Trial pit and boreholes



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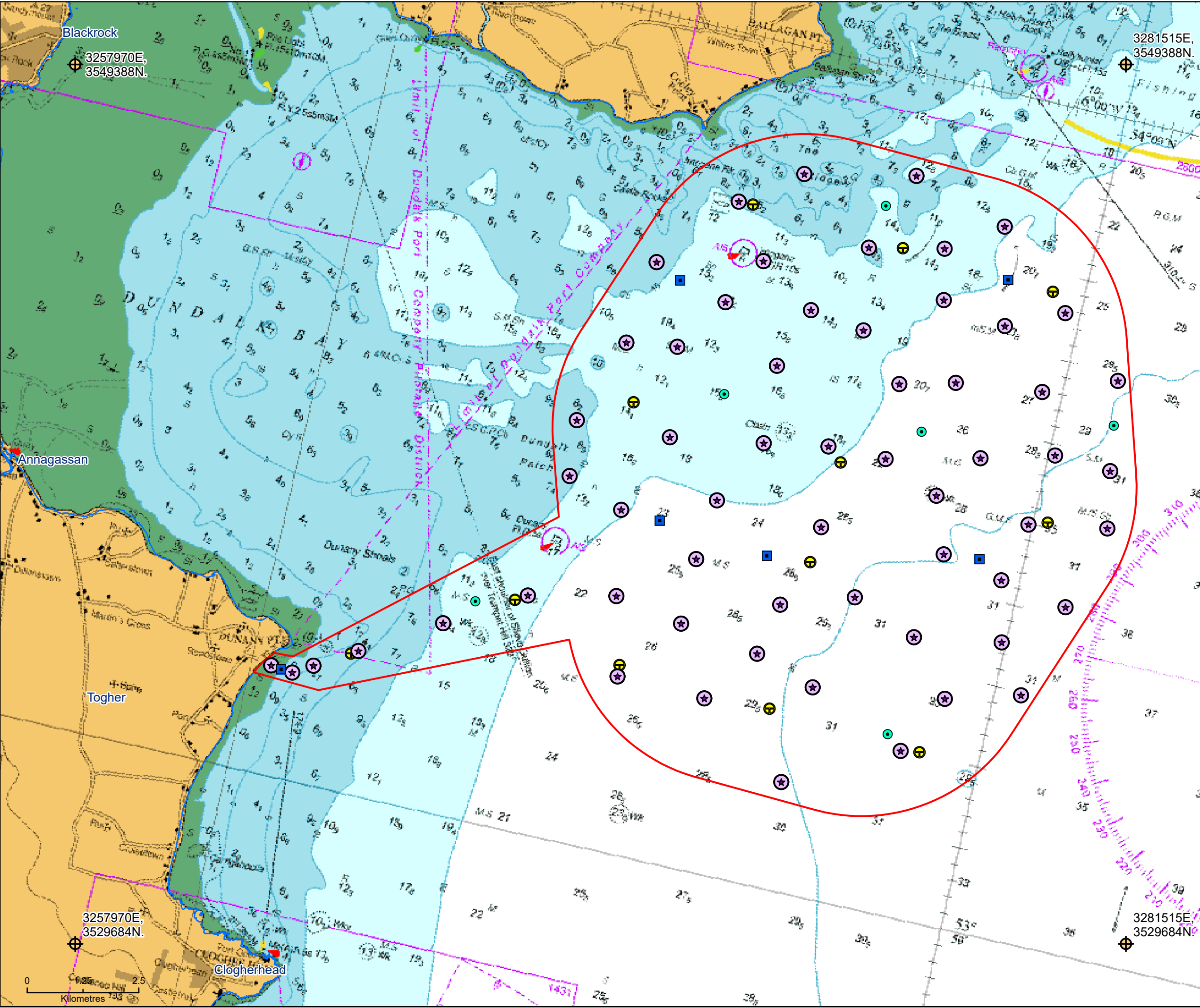
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Issue Details

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Drawn:	NR	Date: 06/07/2026
Checked:	RS	Scale: 1:2,500 (A3)
Approved:	AE	Projection: ETRS 1989 LAEA

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Legend

- Maritime Usage Licence Area
- High Water Mark
- Benthic Sample Locations
- CPODS
- Water Quality Sonde Locations
- Water Quality and Fish and Shellfish Sonde Locations

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann

Client

Oriel Wind Farm Project

Title

Proposed environmental survey locations

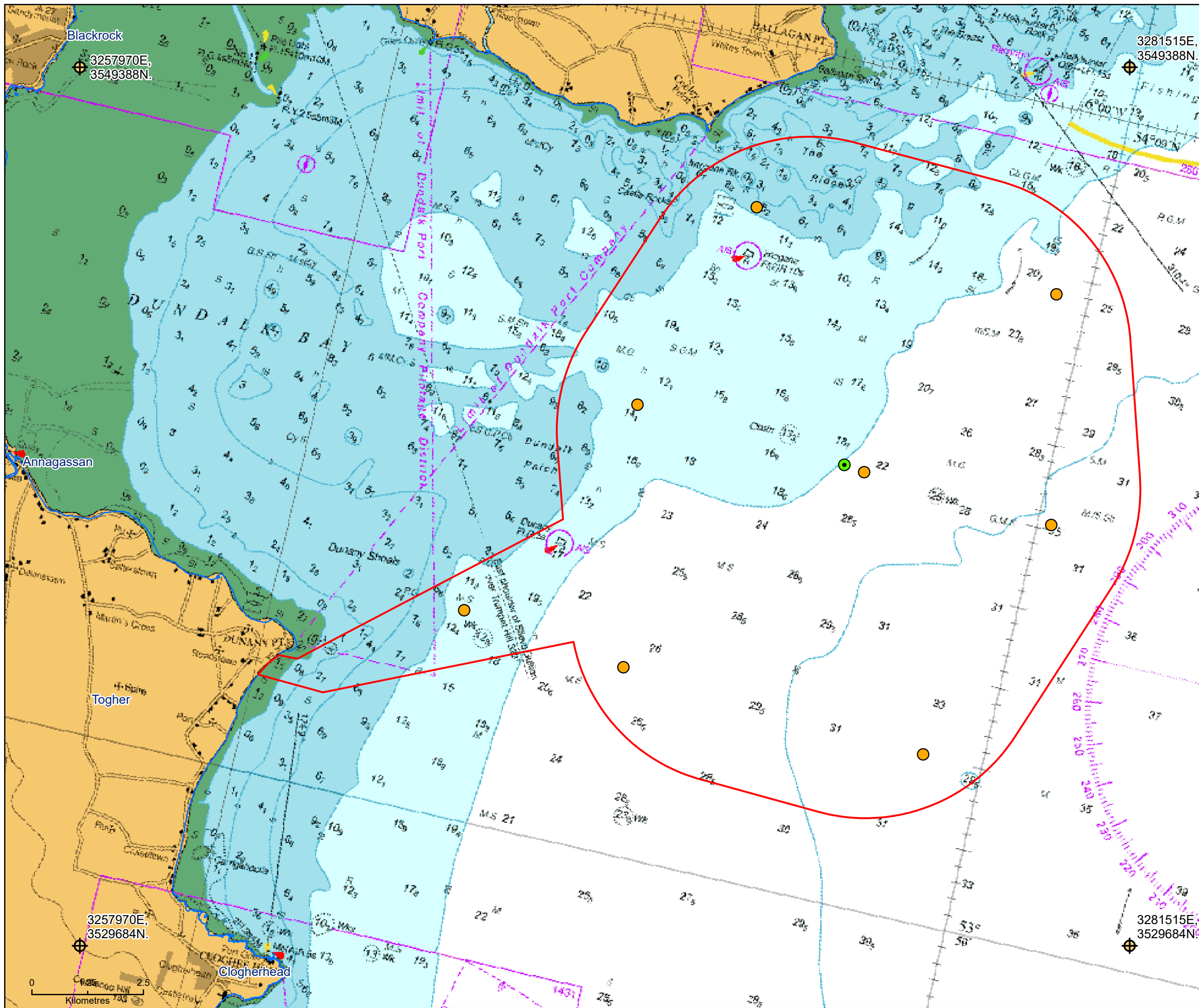
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Issue Details

File Identifier:
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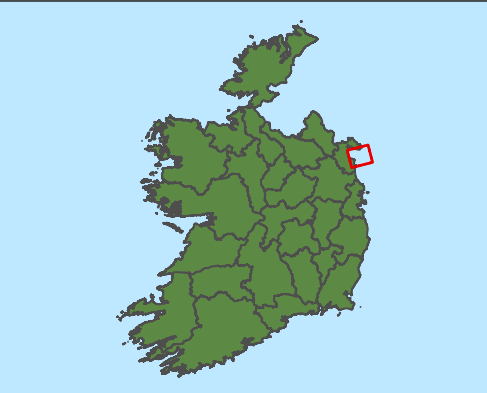


Legend

- Maritime Usage Licence Area
- High Water Mark
- ADCPs
- Metocean buoy

Drawn By:
Nicola Riordan, MSc Geographic Information Science
Senior Project Scientist GIS

Data Sources: Tailte Éireann



Client



Oriel Wind Farm Project

Title

**Proposed metocean
survey locations-
Metocean Buoy and ADCP**



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Issue Details

File Identifier:

MDR1520c-TTI-AP-XX-DR-Z-0012

Status:

A1

Rev:

C01

Drawn:

NR

Date:

06/07/2026

Checked:

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Scale:

1:80,000

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