POWERING UP OFFSHORE SOUTH COAST

Project Description

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PROJECT DESCRIPTION

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1 INTRODUCTION

The Irish Government is taking major steps to make Ireland carbon neutral by 2050. These steps include a commitment to increase the proportion of electricity generated from renewable sources to 80% by 2030. The Climate Action Plan 2024 (DECC, 2024) places offshore wind power at the centre of this commitment, with a key target being the grid connection of at least 5 Gigawatts (GW) of offshore wind by 2030.

EirGrid develops, manages, and operates Ireland's electricity grid and are responsible for the safe, secure and reliable supply of Ireland's electricity. EirGrid was established to act as the independent Transmission System Operator (TSO), in line with the requirements of the EU Electricity Directive (EU) 2019/944 (EU Electricity Directive). EirGrid became operational as the TSO on 1 July 2006 and is a public limited company, registered under the Companies Acts. The Irish Government has also designated EirGrid as the TSO and Transmission Asset Owner (TAO)/ Offshore Asset Owner (OAO) for Ireland's offshore electricity grid.

In March 2023, the Department of the Environment, Climate and Communications (DECC) published the "Accelerating Ireland's Offshore Energy Programme; Policy Statement on the Framework for Phase Two Offshore Wind" (the Framework). This policy identified EirGrid as the developer of new offshore grid transmission infrastructure to connect new offshore wind farms on the south coast.

On the basis of the policy, EirGrid has initiated the Powering Up Offshore South Coast (PUOSC) project. This will be the first state led offshore renewable electricity connection in Ireland. The project was included in the European Network of Transmission System Operators for Electricity (ENTSO-E) Ten Year Network Development Plan (TYNDP) in 2024. While the project is at an early stage of development, it is expected to include the development of offshore substation(s) off the southern coast of Ireland, new onshore and offshore transmission cables and new onshore compensation compound as required to accommodate the connection on the existing onshore transmission system. The development area will be established based on the South Coast Designated Maritime Area Plan (SC-DMAP), which was published by the Government of Ireland on 25th October 2024. This infrastructure will facilitate up to 900 MW of power generated by offshore wind farms in Irish waters into our national electricity grid.

The DECC Framework outlined a four-phase process for developing offshore wind energy infrastructure. In the short-term, the framework is based on a developer-led approach, taking advantage of projects that have been in development for several years. In the medium to long-term it transitions to a plan-led approach in which EirGrid plays a key role.

EirGrid are undertaking the engineering, planning and environmental services necessary to provide the grid infrastructure to support the development of offshore wind.

PHASE 2

As part of the government-led approach to the delivery of offshore wind, known as Phase 2, approximately 900 MW of electricity will be supplied from wind farms off Ireland's south coast. It is anticipated that these offshore wind farms will be constructed in Area A – Tonn Nua within the SC-DMAP area (see Figure 1.1).

These wind farms will be provided by private developers. EirGrid will be responsible for delivering the infrastructure that will connect the power from these wind farms off the south coast to the onshore grid. This will be realised through EirGrid's PUOSC project.

Following publication of the SC-DMAP, EirGrid plans to develop offshore electricity substation(s) and associated offshore transmission cables. This new infrastructure will connect the power generated by offshore windfarms to the national electricity grid.

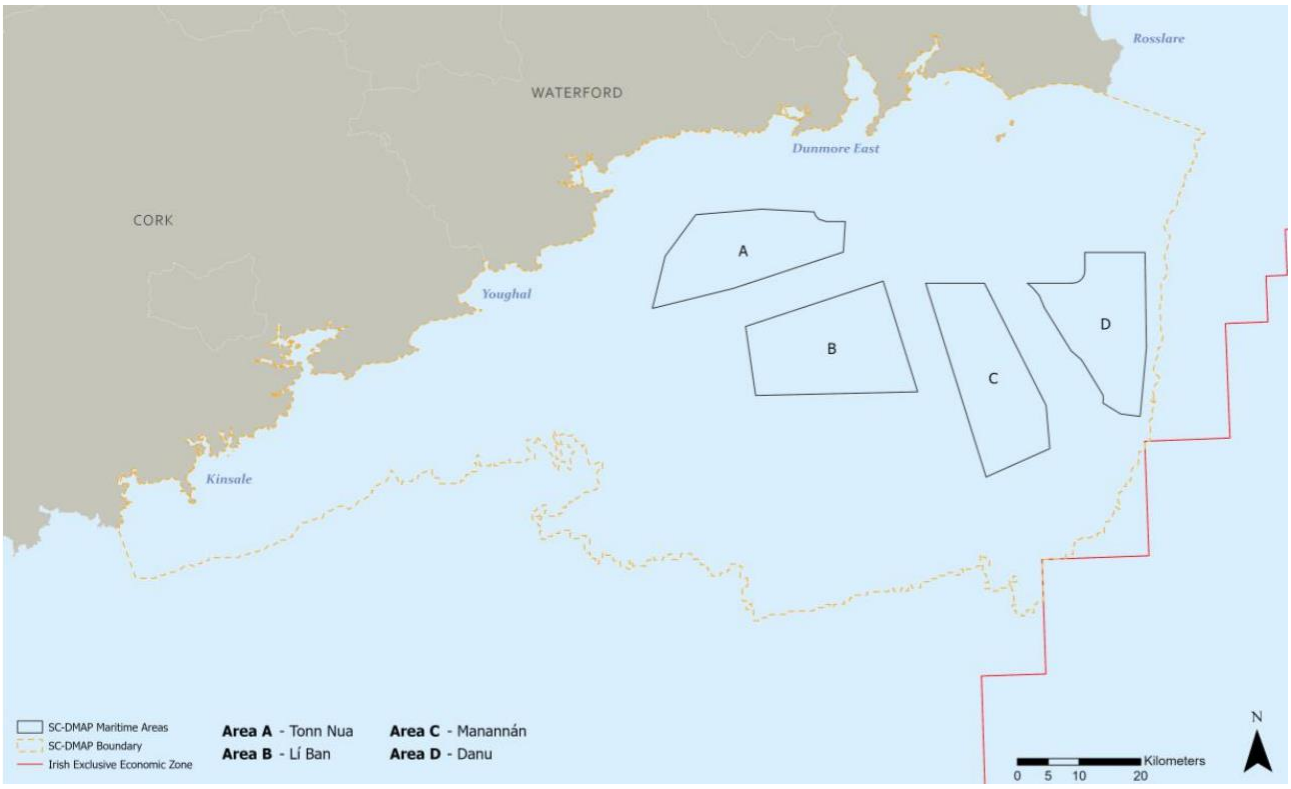

Figure 1.1 SC-DMAP Area

The main components of PUOSC project are:

- Offshore substation(s) – to be located within Maritime Area A (Tonn Nua) of the SC-DMAP (Figure 1.1).
- A connection between the offshore substation(s) and onshore compensation compounds. This will involve offshore transmission cables; and
- Onshore compensation compounds.

The precise location of the offshore substations have not yet been determined, nor has it been determined how and where they will connect to the national electricity grid onshore. However, due to onshore grid capacity constraints, it is anticipated that one 450 MW offshore to onshore connection will be developed in the Cork area and the other 450 MW offshore to onshore connection will be developed in the Waterford/ Wexford area.

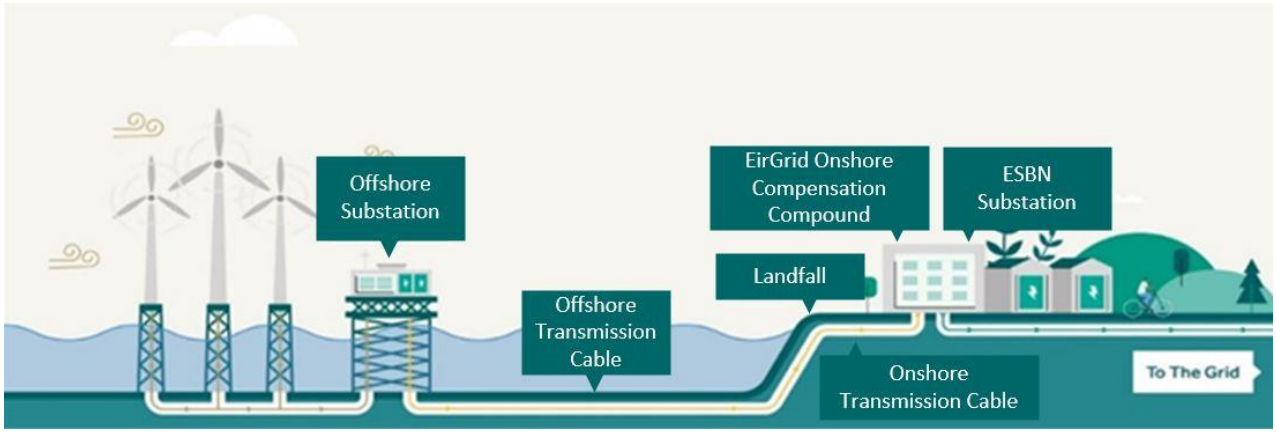

Figure 1.2 Typical Offshore Wind Project Schematic

1.1 Accompanying Reports

The Maritime Usage Licence Application (MULA) consists of the following documents and reports:

- Maritime Usage Licence Application;
- Project Description including drawings;
- Assessment of Impact on the Maritime Usage (AIMU);
- Supporting Information for Screening for Appropriate Assessment (SISAA);
- Risk Assessment for Annex IV Species;
- Subsea Noise Technical Report.

1.2 Purpose of the Report

This report has been prepared by RPS, on behalf of the EirGrid, to provide information on the site investigation (SI) works (the SI works) proposed to be undertaken for the PUOSC project in support of the Maritime Usage Licence Application (MULA) to MARA. This document provides a description of the proposed geophysical, geotechnical, metocean, environmental, archaeological and other surveys and investigations that are proposed to be undertaken. The project description includes details of the methods, equipment and quantities for proposed activities. The SI works will be used to inform engineering design and will also provide baseline data for any subsequent environmental assessments.

2 PROJECT DESCRIPTION

2.1 Site Location

The PUOSC SI works Area of Interest (AoI) is located off the south coast of Ireland from the High Water Mark (HWM) out into the Celtic Sea. The AoI has been developed to include:

- Potential areas where offshore substations (OSS) may be constructed,
- Potential offshore transmission cable corridors from the OSS locations towards seven potential landfall zones in coastal areas, and
- The intertidal area below the HWM at seven potential landfall zones where the offshore transmission cables will come to shore and connect to onshore infrastructure.

The AoI for this MULA is illustrated in Figure 2.1. This area is almost entirely within the area of the SC-DMAP except for a number of coastal locations. The AoI also includes the full extent of SC-DMAP Area A Tonn Nua within which it is proposed that the OSS will be located, as shown in Figure 2.1

A site location map with the proposed locations of SI works is shown in Figure 2.2 through to Figure 2.9. More detailed drawings are provided in Appendix A.

The total AoI encompass an area of 2,336 km^2. The western extent of the AoI is at Ringroe in County Cork (approx. 10 km south of Crosshaven and 13 km east of Kinsale) and extends eastwards to Cullenstown in County Wexford (approx. 4 km east of Bannow Bay and 6 km south of Wellingtonbridge). The AoI extends into the offshore area to approx. 34 km (18.4 nm) from the coastline at its furthest distance (measured from Bunmahon).

The AoI includes coastal areas below the HWM from Ringroe, Co. Cork to Ballycrenane Co. Cork, and from west of Bunmahon, Co Waterford to east of Bannow Bay, Co. Wexford. These coastal areas include seven possible landfall zones for the offshore transmission cables as summarised in Table 2.1.

Table 2.1 Potential Landfall Zones to be Investigated

Landfall Zone	Nearest Townlands	County
A	Ballintra West, Ballintra East, Inch, Lahard	Cork
B	Ballybrangan, Ballycroneen West, Ballyrobin South	Cork
C	Garryvoe Lower, Ballybutler, Ballycrenane	Cork
D	Templeyvrick, Ballynasissala, Bunmahon, Ballynagigla, Knockmahon	Waterford
E	Ramstown	Wexford
F	Bannow	Wexford
G	Haggard, Blackhall, Ballymadder	Wexford

2.2 Note on the AoI, Offshore Transmission Cable Corridors and Potential Landfall Zones

It must be noted, that as of the date of this report, no decision has been made on the final location of any infrastructural elements of the PUOSC project.

The information provided in the MULA, including maps, is based on desktop research only and on this basis potential locations for OSS, offshore transmission cable corridors and landfall zones have been identified. The purpose of the SI works is to identify if these potential locations are indeed suitable for the proposed PUOSC infrastructure.

As information from the SI works is collected, processed and analysed, it will inform whether additional areas of investigation are required. Therefore the AoI has been created to provide a wide enough area over which the required SI works can be completed in order to identify preferred locations for all of the PUOSC infrastructure.

A series of SI works and survey campaigns is proposed, as described later in this section.

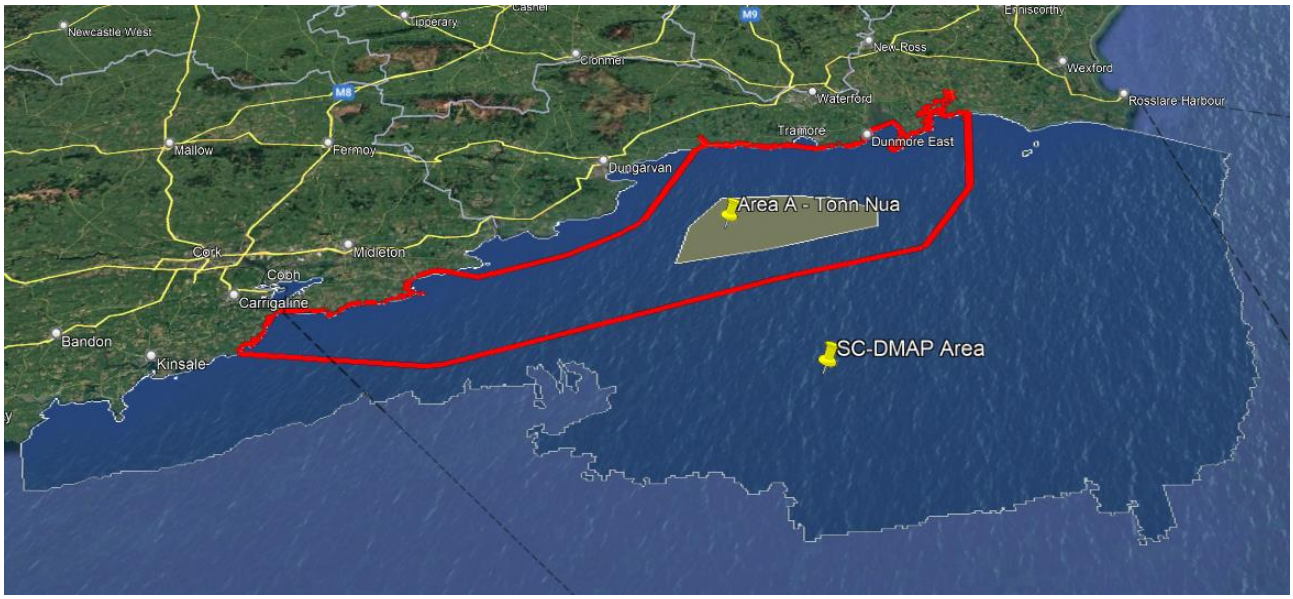

Figure 2.1 MUL AoI (redline boundary) and Area A Tonn Nua within the SC-DMAP Area

Figure 2.2 Overview of Proposed Investigation Locations along the Potential Offshore Transmission Cable Corridors and Landfall Zones

Figure 2.3 Proposed Investigation Locations at Landfall Zone A, Co. Cork

Figure 2.4 Proposed Investigation Locations at Landfall Zone B, Co. Cork

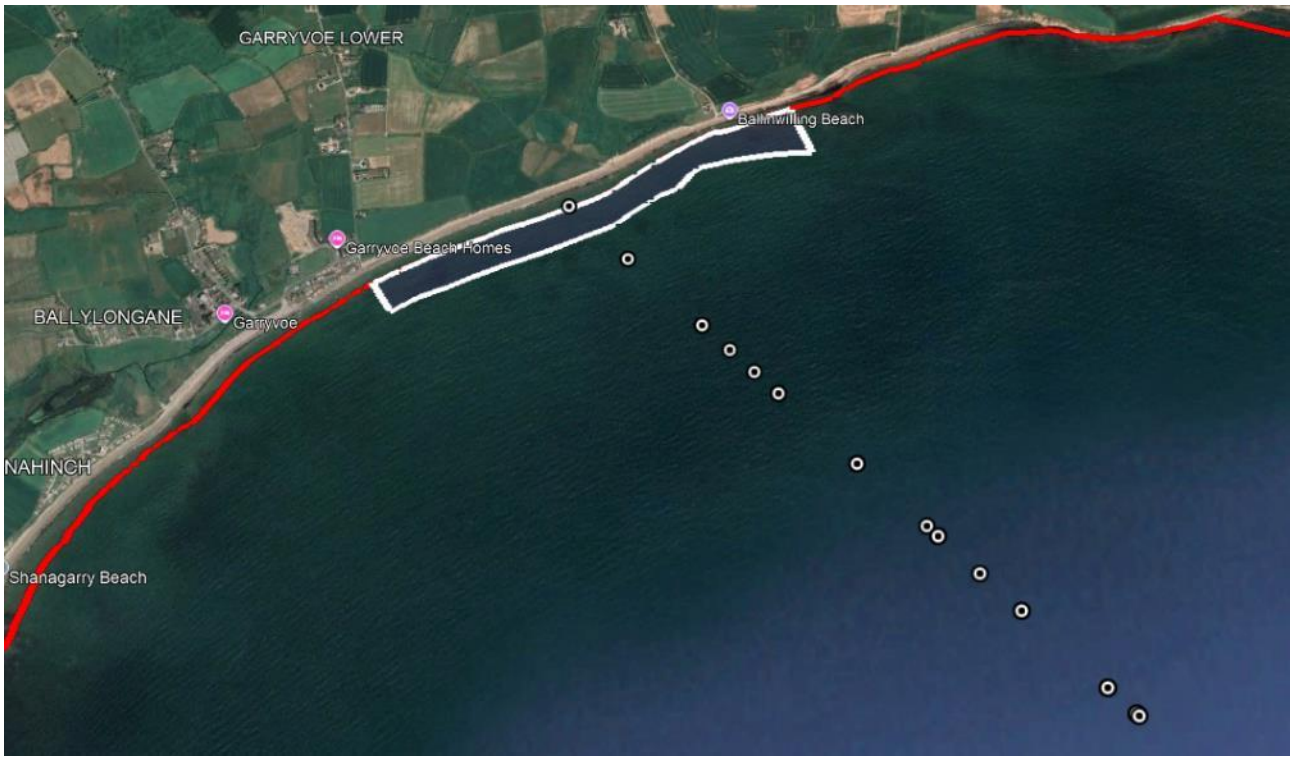

Figure 2.5 Proposed Investigation Locations at Landfall Zone C, Co. Cork

Figure 2.6 Proposed Investigation Locations at Landfall Zone D, Co. Waterford

Figure 2.7 Proposed Investigation Locations at Landfall Zone E, Co. Wexford

Figure 2.8 Proposed Investigation Locations at Landfall Zone F, Co. Wexford

Figure 2.9 Proposed Investigation Locations at Landfall Zone G, Co. Wexford

2.3 Description of the SI Works

2.3.1 Overview

In order to provide a reliable basis for design development, and to support the consenting and construction phases of the PUOSC project, surveys and investigations are necessary. The aim of the SI works is to acquire data to a high quality and specification.

EirGrid are seeking a MUL for a period of five years from the date of the granting of any licence.

The proposed activities within the AoI are planned to take place across phases. Geophysical and geotechnical surveys and investigations will be sequential with the results of the geophysical campaign used to inform the geotechnical campaign. The remaining surveys and investigations (e.g., environmental, archaeological, metocean etc.) can take place at any time during the operational period of the MUL.

The first investigation phase will involve a non-intrusive geophysical survey campaign. The aim of the geophysical survey campaign is to collect data that will inform the site selection process for OSS and offshore transmission cables, and to inform planning of a subsequent geotechnical investigation campaign required to ground-truth and build upon initial findings. Data from geophysical surveys and Drop-Down Video (DDV) and/or Remote Operated Vehicle (ROV) is additionally required for the identification and assessment of marine archaeological features, the evaluation of Unexploded Ordnance (UXO) risk, and for the identification of potential environmental constraints.

The subsequent investigation phase will involve intrusive geotechnical surveys which will physically interact with the seabed. The geotechnical activities will only take place once information from the geophysical survey campaign has been assessed.

Where required, additional geophysical and geotechnical surveys (up to two within the MUL period) for specific zones (of smaller area) of interest will be undertaken. These will likely focus on the offshore transmission cable corridors and OSS locations using similar types of equipment and to similar depths of investigation to achieve a better understanding of potential man-made/ existing obstructions and to provide information on specific geohazards on the seabed to the installation and operations of the offshore infrastructure.

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, subtidal,

nearshore and offshore areas. Therefore, geophysical and geotechnical activities in some areas may be completed in advance of geophysical and geotechnical activities in other areas.

Environmental, archaeological and other surveys will be undertaken within the AoI to characterize baseline conditions. The results of these surveys will be used as part of any future environmental assessments and associated planning consents. 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.

The drawings prepared in support of the MULA are included in Appendix A to this report. As described in more detail in the following sections, the proposed locations shown in the figures and drawings are subject to refinement based on the results of the geophysical and environmental surveys. Similarly, the 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 going to its target depth. In such circumstances, the borehole location is 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 AoI, e.g., potential OSS locations, along routes for the offshore transmission cable corridors and approaches to landfall zones. 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.

The proposed MUL activities are summarised in Table 2.2. It should be noted that the information provided in this table lists the proposed activities. Where possible and efficient to do so, activities will be grouped together and undertaken as part of one survey campaign. For example, the geophysical survey campaign will likely involve one vessel undertaking the multi-beam echosounder (MBES), sub-bottom profiler (SBP), side scan sonar (SSS) and magnetometer surveys, with the magnetometer survey providing the information necessary for the archaeological geophysical survey. Similarly, the environmental drop-down video and benthic grab sampling surveys will be undertaken from the geotechnical survey vessel.

Table 2.2 Proposed SI works Activities

Survey Type	Survey Elements	Maximum Quantity (where relevant)
Coastal Geophysical Surveys (land-based below the HWM)	Ground Penetrating Radar (GPR) and/or Seismic Refraction.	n/a
	Topographical surveying techniques including UAS, GPS, GNSS devices.	n/a
Marine Geophysical Surveys (undertaken from survey vessel(s))	Multi Beam Echosounder (MBES).	n/a
	Sub-bottom profiler (SBP) including Ultra-High Resolution Seismic (UHRS) survey.	n/a
	Side Scan Sonar (SSS).	n/a
	Magnetometer.	n/a
Coastal Geotechnical Surveys (undertaken on land below the HWM)	Trial Pit Investigations.	42
Marine Geotechnical Surveys (undertaken from survey vessel(s) or jack-up barge; JUB)	Grab sampling (this is the same campaign as the surveys included under the Environmental Surveys).	420 (subtidal)
	Vibrocore testing.	276
	Borehole investigations (including downhole Cone Penetration Testing; CPT and sampling).	21 (inshore) 8 (OSS locations)
	Shallow CPT.	276
	Deep Drive CPT.	16
Metocean and Marine Mammal Acoustic Device Deployment (deployed by vessel and moored to seabed)	Metocean buoy.	2
	Acoustic Doppler Current Profiler (ADCP).	3
	Marine Mammal Static Acoustic Monitoring (SAM).	16 locations (4 SAMS x 4 different locations)
Coastal Environmental Surveys	Ecological walkover surveys (habitats, bat activity and roose assessment, mammals including otter).	n/a

Survey Type	Survey Elements	Maximum Quantity (where relevant)
(land-based below the HWM)	Ornithological vantage point surveys.	n/a
	Marine mammal vantage point surveys.	n/a
	Intertidal core sampling survey.	Intertidal cores = 126
Marine Environmental Surveys (undertaken from survey vessel(s))	Drop-down video (DDV) and/or Remotely Operated Vehicles (ROV) survey.	n/a
	Grab sampling (this is the same campaign as the surveys included under the Marine Geotechnical Surveys Surveys).	Subtidal = As per geotechnical specification.
	Ornithological surveys (boat-based).	n/a
	Marine mammal surveys (boat-based) including passive acoustic monitoring (PAM).	Monthly surveys for minimum two-year period.
	Water Quality Samples, including Conductivity, Temperature and Depth (CTD) Measurements.	n/a
Archaeological Surveys	Intertidal Survey.	n/a
	Coastal and Marine Geophysical Surveys (this is the same campaign as the Coastal and Marine Geophysical Surveys described above).	n/a
	Sampling.	n/a
	Dive Survey.	n/a
	Wade Survey.	n/a
	Monitoring.	n/a
Other Surveys	Noise Surveys.	n/a
	Shipping & Navigation Survey.	n/a
	Unmanned Aircraft Systems (UAS)/ drone surveys.	n/a
	Aerial Surveys (birds and marine mammals).	n/a

2.3.2 Estimated Project Schedule/ Programme

EirGrid propose a SI works schedule that will be phased over a five-year period. The intention is to begin survey activities 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 an 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 2.3 below. It is anticipated that the majority of the SI works will be completed within the first 24 months from the date the license is granted. However, 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, etc.

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 could include Cork or Rosslare depending on vessel size and marine traffic restrictions.

As noted previously, 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, subtidal, sea areas <15m below lowest astronomical tide (LAT) and sea areas >15m below LAT. Therefore, geophysical and geotechnical activities in some areas may be completed in advance of geophysical and geotechnical activities in other areas.

Table 2.3 Estimated Project Schedule/ Programme

Type	Scope of Work	Location and number	Estimated Timeframe for Activities (weather dependent)
Geophysical and Geotechnical Campaigns	Coastal surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Geophysical surveys	The survey will focus on the potential landfall zones, offshore transmission cable corridors and Area A Tonn Nua. However, depending on the survey results, additional areas for geophysical survey within the AoI may be required.	Within the first 24 months. Additional targeted geophysical surveys may be undertaken at any time during the lifetime of the MUL.
	Sediment/ Benthic sampling	The offshore transmission cable corridors and the seven potential landfall zones. Up to 420 grab samples in total.	Within the first 24 months. Additional targeted sampling surveys may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 420 samples.
	Vibrocores	The offshore transmission cable corridors. Up to 276 vibrocores.	Within the first 24 months. Additional targeted vibrocores may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 276 locations.
	Boreholes (approaches to potential landfall zones)	The potential landfall zones. Up to 21 boreholes.	Within the first 24 months. Additional targeted boreholes may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 21 locations.
	Boreholes (OSS)	Each potential OSS location. Up to 8 boreholes.	Within the first 24 months. Additional targeted boreholes may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 8 locations.
	Shallow CPT (S-CPT)	The offshore transmission cable corridors and at the potential OSS locations. Up to 276 S-CPT.	Within the first 24 months. Additional targeted S-CPT may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 276 locations.
	Deep CPT (D-CPT)	The potential OSS locations. Up to 16 D-CPT.	Within the first 24 months. Additional targeted D-CPT may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 126 locations.
	Trail pits (TP)	Proposed landfall zones. Up to 42 TP.	Within the first 24 months. Additional targeted trial pits may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 42 locations.
	Metocean device(s)	The potential OSS locations. Up to 2 buoys and 2 ADCPs will be deployed at any one time.	Typically twelve months for any one deployment. It may take place at anytime over the lifetime of the MUL.
Environmental Surveys	Coastal ecological surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Ornithological surveys	Seven potential landfall zones and OSS locations.	Anytime over the lifetime of the MUL.
	Marine mammal monitoring	The potential OSS locations, the offshore transmission cable corridors, and at the potential landfall zones. Includes deployment of PAM equipment (towed or boat based) within the AoI and of SAM devices (fixed locations) at potential OSS locations.	Anytime over the lifetime of the MUL.

Type	Scope of Work	Location and number	Estimated Timeframe for Activities (weather dependent)
	Sediment/ Benthic sampling	Intertidal: Seven potential landfall zones. Up to 126 samples.	Within the first 24 months. Additional targeted sampling may be undertaken at any time during the lifetime of the MUL. The total number will be limited to 126 samples.
		Subtidal: Refer to Sediment/ Benthic sampling under the Geophysical and Geotechnical Campaigns above.	Refer to Sediment/ Benthic sampling under the Geophysical and Geotechnical Campaigns above.
	Digital aerial surveys	Entire AoI	Anytime over the lifetime of the MUL.
	Water quality sampling and CTD	The potential OSS locations, the offshore transmission cable corridors, and at the landfall zones.	Anytime over the lifetime of the MUL.
	DDV and/or ROV	The potential OSS locations, the offshore transmission cable corridors, and at the landfall zones.	Anytime over the lifetime of the MUL.
Archaeological Surveys	Intertidal archaeology surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Geophysical surveys	Refer to Geophysical Surveys under the Geophysical and Geotechnical Campaigns above.	Refer to Geophysical Surveys under the Geophysical and Geotechnical Campaigns above.
	Archaeological samples	The potential OSS location, the offshore transmission cable corridors, and landfall zones.	Within the first 24 months. Additional samples may be taken during any further borehole drilling activities.
	Archaeological dive surveys	The potential OSS location, the offshore transmission cable corridors, and landfall zones.	Anytime over the lifetime of the MUL.
	Archaeological wade surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Archaeological monitoring	Where deemed necessary during survey and investigation campaigns.	Anytime over the lifetime of the MUL.
Other Surveys	Noise surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Shipping & navigation surveys	Within the AoI.	Anytime over the lifetime of the MUL.
	UAS/ Drone surveys	Seven potential landfall zones.	Anytime over the lifetime of the MUL.
	Aerial surveys	Within the AoI.	Anytime over the lifetime of the MUL.

2.3.3 Surveying Periods

Surveys will be conducted during the following daily periods:

- Landfall/Intertidal Zone – during daylight hours and subject to tidal conditions.
- <15m below LAT – during daylight hours up to 12 hours per day, seven days a week.
- >15m below LAT – 24 hours per day, seven days a week.

2.3.4 Vessels

At the time of this application specific details of the survey vessels to be used were not available and were subject to an ongoing tender process. Based on typical survey vessels operating in offshore waters, the SI works are proposed to utilise vessels which range in length between 15m and 75m, have an endurance of up to 30 days and require a draft depth greater than 15m below lowest astronomical tide (LAT) to safely operate. Such vessels will therefore generally be deployed for survey tasks from approximately the 15m depth contour of the LAT to the seaward extent of the AoI.

Survey vessels will be used to undertake the following surveys:

- Coastal and marine geophysical surveys (one vessel <15 m; another vessel >15 m LAT);
- Coastal and marine geotechnical surveys (one vessel <15 m and the JUB; another vessel >15 m LAT);
- Coastal and marine environmental surveys (one vessel <15 m and another vessel >15 m LAT. Usually undertaken from one of the geophysical and/or geotechnical survey vessels);
- Coastal and marine archaeological surveys (one vessel <15 m and another vessel >15 m LAT. Usually undertaken from one of the geophysical and/or geotechnical survey vessels);
- Boat-based ornithology surveys (one vessel); and
- Boat-based marine-mammal surveys (one vessel).

In addition, vessels will be required to deploy and retrieve the static recording devices; metocean buoy, ADCP and SAM. A tug will be required to tow the JUB into and from position, and a rigid inflatable boat (RIB) will be used to transfer personnel to and from the JUB as required.

Specific survey vessel details are subject to a procurement process and are currently unavailable, and it is not yet known if a multi-disciplinary survey vessel will be used, i.e. one vessel capable of undertaking geophysical, geotechnical and environmental surveys, or separate vessels for each survey type. It is extremely unlikely that all vessels will be mobilised at the same time. For example, the geophysical survey campaign will need to occur prior to geotechnical and environmental sampling. Vessels retrieving static recording devices, transferring personnel or positioning the JUB will operate for a short period of time, transiting to and from survey locations. It is estimated, on a precautionary basis, that up to eight vessels could be operating within the AoI at a time.

2.3.4.1 Greater than 15m below LAT

The survey vessels may use a local port for personnel/ equipment mobilization, bunkering, and provisioning as necessary. For clarity, no bunkering will take place offshore, with such operations carried out under quayside operations only. In the event survey vessels originate from overseas assessments will be undertaken to determine the risk of invasive species introduction. Related mitigation will be implemented accordingly in advance of entering Irish waters as appropriate, and as required under regulation and best practice.

The geophysical and geotechnical marine surveys will involve the deployment of dedicated marine spreads suitable for the scope of work required, the water depth expected, and the anticipated seabed conditions. The final details of equipment to be deployed are not yet confirmed. However, standard equipment proposed to meet the survey specifications is described in the following sections and has been assessed in this MULA. This information is considered adequate to enable the likelihood and significance of any related environmental impacts to be determined on a conservative basis. Appointed survey contractors will be required to use equipment which aligns with the parameters of the standard equipment described below and assessed in this MULA in order to ensure that no greater environmental impacts than those assessed in this MULA will arise.

All survey vessels will be fit for purpose, will possess all relevant classification certificates, and will be capable of safely undertaking the survey work required. Health, safety, environment, and welfare considerations will be a priority and will be actively managed. Vessels will comply with all applicable MARPOL requirements including vessel-based spill response planning. Appointed survey contractors will be required to comply with all legislation and license conditions relevant to the activities within their scope of work including the provision of marine mammal observers (MMOs) where relevant to the activity scope. Prior to survey mobilization all statutory safety roles will be appointed and responsibilities assigned, and project/ survey-specific HSE plans will be approved for implementation as part of project execution planning.

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

- Compliance with Safety of Life at Sea (SOLAS), International Maritime Organization (IMO), and national requirements for operating within Irish territorial waters;
- Compliance with applicable MARPOL requirements;
- Station-keeping and sea-keeping capabilities required to safely carry out the proposed survey activities;
- Calibrated equipment and spares with tools as necessary to undertake all specified works;

- Endurance to undertake the required survey works (e.g. in respect of fuel, water, stores, etc.) for up to 30 days;
- Sufficient qualified staff to allow the survey operations to be carried out efficiently (typically 24-hour continuous for offshore survey, 12-hour for nearshore survey) including anticipated requirements for marine mammal observers as appropriate; and
- Adequate accommodation and crew welfare facilities.

2.3.4.2 Less than 15m Below LAT

In cases where survey is required but larger survey vessels cannot be deployed safely (i.e. in waters typically shallower than 15m below LAT) smaller vessels may be used subject to safe vessel draft limits and other local conditions. All such smaller vessels will comply with the HSE requirements listed above as applicable to vessel class.

For the shallowest locations, including the intertidal zone, and where intrusive geotechnical survey is required (i.e. vibrocores, CPTs, boreholes and grab samples), such investigations may be undertaken from a jack-up barge (JUB). Where required, the JUB will be towed to and from the investigation sites by tugs.

Figure 2.10 Jack-Up-Barge (JUB)

At the time of this application procurement of the JUBs was subject to a tendering process and the specific details were not available. However, for the purposes of conservative assessment it is assumed that the most likely arrangement is that the JUB will have four legs that are deployed when on station. It is estimated that each leg has a plan area of 3 m^2 which interacts with the seabed. Therefore, approximately 12 m^2 of seabed will have the potential to be directly disturbed each time the JUB is deployed at a given survey location. The JUB model that is used may have slightly different dimensions to those described herein but EirGrid will ensure that the model is within the parameters described above such that no greater environmental impacts than those assessed in this MULA can arise.

Where feasible, some boreholes within the AoI below the maritime area land boundary and in the intertidal area may be drilled using a vehicle-mounted drilling spread and associated support vehicles. In any such cases existing land access routes to investigation locations will be used to the extent practicable.

2.3.5 Coastal Geophysical Surveys

Conventional land-based geophysical surveys will be undertaken below the HWM. Those elements of the land-based survey that occur within the AoI are activities included in this MULA. This MULA is not seeking a licence for any land-based works which will take place outside the maritime area.

Detailed topographical surveying is required to provide accurate and up-to-date maps detailing natural and man-made features, elevations, land boundaries and landforms. The topographical surveys provide high-quality information to enable the creation of accurate maps of the terrestrial and intertidal areas, including elevation models for use in Geographic Information Systems (GIS). These are then used to inform both the engineering and environmental designs.

Surveys will comprise conventional land-based topographical and photogrammetry techniques, airborne Light Detection and Ranging (LiDAR) and/or laser scanning.

Traditional land surveying techniques will involve the deployment of personnel and land surveying equipment. This can include the setting up of a survey station (e.g., tripod and total station) from which accurate measurements and levels can be taken. Similarly, more mobile surveying equipment can be used to accurately map the ground. These units can consist of handheld devices, backpacks, or hand-held pole mounted Global Navigation Satellite Systems (GNSS) devices.

LiDAR surveys are often undertaken using Unmanned Aerial Vehicles (UAV)/ Unmanned Aircraft Systems (UAS), more commonly known as drones. Fixed wing aircraft can also be used for aerial surveys for large scale data collection. UAS can also be equipped with cameras to take photographs and/or video of the surveyed area for use in aerial mapping and to create ortho-mosaic maps. For the purposes of the MULA, operators of the drones may need to be stationed within the maritime area while operating the drone. UAS will be deployed by qualified personnel and will comply with the relevant legislation including Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft (Regulation 2019/247).

Coastal surveys will also include seismic refraction and/or ground-penetrating radar (GPR) or electrical resistivity to profile geological features and infrastructure. In addition, magnetometer or electromagnetic survey will be undertaken for the detection of UXO, archaeological and other anthropogenic features and anomalies.

Figure 2.11 GPR Survey Equipment and Intertidal Magnetometer Survey Equipment

2.3.6 Marine Geophysical Surveys

Geophysical surveys are proposed to be conducted. These surveys will not physically interact with the seabed and will determine:

- Bathymetry data;
- Seabed conditions and hazard identification;
- Seismostratigraphic units and terrain models;
- Ground provinces and ground units; and
- Sub-bottom ground conditions and geohazards (magnetic anomalies, UXO etc.).

The exact geophysical equipment details will be confirmed following the procurement of a survey contractor. The assessment of the impacts of the SI works set out in this MULA is based on standard survey equipment that is expected to meet the survey specifications. Appointed survey contractors will be required to use equipment which aligns with the parameters of the standard equipment described and assessed in this MULA in order to ensure that no greater environmental impacts than those assessed in this MULA will arise.

Geophysical surveys may be conducted across the entirety of the AoI for the license duration. Geophysical surveys will be conducted to the spatial specifications provided below.

In specific zones of interest (relating to manmade or natural geohazards, as well as involving marine archaeology artefacts as identified from the desktop studies, which is carried out prior to the surveys), a

phased approach for the survey will be implemented. The first phase will collect information suitable at reconnaissance survey level and concept design for all the potential offshore transmission cable corridors and OSSs, and then, if required, the second phase will concentrate on much smaller zones of special needs within the AoI. Both phases will use the same equipment as described below and to the same spatial specifications.

2.3.6.1 Landfall/Intertidal Geophysical Survey Spatial Specifications

- Potential offshore transmisson cable corridor centre line and within 1000m width.
- 4 x wing lines at 250m intervals either side of centre line.
- Orthogonal tie-lines at 1000 m intervals.

2.3.6.2 Geophysical Survey <15 m LAT Spatial Specifications

- Bathymetry - 100% corridor MBES coverage with backscatter and velocity data.
- Seafloor imagery - SSS at 50 m line spacing, acquiring data at 75 m range together with (minimum of 150% coverage (200% preferable) including nadirs of adjacent lines). The full SSS coverage (150% or better) is specified including nadirs, at the required SSS along-track and across-track resolutions. This should be achievable in most areas with 50 m line interval at 75 m range. With shallow water inshore, infill lines will be mobilized to achieve the required coverage in accordance with the best of practice guidance (Historic England, 2013).
- Sub-bottom profiling (SBP) - parametric type, acquiring data to 10 m below seafloor (where geology allows) acquired along all survey lines, i.e. 5 parallel lines (250m spacing) and crossline.
- 2D-UHR seismic - single or multi-channel sparker system acquiring data up to 15 m below seafloor along 1 x centreline and up to 2 winglines along the offshore transmission cable corridors (spacing maximum of 500m).
- Single magnetometer - on all survey lines (i.e. at 50 m line spacing as per SSS). The magnetometer should ideally be on a dedicated winch, but if necessary can be piggy-backed to the SSS towfish.
- Multi-sensor magnetometer towed unit (preferably with set up of magnetometers of 4 on each scanfish) - approximate centre-line of corridor and up to 4 x parallel lines spaced up to 250m to each side of the centre-line.
- Cross-lines of spacing between 250-1000m, where the lower range (250m) shall be applied where there are changes in ground conditions especially near the boundary of the outcrop bedrocks.

2.3.6.3 Geophysical Survey >15 m LAT Spatial Specifications

Along potential offshore transmission cable corridors:

- As per Inshore Geophysical Survey.

At potential OSS locations:

- As per Inshore Geophysical Survey and with no requirement for SBP.
- Survey lines at 200 m spacing oriented north-south.
- Crosslines at 500 m spacing oriented east-west.

2.3.6.4 Multibeam Echosounder Survey

Method: A Multibeam Echosounder (MBES) sonar system will be used to map bathymetry within the AoI. MBES surveys are non-intrusive and do not physically interact with the seabed (Figure 2.12). The equipment is expected to be hull-mounted on the geo-referenced survey vessel but may be deployed over the vessel's side. Regardless of the final deployment method and vessel type the principles and potential impacts are the same. Appointed survey contractors will be required to use equipment and vessel types which align with the parameters of the standard equipment described and assessed in this MULA in order to ensure that no greater environmental impacts than those assessed in this MULA will arise.

MBES survey will be undertaken to provide 100% seabed coverage across the required survey area transects (specified to a minimum ping rate of 8 hits per m^2). Backscatter data will be collected, in addition to speed of sound measurements. The frequency of measurements may be increased if required to obtain the necessary bathymetry resolution. The swath widths for MBES surveys can vary between 4-6 times the water depth depending on the required bathymetry resolution. The estimated water depth in the survey area is between 4m and 90m, therefore the expected narrowest swath width is 16m.

Location: MBES survey will be undertaken within the AoI at the potential sites of the OSSs and along potential offshore transmission cable corridors to the practical operating limits of offshore survey vessels as dictated by draft depth and other safety requirements.

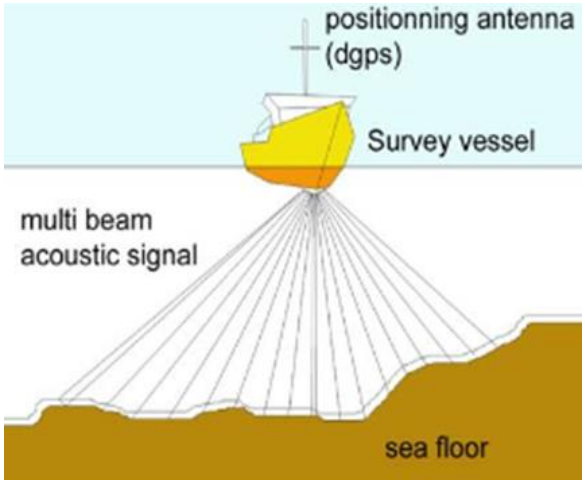

Figure 2.12 Indicative MBES Schematic

2.3.6.5 Sub-Bottom Profiling Survey and Ultra High Resolution Seismic Survey

Method: Sub-bottom profiling (SBP) is a survey technique that uses sound energy to map stratigraphy within the seabed's upper layers. Sonar pulses are directed at the seafloor which are selectively reflected from subsurface layers and detected by a receiving array at the surface. The wavelength and magnitude of the reflections allow geological characteristics and sediment thicknesses below the seabed to be mapped. It is non-intrusive and does not interact directly with the seabed. A parametric type SBP has been specified to gather data up to 10 m below the seabed. The SBP will be towed behind the survey vessel along with its receiving array (Figure 2.13).

Results from SBP survey will be enhanced and supported by 2D Ultra-High Resolution Seismic (UHRS) survey which will extend data gathering resolution for depths up to 15 m below the seabed. This will be based on either a single or multichannel sparker system. The UHRS sparking system and transmitter will be fixed to the survey vessel's hull. The sparking system will employ an electrical discharge to generate sound energy pulses that are directed to the seabed. Subsurface sound reflections are then captured at the surface by a towed detection array, similar in principle to SBP.

Location: This data will be collected across the AoI covering the same general areas as the MBES and SSS.

Figure 2.13 Parametric Sub-Bottom Profiler

2.3.6.6 Side-Scan Sonar Survey (SSS)

Method: A dual frequency Side Scan Sonar (SSS) will be used to generate seafloor imagery. This technique generates high resolution seabed imaging using an acoustic beam. The technique is non-intrusive and does not physically interact with the seabed. Collection of these data will enable the location and identification of debris, wrecks, potential archaeological features, sand waves, bedrock outcrops and subsurface geology within the AoI. SSS will be planned and conducted to ensure at least 150% seabed coverage (200% being preferrable) following the same transects as the MBES surveys. The SSS transceiver will be towed behind the offshore survey vessel in a 'towfish' arrangement at a controlled height within the water column.

The SSS uses piezoelectric transducers to generate high-frequency acoustic pulses which are directed at the seabed either side of the towfish. The intensity of the received acoustic reflections are then processed to generate the seabed imagery.

The SSS system offers real-time dual frequency operation which allows acquisition of both frequencies across a swath independently and simultaneously. The higher frequency produces higher resolution data and sharper images but with a narrow swath width while the lower frequency results in wider seabed coverage at lower resolutions.

Location: SSS will be undertaken within the AoI at the potential sites of the OSSs and along potential offshore transmission cable corridors to the practical safe operating limits of offshore survey vessel as dictated by draft requirements (estimated at the 15 m depth contour) and potential constraints presented by the towfish deployment.

SSS transects will be performed at potential OSS location covering an area of 1 km^2 centred on the OSSs, and along the potential offshore transmission cable corridors. At the OSS locations, SSS will be performed to ensure full coverage with 50 m spaced inline in a NW – SE orientation, and 200 m spaced crossline in a NE – SW orientation.

Along the potential offshore transmission cable corridors SSS will be performed to provide greater than 150% coverage over the seabed of interest. This will include full coverage of the nadir of the adjacent lines. For each potential offshore transmission cable corridor three longitudinal SSS survey lines will be performed: one at centre line of the corridor, and two parallel lines spaced at 250 m either side of the centre line.

The full SSS coverage (150% or better) is specified including nadirs, at the required SSS along-track and across-track resolutions. This should be achievable in most areas with 50 m line interval at 75 m range. With shallow water inshore, infill lines will be mobilized to achieve the required coverage in accordance with the best practice guidance (Historic England, 2013). Cross-lines will also be undertaken of spacing between 250-1000m, where the lower range (250m) shall be applied where there are changes in ground conditions especially near the boundary of the outcrop bedrocks.

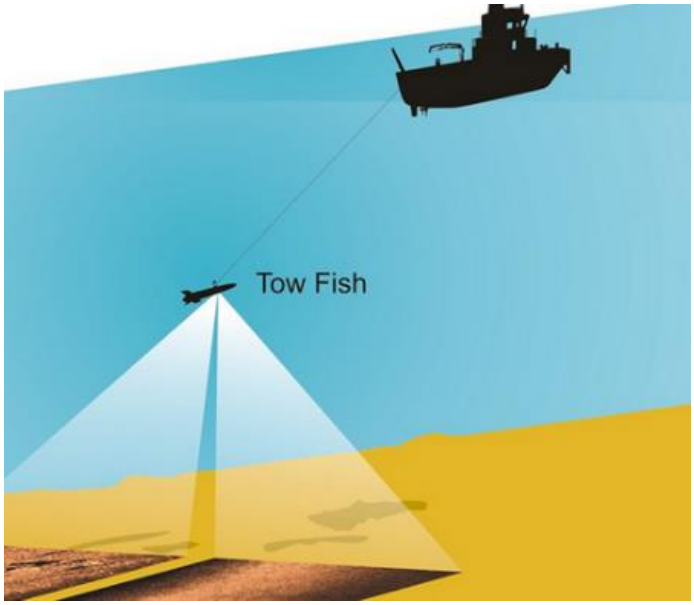

Figure 2.14 SSS Towfish Arrangement

2.3.6.7 Marine Magnetometer Survey

Method: A marine magnetometer will be deployed to locate and identify ferrous objects on or below the seabed. The device precisely measures the Earth's magnetic field and detects any ferrous anomalies such as anchors, Unexploded Ordnance (UXO), fishing gear, wrecks, pipelines, cables etc. The magnetometer is a passive system and will be towed behind the survey vessel. Whilst the exact equipment details are not available, the magnetometer has been specified to be of the caesium vapour type and capable of recording to an accuracy better than 0.1nT.

A single magnetometer will be deployed on all survey lines (i.e. at 50 m line spacing as per SSS). The magnetometer should ideally be on a dedicated winch, but if necessary can be piggy-backed to the SSS towfish.

A single multi-sensor magnetometer towed unit (preferably with set up of magnetometers of four on each scanfish) will also be undertaken along the approximate centre-line of each potential offshore transmission cable corridor and up to 4 x parallel lines spaced up to 250m to each side of the centre-line.

Location: The magnetometer will be deployed across the same locations described for the SSS.

Figure 2.15 Towed Magnetometer

2.3.6.8 Ultra-short Baseline Subsea Positioning

Method: Ultra-short baseline (USBL) subsea positioning is a method to accurately determine and log the 3D position of towed subsea equipment and sensors. USBL systems employ a transceiver fixed to the hull of the survey vessel in combination with transponders on the towed equipment. Triangulation is achieved using acoustic signals transmitted and detected at regular intervals from which bearing, depth and distance can be calculated.

Location: Coincident with towfish surveys (e.g. SSS, magnetometer).

2.3.7 Coastal and Marine Geotechnical and Other Intrusive Surveys

Based on the results of the geophysical surveys, the programme for geotechnical and other intrusive surveys will be developed to provide detailed, site-specific data within the AoI, and to ground-truth initial findings from the geophysical campaign.

2.3.7.1 Trial Pit Investigations

Method: Trial pits will be excavated across intertidal and onshore locations (below the HWM) at potential offshore transmission cable landfall zones and potential transition joint bay (TJB) sites. 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.

Quantity/Dimensions: Trial pits will be excavated to a depth of 2 m and will be 2 m^2 in plan. Up to 42 trial pits will be undertaken, up to 6 trial pits at each of the seven potential landfall zones. These will be excavated, logged and subsequently backfilled within the AoI in intertidal and onshore areas.

Location: Proposed trial pit locations are shown in the drawings in Appendix A.

2.3.7.2 Grab Sampling

Sediment grab sampling will be carried out as part of the environmental survey campaign, the results of which will also inform the geotechnical assessments. Grab sampling methodologies are outlined in Section 2.3.10.1.

2.3.7.3 Vibrocore Investigations

Method: Details of the specific vibrocoring equipment to be used are not currently known and are subject to a tendering process. The assessment of the impacts of the SI works set out in this MULA is based on standard vibrocoring equipment that is proposed to meet the survey specifications. Appointed survey contractors will be required to use equipment which aligns with the parameters of the standard equipment described and assessed in this MULA in order to ensure that no greater environmental impacts than those assessed in this MULA will arise. Standard vibrocorers consist of steel coring barrel of between 75 – 120 mm diameter housed within a steel support frame designed to enable stable deployment to the sea floor from the survey vessel. The steel coring barrel is equipped with a cutting shoe and contains within it a plastic liner to capture the procured sample. A spring steel core catcher is fitted to the cutting shoe to retain the sample once the corer assembly has advanced to the required depth, or refusal. Linear electric motors enclosed in a pressure housing provide vibratory motion to advance the coring barrel into the seabed to the specified target depth of 6 m below seafloor (BSF). Electrical power is provided from the survey vessel to the vibrocorer assembly through an electrical control umbilical.

Vibrocores will be driven to 6 m BSF or to refusal. Following recovery of the vibrocorer to the vessel the sample container is removed from the steel barrel and the sample is split, logged, sealed and stored for subsequent laboratory analysis. At each new location the vibrocore sampling operation will typically take less than one hour to complete.

Noise from vibrocoring occurs as a series of impulses which correspond to the vibrating oscillating motors interacting with the steel coring barrel.

Figure 2.16 Method of Vibrocore Assembly

Quantity/Dimensions: Up to 276 vibrocores are planned, comprising 171 vibrocores in the area seaward of the 15m LAT contour and 105 vibrocores in the area landward of 15m LAT contour. The vibrocores will be undertaken across the AoI along potential offshore transmission cable corridors to a target depth of 6 m BSF. The locations will be generally coincident with Cone Penetrometer Test (CPT) locations and dependent upon the findings of the geophysical survey. However, the proposed sampling locations are indicated in the drawings in Appendix A.

Each vibrocore sample is expected to take up to one hour to procure. The vibrocore assembly has a footprint of 4 m^2 and it is conservatively assumed that this is also the area of seabed potentially disturbed with each deployment of the equipment additional to the sub-surface sample procured.

Location: Vibrocores will be performed along the potential offshore transmission cable corridors and respective landfall approaches. Representative locations are given in the drawings in Appendix A. Final locations will be subject to the analysis of geophysical survey findings regarding anticipated geology and any identified anomalies (e.g., uncharted archaeology features, potential UXO etc.).

2.3.7.4 Borehole Investigations (including downhole CPT and sampling)

Method: Within the AoI boreholes will be drilled at the potential OSS locations to a target depth of 100 m BSF and at potential offshore transmission cable landfall zones to a target depth of 15 m BSF.

As discussed in Section 2.3.4, the type of vessels used to drill the boreholes will depend on the depth of water and the available vessels.

The majority of boreholes will be drilled directly from a geotechnical survey vessel which will be held on station by Dynamic Positioning (DP). The vessel will accommodate the rig generators, drilling machinery and the rig itself.

Boreholes closer to shore along the potential offshore transmission cable corridors and landfall zones in intertidal/ nearshore areas will be drilled from a JUB where water depths allow.

Depending on feasibility, some boreholes within the AoI below the maritime area land boundary and in the intertidal area may be drilled using a vehicle-mounted drilling spread and associated support vehicles. In any such cases existing land access routes to investigation locations will be used to the extent practicable.

Borehole drilling allows the recovery of undisturbed subsurface samples to directly confirm in-situ geotechnical conditions. A drilling head with an outside diameter of 250 mm will be lowered to the seabed via a drill string at offshore locations. The assembly will be stabilized on the seabed using a support frame where necessary. The drill string will then be rotated to commence boring to the specified depth. Tools will be lowered into the drill string to recover samples or conduct in-situ soil testing. The downhole CPT will be conducted using a pushed CPT system similar to the seabed CPT system but within the casing of the borehole. The following requirements are applied to the downhole CPT mode:

- The stroke for a mud pressure system shall be not less than 1.5 m.
- The stroke for an umbilical system for a 5 cm^2 cone specifically intended to penetrate very dense sands or over-consolidated clays shall be not less than 1.5 m.
- The downhole CPT system shall be capable of achieving minimum cone resistances of 60 MPa cone resistance using the 10 cm^2 cones, and 90 MPa using 5 cm^2 cones.
- The downhole CPT system shall be capable of achieving minimum 1.0 MPa sleeve friction resistance using both 10 cm^2 and 5 cm^2 cones.

Any drill cuttings returned to the vessel or JUB will be stored for responsible onshore disposal and will not be discharged to sea. However, some loss of flush and cuttings would be expected at the seabed drilling location. Boreholes will be left to collapse naturally and will not be backfilled. The duration of the operations at each drilling location will be approximately 48 hours in deeper waters and 36 hours in shallower waters.

Quantity/Dimensions: Up to 21 boreholes will be drilled at potential landfall zones. In addition, up to 8 boreholes for two OSSs will be drilled offshore at potential OSS locations.

Location: Boreholes will be drilled offshore at the potential OSS locations and at potential landfall zones. Final locations will be confirmed following results of the geophysical surveys. However, the proposed locations are presented in the drawings in Appendix A.

Figure 2.17 Offshore Geotechnical Drilling Vessel

2.3.7.5 Shallow CPT

Method: Shallow cone penetration tests (CPTs including thermal testing at certain depth elevations TCPTs) with a minimum thrust at refusal of 50 kN will be undertaken from the geotechnical survey vessel crane or dedicated launch and recovery system to test in-situ soil characteristics at the seabed. At shallower water depths, CPTs/TCPTs may be deployed from a JUB.

The survey involves pushing an instrumented steel cone into the ground at a constant rate with continuous measurement of the cone end resistance, the friction along the sleeve of the cone, and the pore water pressure and thermal soil properties. No material will be removed from the seabed during CPT testing. The CPT spread has a footprint of 5 m^2.

Quantity/Dimensions: Up to 276 shallow CPTs will be performed to a penetration depth of 6m below seafloor (BSF) or refusal.

Location: CPTs will be performed along the potential offshore transmission cable corridors and at the OSS locations. Proposed locations are given in the drawings in Appendix A. Final locations will be subject to the analysis of geophysical survey findings with respect to anticipated geology and any identified anomalies (e.g., uncharted marine archaeology features, potential UXO etc.).

Figure 2.18 CPT Rig

2.3.7.6 Deep Drive CPT

Method: A deep drive CPT device with minimum thrust of 200 kN, and minimum stroke capability of 20m, will be utilized at the potential OSS locations. The Deep Drive CPT equipment will be deployed from the geotechnical survey vessel using the same principles as described for the shallow CPT testing.

Quantity/Dimensions: A maximum of 16 deep drive CPTs will be performed for two OSSs across the AoI to a minimum penetration depth of 15 m BSF. No sediment will be removed from the seabed.

Location: Representative locations at the potential OSS locations are shown in the drawings in Appendix A. Final locations will be subject to the analysis of geophysical survey findings with respect to anticipated geology and any identified anomalies (e.g., uncharted marine archaeology features, potential UXO etc.).

2.3.7.7 Summary of Geotechnical Investigations within AoI

A summary of geotechnical survey quantities involving direct interaction with the seabed and included in this MULA is presented in Table 2.4. Final sampling locations are not yet confirmed and are subject to geophysical survey findings. However, proposed locations are presented in the drawings in Appendix A.

Table 2.4 Summary of Ground Investigations within the AoI

Activity	Maximum Quantity
Trial pit investigations	42
Sediment/Benthic Sampling (Subtidal)	420
Vibrocore	276
Inshore/onshore borehole	21
Offshore borehole	8
Shallow CPT	276
Deep drive CPT	16

2.3.8 Metocean and Marine Mammal Acoustic Device Deployments

2.3.8.1 Metocean Buoys

Method: A metocean buoy will be deployed within the AoI to gather metocean data necessary to inform future OSS design. Mounted within the buoy is an accelerometer which registers the rate at which the buoy rises or falls as it follows the pattern of waves. By integrating against time, the acceleration signal can be converted to vertical displacement. The buoy may also incorporate Floating LiDAR (FLiDAR) technology or a stand-alone FLiDAR buoy may be deployed.

In addition, the buoy is specified to gather:

- Wind and water current velocities and directions;
- Atmospheric pressure, temperature, humidity, radiation and precipitation;
- Water quality: dissolved oxygen, pH, conductivity, temperature, salinity, turbidity, chlorophyll and cyanobacteria.

The metocean buoy will be equipped with solar panels, aids to navigation positioning, data recording and telemetry systems. It will be deployed for a minimum of twelve consecutive months.

All notifications and consents relating to navigation risk and corresponding public chart updates will be completed and approved prior to deployment.

Quantity/Dimensions: Up to two metocean buoys will be deployed within the AoI. Although the wave buoy is passive equipment, deployment will require an anchoring system that will necessarily interact with the seabed. Although the details of the buoy and associated anchor system are subject to a tendering exercise and not confirmed, it is conservatively estimated based on standard metocean buoy equipment that 10 m2 of the seabed will be potentially disturbed by the anchor system for the duration of deployment. Appointed metocean buoy survey contractors will be required to use equipment which aligns with these parameters in order to ensure that no greater environmental impacts than those assessed in this MULA will arise.

Location: The metocean buoy will be deployed within the AoI at a location representative of potential OSS location. The proposed location is presented in the drawings in Appendix A.

Figure 2.19 Metocean Buoy

2.3.8.2 Acoustic Doppler Current Profiler (ADCP)

An Acoustic Doppler Current Profiler (ADCP) is used to collect data on water movements, current speeds, and directions.

Method: The ADCP will be deployed to the seabed via a crane from a survey vessel for a duration of at least five weeks to capture a full lunar cycle including spring and neap tides.

Quantity/ Dimensions: Up to three ADCP units may be deployed at any one time within the AoI. The ADCP unit is mounted in a seabed frame (1.8m wide and 0.6m high) with a weight of 300 kg. This will be attached to a ground line, a clump weight and to an acoustic release system carrying a rope retrieval system. The precise equipment utilised will depend on the water depths at the locations proposed for survey.

ADCPs will operate at or above a frequency of 300 kHz in order to avoid impacts on marine species.

Location: Deployment of the ADCP is anticipated to be in proximity to the potential OSS locations. The actual locations will be determined based upon interpretation of the geophysical data and following a navigation safety assessment.

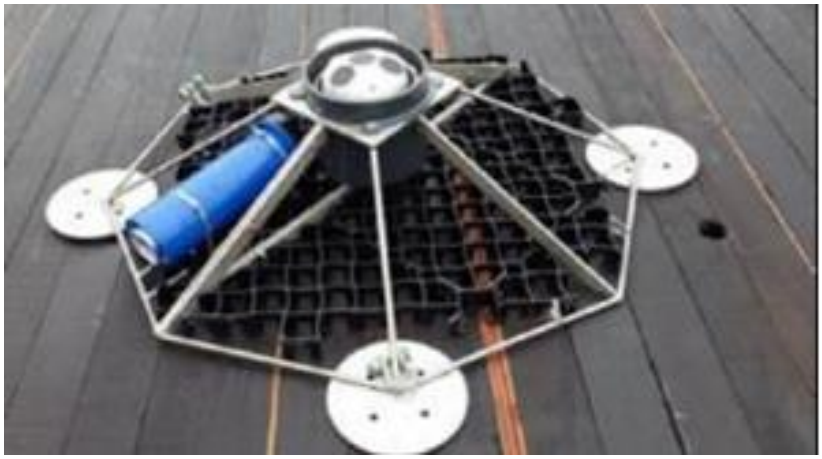

Figure 2.20 ADCP

2.3.8.3 Marine Mammal Static Acoustic Monitors (SAM)

Static Acoustic Monitors (SAM), Cetacean Porpoise Detectors (C-POD) and/or Full waveform capture POD (F-POD) will be deployed within the AoI to capture marine mammal activity with particular focus on areas proposed for infrastructure, i.e. potential OSS locations, potential offshore transmission cable corridors, and potential landfall zones, including suitable buffer zones around these potential locations.

SAM involves detectors that are deployed in a single location, for a period of weeks or months. The detection range will depend on the species and their orientation to the hydrophone, the frequencies of vocalisations, and the sensitivity of the SAM equipment and its deployment method. There are two main ways to deploy SAM devices: one is with moorings including surface floats/ buoys and the second is with moorings and an acoustic release with no surface floats/ buoys although a float is used to keep the unit within the water column. Moorings deployed on the bottom with no surface floats/ buoys are usually recommended as there is no self-noise from the buoys moving in the water and they are less likely to be interfered with. This method utilises acoustic releases to recover the equipment. The type of moorings used will depend on the type of SAM deployed but will typically include a clump weight(s)/ anchors with rope connections to the acoustic release, SAM and float/ buoy. The moorings for each SAM will be retrieved along with the SAM.

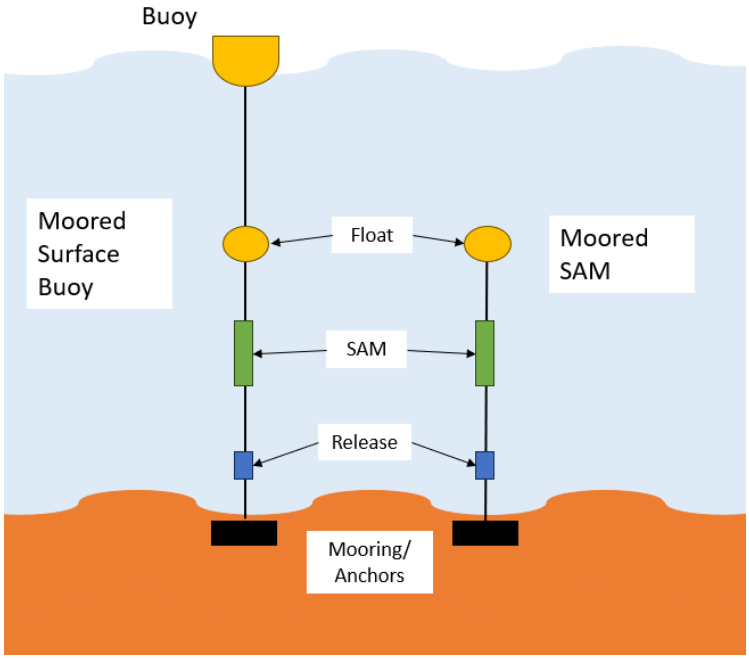

Figure 2.21 SAM Deployment Methods

The type, locations and number of SAM units deployed will be determined based on the proposed infrastructure element (e.g. OSS) and the type of construction works proposed in that area (e.g. offshore piling). Other factors taken into consideration will include tides, sediment and currents, as well as distance from shipping/ onshore noise sources that may impact on baseline noise levels and marine mammal activity.

The monitoring will involve stratified random sampling based upon bathymetric depth horizons and published frontal zones for static passive acoustic monitoring. There will also be a targeted array deployed around potential OSS locations for site specific data collection.

Consultation will be undertaken with relevant stakeholders prior to selecting the most appropriate locations for deployment and the duration of deployment. As further information from the geophysical and geotechnical campaigns is analysed, the survey areas within the AoI may be refined to reflect changes to the potential locations.

The deployment of the underwater acoustic monitoring equipment may be undertaken at any stage during the lifetime of the MUL with durations to be confirmed following initial investigations and consultations with relevant stakeholders.

Potential locations for the OSS have been identified and are shown in the drawings. The potential impact of construction of the OSS is much greater than from cabling and, therefore, a higher resolution survey, to identify any important local habitats, times of year, day or tide, will be undertaken using SAM. A minimum of

four SAM arrays will be used and recovered every 3 months and re-deployed at four separate locations. This will enable a minimum of 4 x 4 = 16 locations to be sampled. It is proposed, subject to the availability of suitable equipment, that each array will have a combination of click detector and sound recorder to enable a broad sample of vocalizing animals, including seals, to be recorded as well as ambient noise, which is required for noise modelling to assess the potential acoustic Zone of Influence (ZoI) for environmental assessment.

2.3.9 Coastal Environmental Surveys

2.3.9.1 Ecological Walkover Surveys

Baseline coastal surveys at the potential landfall zones be undertaken for mammals, birds and habitats. Where deemed necessary by the project ecologist, camera traps may also be installed at discrete locations to monitor activity, e.g. at the location of otter holts or couches. The coastal surveys will include:

- Habitat walkover surveys (including protected and notable flora, and invasive alien plants and animals) with a c. 100 m buffer from proposed works areas;
- Bats activity and bat roost assessment surveys;
- Mammal surveys (including otters) with a c. 500 m buffer from proposed works areas;
- Ornithological surveys (see Section 2.3.9.2); and
- Other walkover surveys as deemed necessary for the purposes of environmental and SI works.

The coastal ecological surveys will be undertaken at the potential landfall zones including a circa 100 m to 500 m buffer from the potential works area(s) depending on the feature to be surveyed. It is envisaged that the majority of coastal ecological surveys will be undertaken during low tides to provide the greatest extent of intertidal area for survey.

Habitats will be classified in accordance with Fossit 2000 Level 3 and Annex 1 habitats. The extent of surveys undertaken will be appropriate to the level of development proposed at each location.

Other non-intrusive ecological surveys may be required as the preliminary design of the project progresses. Walkover surveys will be required to identify constraints, opportunities and risks within the AoI and especially at potential landfall zones.

Coastal ecological surveys may take place at any time over the lifetime of the MUL.

2.3.9.2 Ornithological Surveys

Coastal waterfowl surveys and breeding seabird surveys will be undertaken at the potential landfall zones, including a 1 km buffer area as standard, increasing to a 5 km buffer for breeding bird colonies. These surveys will be standard vantage point monitoring surveys and coastal seabird and waterfowl surveys with breeding marine sea bird colony surveys where appropriate. The MULA covers those ornithological surveys to be undertaken within the AoI that includes coastal areas below the HWM.

Coastal waterfowl surveys will be undertaken in accordance with ‘Through the Tidal Cycle’ (TTTC) method which is based on the ‘look-see’ methods (Gilbert et al, 1998). As outlined by Lewis and Tierney (2014), the TTTCC method is deemed the most appropriate approach to determine usage of the intertidal zone by waterbirds in Ireland. Surveyors will record the species present, their location, abundance, behaviour and note any disturbance events including the type, the intensity of the stimuli, and the reaction of the birds with a minimum of three visits for breeding seabirds (March-October).

The surveys will be undertaken on a monthly basis (subject to weather conditions) over a minimum two-year period but may take place at any time over the lifetime of the MUL.

2.3.9.3 Marine Mammal Surveys

Coastal marine mammal surveys will be undertaken from suitable Vantage Points (VP). They are being included here as the VPs may involve surveyors operating at coastal locations below the HWM within the AoI. These will be chosen based on the potential landfall zones or other suitable elevated positions within 1 km of the potential landfall zones. These MMO VP surveys are a cost effective and efficient marine

mammal survey technique, particularly suited to shallower areas where boat-based and SAM survey techniques are not as effective. Equipment typically includes a good telescope or binoculars on tripod and a high quality spotting scope.

A protocol will be developed to ensure consistency of effort. The location of key ecological constraints such as possible areas of regular/frequent usage once recorded will be mapped to inform the site layout and appropriate mitigation measures and recommendations.

Dedicated watches will be carried out by an experienced MMO for at least 6 hours at each site, at least twice per month for a minimum two-year period.

2.3.9.4 Intertidal Sampling

Intertidal core sampling will be undertaken on foot using hand cores (0.01m^2). Cores in the intertidal area are proposed to be taken to a depth of 15cm-20cm.

At each potential landfall zone (7 no.) a walkover survey will be undertaken with two transects and three stations on each transect, giving a total of 6 locations at each potential landfall zone. A maximum of three samples will be collected at each location. Quadrat sampling will be undertaken with sediment cores removed for laboratory testing. The total quantity of samples will therefore be 126 (6 x 3 x 7).

The intertidal surveys and samples will aim to characterise habitats, with samples to be analysed for fauna, particle size analysis, total organic carbon, and chemical analysis, e.g., heavy and trace metals, hydrocarbons, and polycyclic aromatic hydrocarbons (PAH).

Intertidal surveys will take place at any time over the lifetime of the MUL.

2.3.10 Marine Environmental Surveys

2.3.10.1 Drop-down Video and Subtidal Grab Sampling

This section related to sampling in the subtidal zone for both geotechnical and environmental purposes. It is the same campaign as that required under Marine Geotechnical Surveys in Section 2.3.7.2.

The aim of the proposed surveys is to collect baseline sediment and benthic habitat data which will be used to inform future environmental assessments. Surveys will comprise Drop Down Video (DDV) and/or Remote Operated Vehicle (ROV) inspection, diving (if necessary), and the taking of grab samples as required in order to identify benthic habitats.

Where deemed necessary by the marine ecologist, a DDV high-resolution system will be deployed from a suitable vessel to characterise the flora and fauna at each survey location. This activity will be passive and non-intrusive and will not interact with the seabed. The DDV may require a 100 m transect to be conducted with still images taken at 10m intervals. The video footage will be analysed in real time and an assessment on the suitability of the survey station for grab sampling will be made.

At locations determined suitable for grab sampling effort by the DDV transect analysis, a 0.1 m^2 Day grab or 0.1 m^2 Hamon grab will be deployed from a suitable vessel to collect sediment samples.

Method: Superficial sediment/ benthic seabed samples will be obtained using grab samplers deployed from the survey vessels and potentially the JUB in nearshore/intertidal waters. Grab samplers employ mechanical force to close opposing steel clam shells which in turn scoop up superficial samples of seabed sediments and benthic material. Samplers operate to a seabed depth not exceeding 0.5m and sample over an area of 0.1m^2 with recovery of approximately 0.015 m^3 (~15 litres) of material. Two to three grab samples will be collected at each location, one for faunal analysis and a second for sediment physicochemical analysis (sediment particle size analysis (PSA) and loss on ignition (LOI) organic carbon analyses). A third sample may be recovered for sediment contaminant analysis. Faunal grab samples will be sieved on a 1 mm mesh sieve and preserved in 5-10% buffered formalin for analysis in a laboratory.

Different types of grab samplers are available according to the types of seabed conditions expected. Day and Van Veen type grab samplers are suited to general seabed conditions and Hamon type grab samplers are suited to the recovery of mixed and coarser sediments. While all types of grab samplers may be deployed in the proposed surveys across the AoI according to expected site-specific conditions, the principles of operation are the same.

Quantity/Dimensions: Up to 420 grab samples will be taken across the AoI. The grab samplers and their mounting frames have a footprint of 0.1 m^2. The quantity of material recovered is typically in the order of 0.015 m^3 depending on the nature and characteristics of the substrate being sampled.

Location: Sediment/ benthic grab samples will be performed along the potential offshore transmission cable corridors and at the OSS locations where practicable. Proposed locations are presented in the drawings in Appendix A. Final sampling locations will be subject to the analysis of geophysical survey findings with respect to anticipated geology and any identified anomalies (e.g., uncharted marine archaeology features, potential UXO, etc.) but they will nominally coincide with CPT and VC sampling and testing locations (see following sections) and/or where a potential change in habitat type is expected.

Figure 2.22 Day Grab Sampler and Hamon Grab Sampler

2.3.10.2 Ornithological Surveys

Marine ornithological surveys will be undertaken to determine the usage of sea regions by assemblages of marine birds. These data may be used to inform impact assessment and subsequent mitigation (if required).

The marine ornithological surveys will take place within the AoI with particular focus on areas for infrastructure, i.e. potential OSS locations, potential offshore transmission cable corridors, and potential landfall zones, including suitable buffer zones around these areas. As further information from the geophysical and geotechnical campaigns is analysed, the survey areas within the AoI may change to reflect changes to the potential locations.

The marine ornithological surveys will be undertaken from a vessel that will follow transects of the survey area within the AoI. The transects will be set apart at intervals of between c. 300 m and 500 m. Birds within the transect will be recorded alongside their species, count (numbers), and a relative measure of their fight height and behaviour.

Where possible, the surveys will be undertaken monthly, or at an interval of 3-4 weeks between surveys, but the exact timing of surveys will be dependent on suitable weather conditions and vessel availability. It is anticipated that the offshore ornithological surveys will be completed over a two-year period but may take place at any time over the lifetime of the MUL. Depending on the findings of the surveys, this survey intensity and duration may be increased or decreased as deemed necessary by the project ornithologist based on either desk study or preliminary survey data.

2.3.10.3 Marine Mammal Surveys and Passive Acoustic Monitors (PAM)

To take advantage of the mobilisation of vessels for the geophysical and geotechnical campaigns, Marine Mammal Observers (MMO) will be present to record marine mammal activities in the AoI. Where required by mitigation, the MMO will be a full-time presence on vessels, e.g., during geophysical surveys campaigns. Where a full-time presence is not required, MMO(s) will be present on vessels as deemed necessary by the marine mammal specialist for the purpose of compiling robust and complete survey data.

Separately, it is proposed that boat-based MMO visual surveys will be undertaken once per month over a minimum two-year period and potentially over the full five-year MUL period being sought. These surveys will

focus on the potential OSS locations as well as the potential offshore transmission cable corridors and a suitable buffer zone around the potential offshore infrastructure locations.

In addition to MMOs, Passive Acoustic Monitoring (PAM)/ hydrophones will be deployed as deemed necessary for all boat based long transect works (i.e. Grab, Flidar and Vibracore along potential offshore transmission cable corridors and OSS areas). PAM typically involves towing a hydrophone through an area to detect vocalizing individuals within the detection range of the vessel. The detection range will depend on the species and their orientation to the hydrophone, the frequencies of vocalisation, and the sensitivity of the PAM equipment.

2.3.10.4 Water Quality Samples, including Conductivity, Temperature and Depth Measurements (CTD)

Water samples will be taken at various locations throughout the AoI, with a particular focus on areas proposed for infrastructure, i.e. potential OSS locations, potential offshore transmission cable corridors, and potential landfall zones, including suitable buffer zones around these potential locations. As further information from the geophysical and geotechnical campaigns is analysed, the survey areas may change to reflect changes to the potential locations.

Water quality samples are proposed to be taken every 1 km along the offshore transmission cable corridors and at least four sampling locations (one at each of the cardinal directions N, S, E and W) of impactful activities. Each water sample shall be analysed for the following: conductivity, temperature, pH, dissolved oxygen and turbidity. Where suitable, parameters will be tested in situ to receive accurate data. 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.

Water quality sampling may take place at any time over the lifetime of the MUL. Where deemed necessary, samples will be taken once in each season, i.e., summer, autumn, winter and spring.

Conductivity, Temperature, Depth (CTD) water measurements shall be taken at a number of locations across the AoI. The CTD unit will be deployed from the survey vessel into the water column. Depending on conditions up to three measurements at each location may be taken, i.e. near surface, mid-water, and near-seabed. Measurements shall be taken only after stabilisation of the temperature at each location. At each location conductivity and temperature shall be recorded every hour during a complete semi-diurnal tidal cycle. A CTD profile shall be produced for each location.

2.3.11 Archaeological Surveys

Archaeological surveys will be undertaken by a suitably qualified archaeologist. The purpose of the surveys is to collect baseline data which will be used to inform the cultural heritage impact assessment. Archaeological surveys will be undertaken in advance of any intrusive survey work. Archaeological surveys will include the following.

2.3.11.1 Intertidal Surveys

A team of archaeological personnel will be deployed to each potential landfall zone to undertake a walkover inspection of the intertidal area at Low Water Spring tide, during daylight hours. Surveys will include the use of handheld metal-detectors, photographic survey and drone survey where applicable. Surveys involving handheld metal-detectors will include a series of transects at 10 m intervals across the accessible intertidal area.

2.3.11.2 Coastal and Marine Geophysical Surveys

Geophysical survey for the purposes of archaeological investigation is the same campaign described in Section 2.3.6. This includes a multi-suite instrument deployment to provide comprehensive and robust survey information of the seabed surface and the sub-surface layers. Marine geophysical survey is subject to archaeological licensing from the National Monuments Services in the Department of Housing, Local Government and Heritage.

2.3.11.3 Sampling

Where deemed necessary by the project archaeologist, at the location of geotechnical investigations (both in the intertidal and subtidal areas) an archaeologist/ geoarchaeologist will be present 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.

2.3.11.4 Dive Survey

Where deemed necessary by the project archaeologist, and where water depths and conditions permit, dive surveys will be undertaken at specified locations. This is anticipated to be necessary along the potential offshore transmission cable corridors and the surf zone in the event that data gaps exist between close-to-shore surveys and intertidal surveys. Such inspections will be conducted in accordance with safety legislation governing Diving at Work and would require specialist mobilisation and support. Deployment of Remotely Operated Vehicle (ROV) may also be used.

The dive/ ROV surveys will be inspections of target features recorded in the walkover, geophysical and geotechnical surveys that require further clarity in relation to their archaeological potential and extent.

2.3.11.5 Wade Survey

Where deemed necessary by the project archaeologist, and where water depths and conditions permit, wade surveys will be undertaken at specified locations reaching up to 75cm water depth seaward of the low water mark.

2.3.11.6 Monitoring

Where required, there will be an archaeological presence onboard the survey and geotechnical vessel(s) to observe the record being taken and recover material of archaeological potential where observed, to ensure such material is recovered and reported properly. The presence on-board will be agreed on a case-by-case basis. Key occasions where presence is anticipated to be required include working within an Archaeological Exclusion Zone; working in an area of known archaeology; working in a location that has a high volume of investigation locations.

2.3.12 Other Surveys

Other surveys are proposed to be undertaken with the AoI during the lifetime of the MUL as summarised below.

2.3.12.1 Noise Surveys

Measurements of baseline airborne ambient noise levels will be undertaken at each potential landfall zone to determine the potential for impacts on Noise Sensitive Locations (NSLs). Up to five locations may be monitored at each potential landfall zone. These will include one unattended monitoring location and up to four attended monitoring locations. Noise surveys will be undertaken in accordance with ISO 1996 Part1, 'Acoustics-Description, measurements and assessment of environmental noise' (2016) and BS 7445 British Standards Institution BS 7445 ‘Description and measurement of environmental noise. Part 1: Guide to quantities and procedures’ (2003).

2.3.12.2 Shipping and Navigation Surveys

The need for shipping and navigation surveys will be determined following consultation with the relevant stakeholders. These can be shore-based visual vessel traffic surveys or may be undertaken from vessels in the marine area. The at-sea surveys can be undertaken from the SI works vessels using on-board radar and AIS data.

2.3.12.3 Unmanned Aircraft Systems (UAS)/ drone surveys

UAS/ drone surveys are proposed to be undertaken in the intertidal and subtidal area to capture photogrammetry, orthomosaic, topography or other features of interest. Where required under Irish legislation, drones will be suitably authorised. The activity will be carried out above the intertidal and subtidal area, i.e. not within the definition of the maritime area. However, take-off and landing zones for the drone, and operatives, may be within the intertidal area.

Aerial surveys: Aerial surveys (e.g., from fixed wing aircraft) will be undertaken across the AoI to capture imagery and video. The aerial surveys will focus on the potential OSS, offshore transmission cable corridors and landfall zones but may be extended as the requirements of the project develop. The digital images will be analysed to record species of interest, e.g. seabirds, cetaceans. Aerial surveys are carried out once per month within the MUL period. The activity will be carried out above the intertidal and subtidal area, i.e. not within the definition of the maritime area.

2.3.12.4 Aerial Surveys

On digital aerial surveys no observers are used but images are acquired on the sea from a digital camera. Typically, up to four cameras might be used to capture a range of angles of the target to aid identification. Still images are taken almost continuously building a huge image database. Post-survey images are analysed for “snags” (features of interest) before being identified visually by trained and experienced observers. Development of algorithms and Artificial Intelligence (AI) are advancing to aid rapid analysis of these images and reduce human error.

Species (e.g. seabirds and marine mammals) of interest are recorded in bands at varying distances and orientation to the aircraft. Data providing good coverage of the site may be acquired (it is proposed that 25% of the AoI is surveyed). It is usual that not all the data are analysed but typically only 25% (one band). Similar to boat-based surveys, detection rate depends on the species being available to detect visually and as aircraft have a greater speed than boat-based surveys detection rates can be much lower. However digital aerial surveys can cover a much greater area in any period compared to boat-based surveys.

The location of the aerial surveys will focus on the potential OSS locations and offshore transmission cable corridors but may be expanded to encompass larger areas of the AoI.

Monthly surveys will be undertaken over a minimum 2-year duration within the MUL period.

2.4 Safety, Health, Environment & Quality Management

The survey contractor will be contractually required to maintain and operate ISO-accredited or compliant Safety, Health, Environmental and Quality (SHEQ) management systems for the duration of its contractual obligations regarding the described survey scopes. Reports and other submissions shall be provided as and when required for review and approval by law and/or by Company to ensure safe and secure operations and Worksites.

2.5 Summary of Marine Survey Noise Generation Sources

Ranges of the noise expected in terms of frequency and sound pressure level from subsea surveys are summarized in Table 2.5.

Table 2.5 Noise Characteristics of Standard Survey Equipment

Equipment	Source level [SPL] (as used in model)	Primary decidecade bands (-20 dB width)	Source model details	Impulsive/non-impulsive
Survey vessel, Geophysical, nearshore	160 dB SPL	10-4,000 Hz	Based on 15 m generic survey vessel.	Non-impulsive
Survey vessel, Geophysical, offshore, with DP-system	183 dB SPL	10-2,500 Hz	Based on 75 m generic survey vessel with DP-system active.	Non-impulsive
Survey vessel, Geotechnical	176 dB SPL	10 – 2,000 Hz	Based on 75 m generic survey vessel.	Non-impulsive
MBES	178 dB SPL (Spherical equivalent level)	200,000-500,000 Hz	Based on units suitable for this survey.	Impulsive
SSS	165 dB SPL (Spherical equivalent level)	100,000-900,000 Hz	Generic SSS from 400-900 kHz.	Impulsive
USBL	190 dB SPL	8,000-40,000 Hz	Active with non-hull mounted SSS & SBP & during vibro-core operations, 2 Hz ping rate, ping length 10 ms.	Impulsive
SBP-parametric (P-SBP)	208 dB SPL	80,000-115,000 Hz (Primary) 2,000-22,000 Hz (Secondary)	Source level adjusted for sediment effects and beam widths.	Impulsive
SBP-chirper/pinger (C-SBP)	185 dB SPL	1,000-20,000 Hz	Generic shallow water SBP of chirper/pinger type. Source level adjusted for sediment effects and beam widths.	Impulsive
SBP-sparker/UHRS (S-SBP)	185 dB SPL 224 dB L_P	600 – 8,000 Hz	Based on GeoSource firing at 1000 J. Firing rate of 1 Hz assumed	Impulsive
SBP-boomer (B-SBP)	185 dB SPL 228 dB L_P	160 – 16,000 Hz	Based on generic boomer model firing at 1000 J. Firing rate of 1 Hz assumed	Impulsive
ADCP	114 dB SPL	300,000-600,000 Hz	Based on suitable ADCP for depths <65 m (e.g. Nortek AWAC, Teledyne Reason Sentinel, Workhorse or Monitor) Source level adjusted for sediment effects and beam widths.	Impulsive
Borehole drilling/ rotary coring	150 dB SPL	10-100,000 Hz	Based on published levels (Erbe, et al., 2017; Fisheries and Marine Service, 1975; MR, et al., 2010; L-F, et al., 2023)	Non-impulsive
Vibro-coring & CPT	189 dB SPL	50 – 16,000 Hz	Based on levels from previous work & (Reiser, et al., 2010)	Non-impulsive

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Appendix A
Drawings

-8.351812
52.752839

-6.710312
52.752839

R498
R503
R505
N24
N24
R513
R688
N76
N76
R44
N24
R665
E201
E201
Thurles
Kilkenny
Kilkenny
Tipperary
918 m

INTERNATIONAL CHART SERIES
IRELAND – SOUTH COAST
HEAD OF KINSALE
TO
TUSKAR ROCK
DEPTHS IN METRES
SCALE 1 : 150 000 at lat 53°00'

I R E L A N D

C E L T I C S E A

N Y M P H E B A N K

C E L T I C

Area = 2,336 km^2

-8.351812
51.476566

-6.710312
51.476566

0 7 14
Kilometres

Esri UK, Esri, TomTom, Garmin, Foursquare, FAO, METI/NASA, USGS, Esri UK, Esri, TomTom, Garmin, FAO, NOAA, USGS, Esri, USGS

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

MARA File Reference No:
MUL240036

Prepared by:
[redacted]

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Proposed Licence Area Map

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0001

Status:	Rev:	Model File Identifier:
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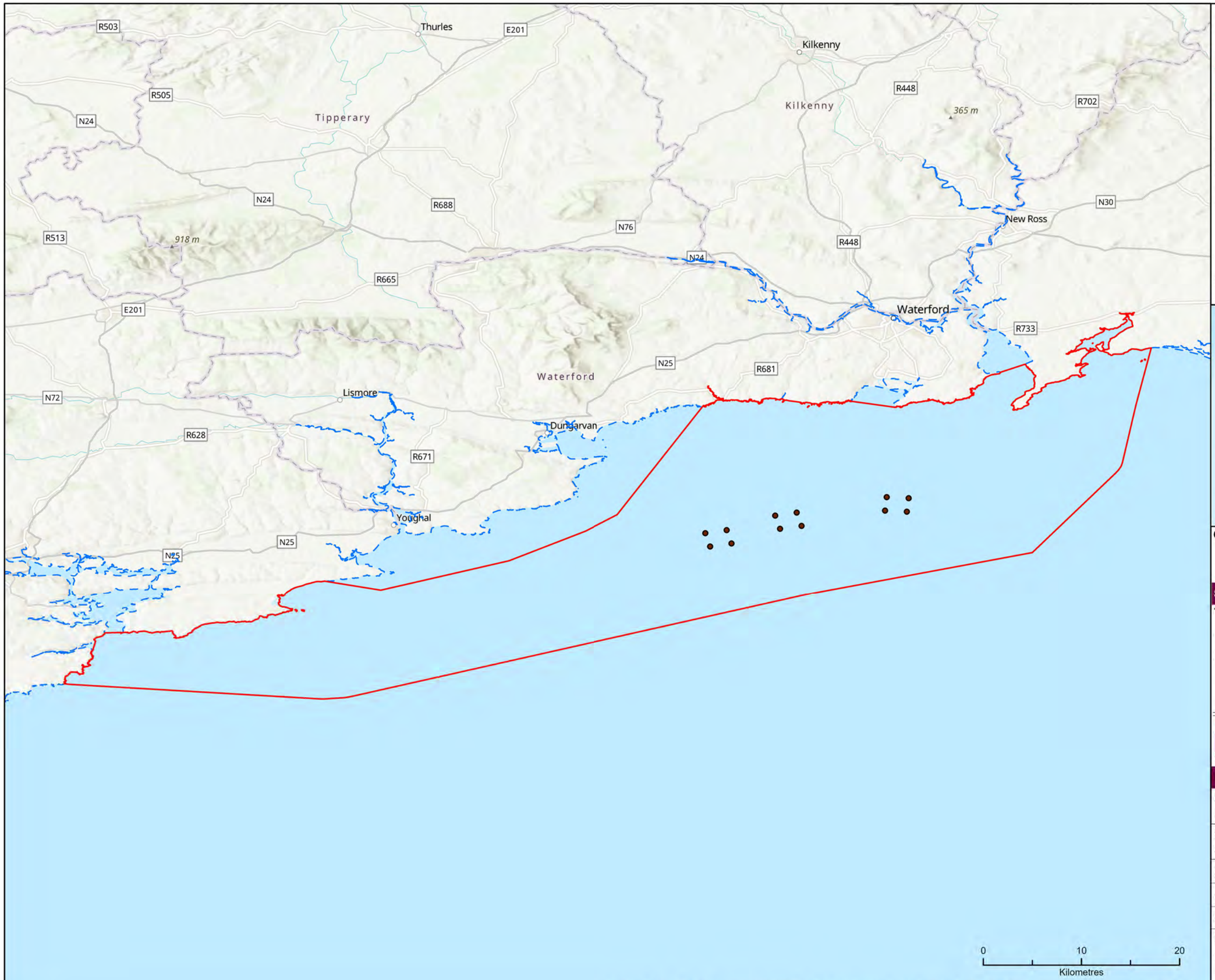

0 10 20
Kilometres

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Deep Drive CPT

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Indicative Sampling Locations Deep Drive CPT

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Issue Details

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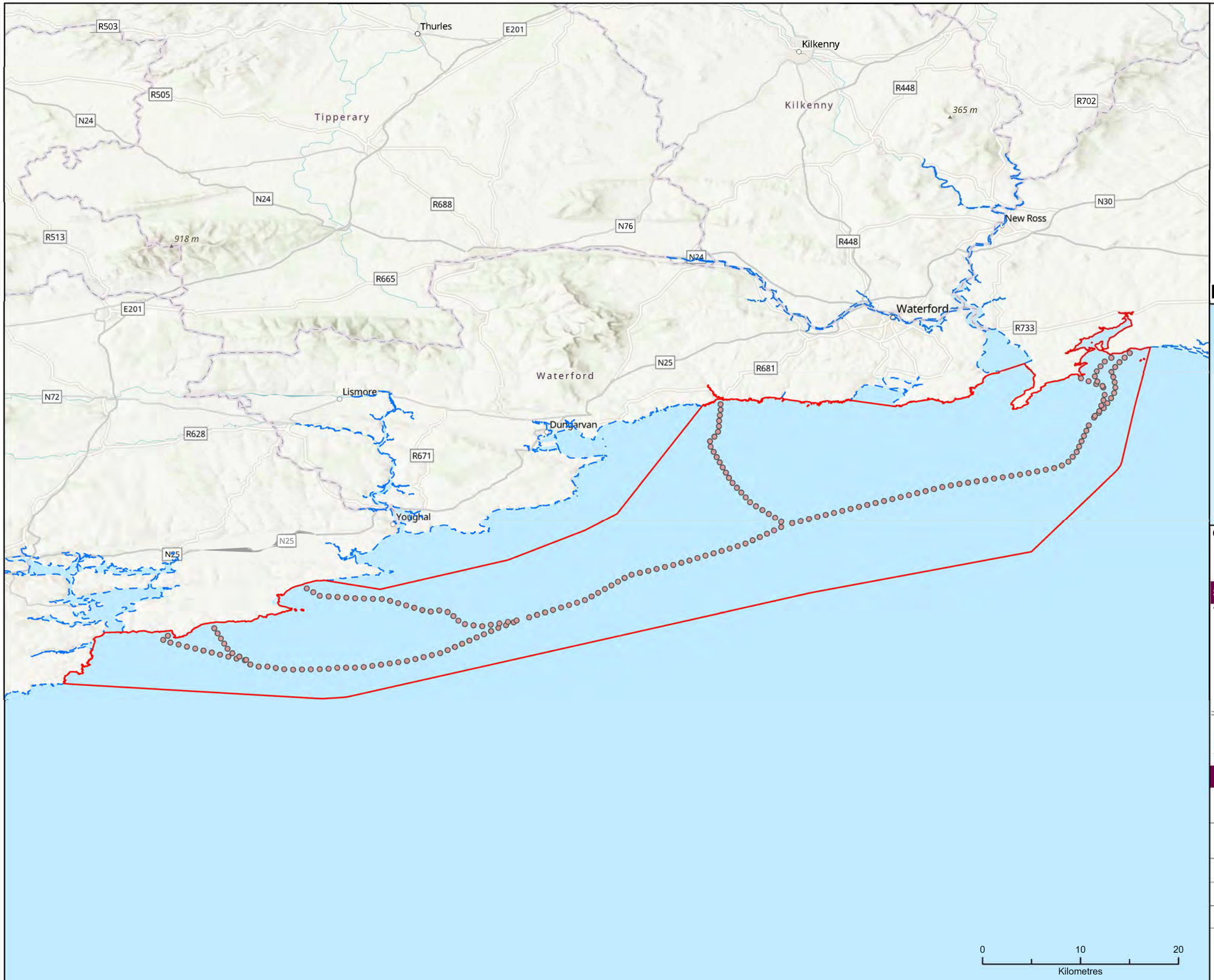

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Grab Samples

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

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South Coast Offshore Transmission Project

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Indicative Sampling Locations Grab Samples

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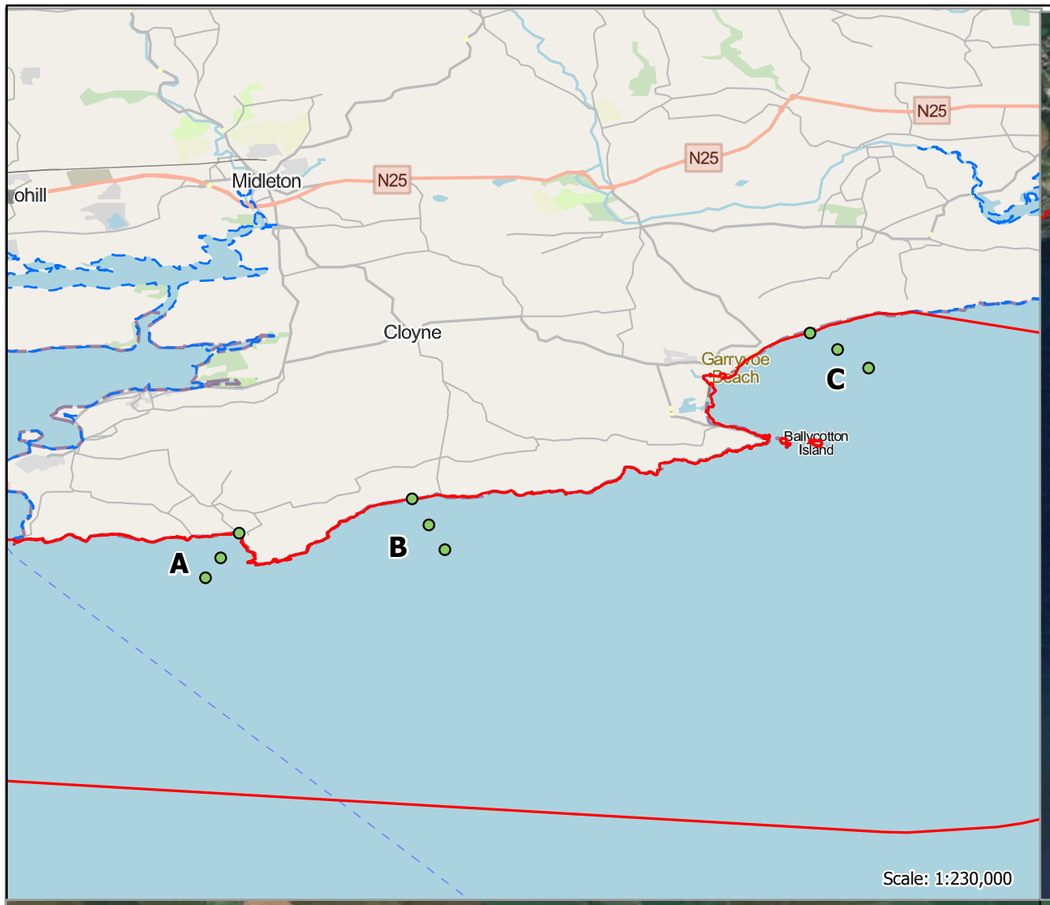

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Inshore-Onshore Boreholes

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by:

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South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Inshore-Onshore Boreholes

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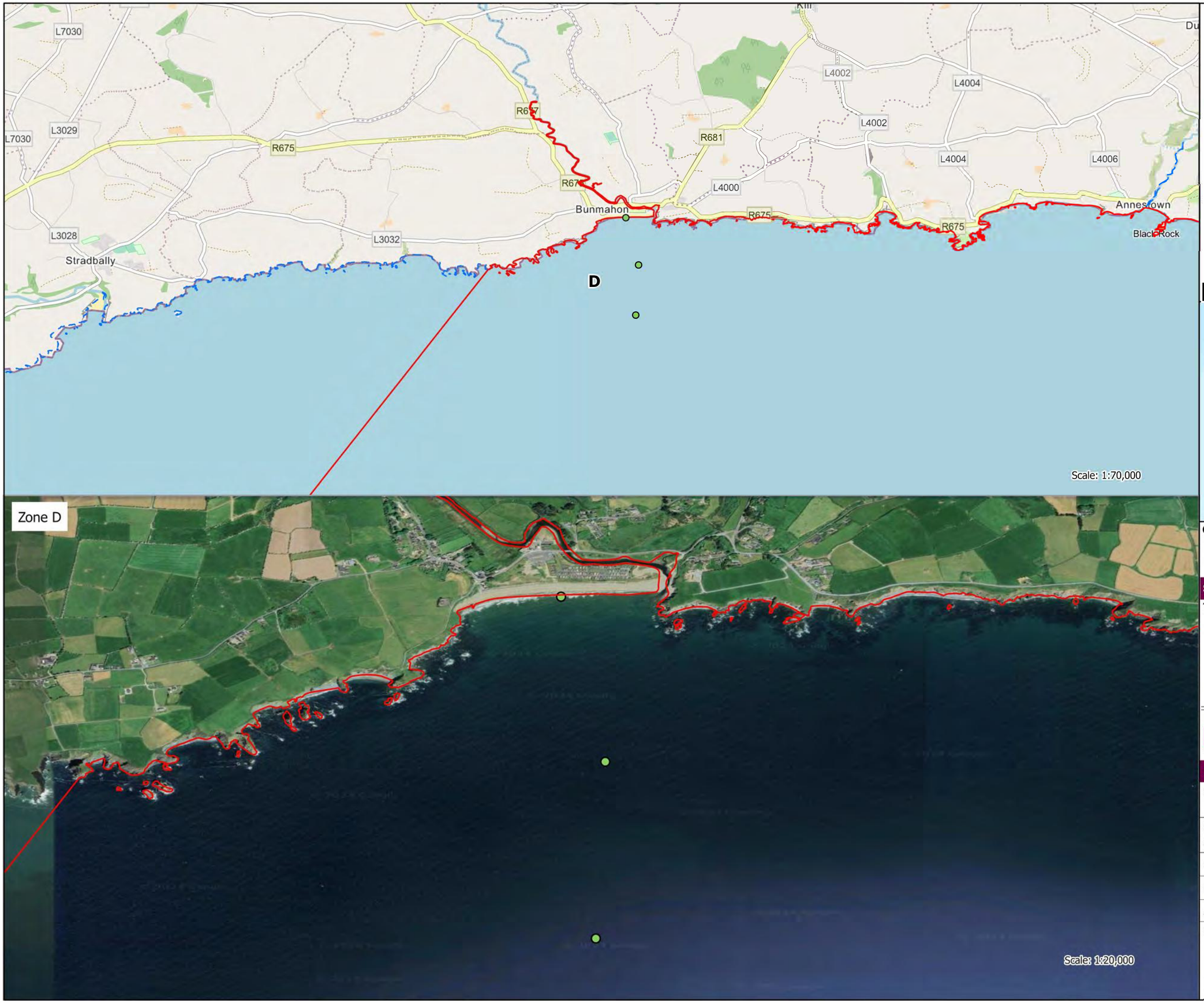

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Inshore-Onshore Boreholes

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

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South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Inshore-Onshore Boreholes

Page 2 of 4

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0004

Status:	Rev:	Model File Identifier:
A1	C03	

Drawn:	MV	**Date:** 04/10/2024	
Checked:	GME	**Scale:** 1:70,000	(A3)
Approved:	GME	**Projection:**	ETRS1989 UTM Zone 28N, 29N or 30N projection

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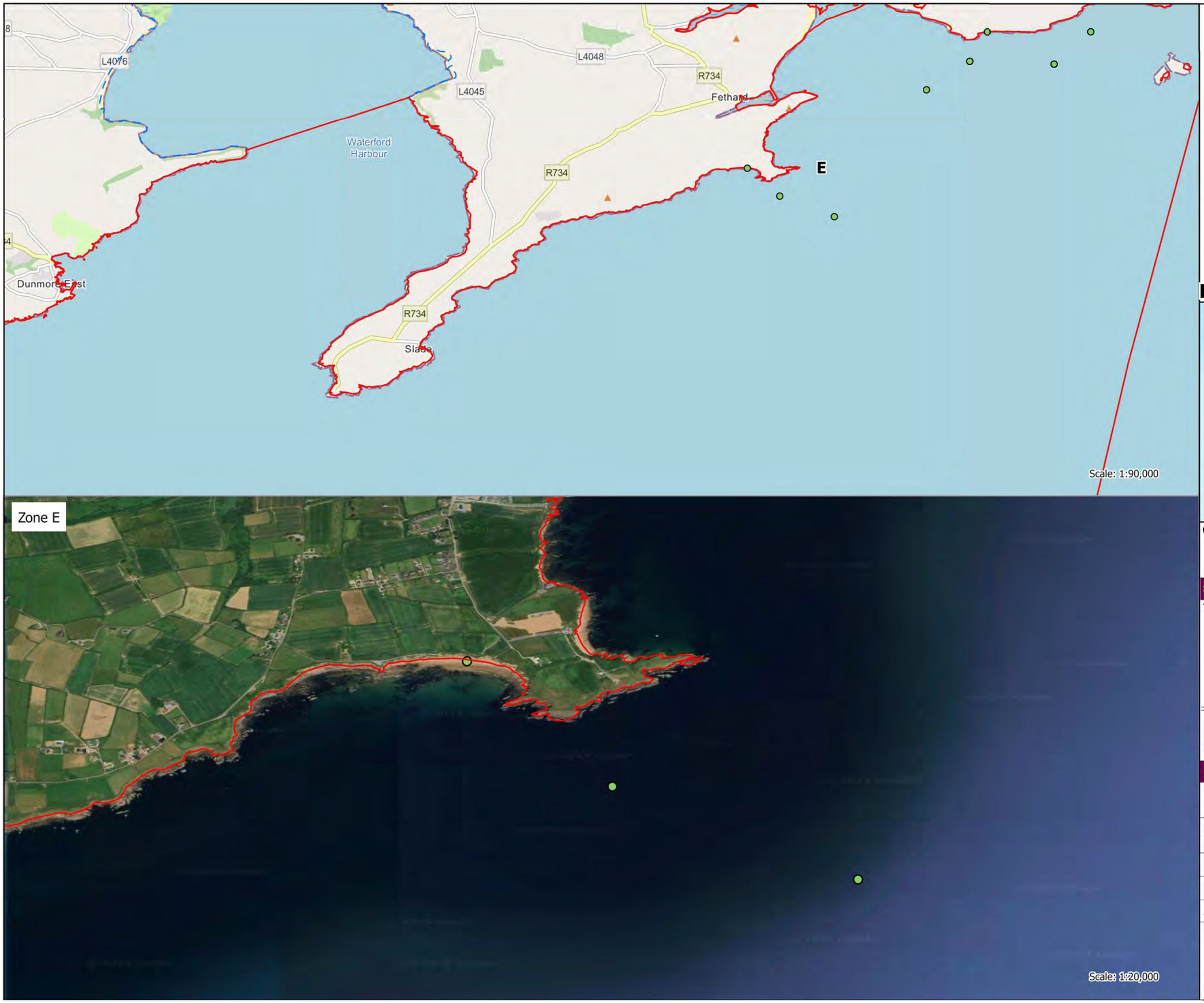

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Inshore-Onshore Boreholes

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

N

Prepared by:
[redacted]

Client
EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Inshore- Onshore Boreholes

Page 3 of 4

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0004

Status:	Rev:	Model File Identifier:
A1	C03	
Drawn: MV		**Date:** 02/12/2024
Checked: GME		**Scale:** different scales (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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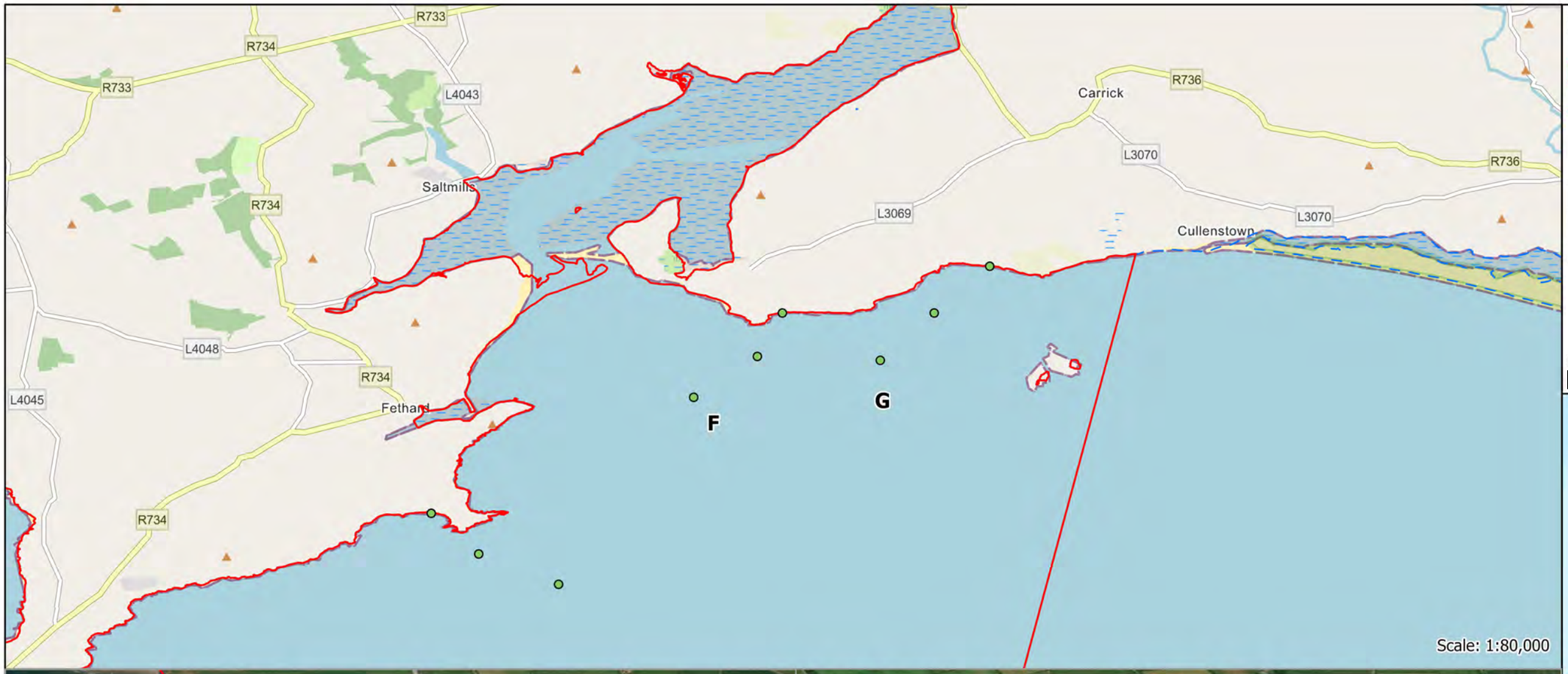

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Inshore-Onshore Boreholes

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by:
[redacted]

N

Client
EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Inshore-Onshore Boreholes

Page 4 of 4

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0004

Status:	Rev:	Model File Identifier:
A1	C03	
Drawn: MV		Date: 02/12/2024
Checked: GME		Scale: different scales (A3)
Approved: GME		Projection: ETRS1989 UTM Zone 28N, 29N or 30N projection

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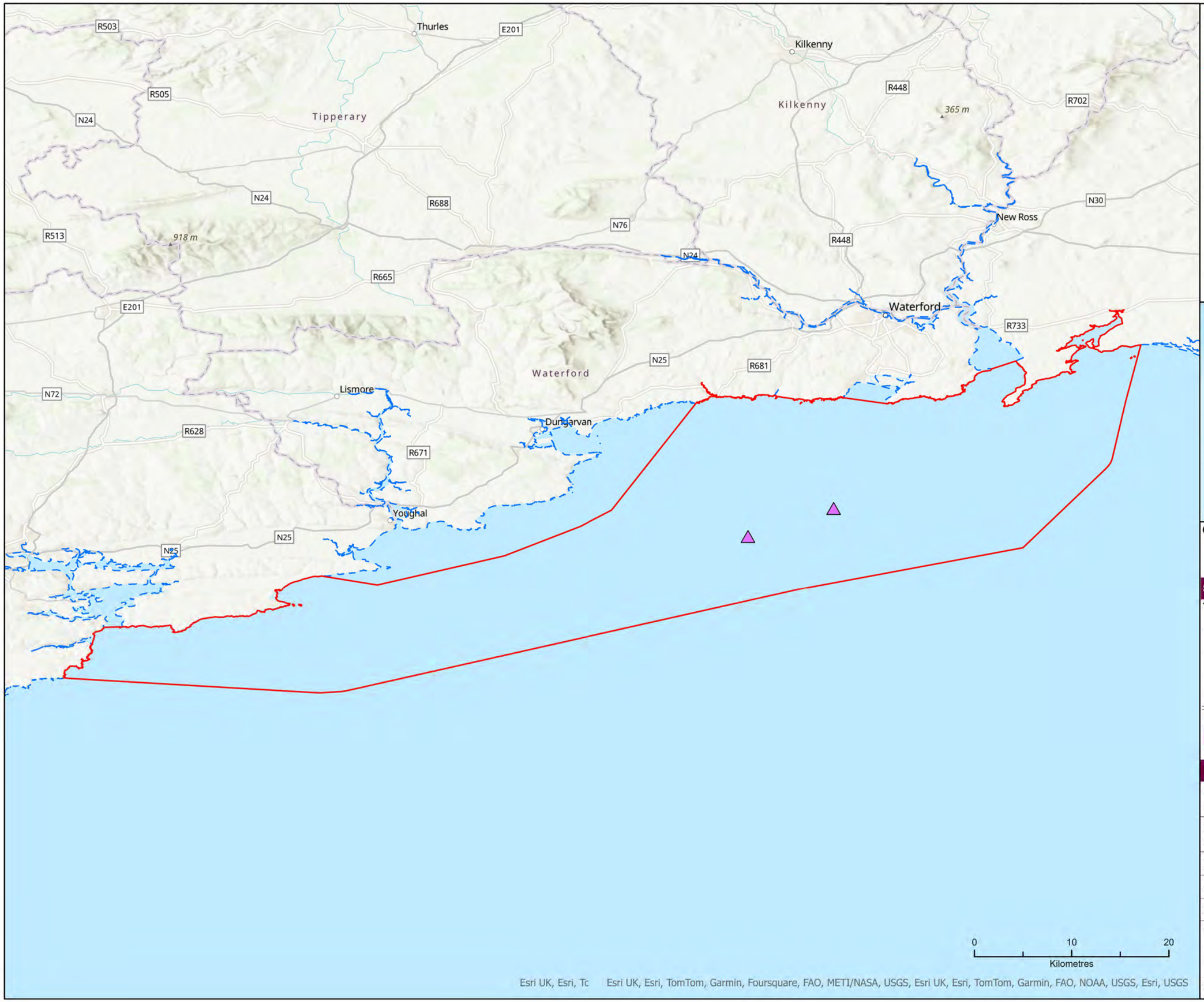

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Metocean Buoy Deployments

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by:
[redacted]

N

Client
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South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Metocean Buoy Deployments

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Issue Details

File Identifier: IE001220-RPS-AP-XX-DG-EN-0005		
Status: A1	**Rev:** C03	**Model File Identifier:**
Drawn: MV		**Date:** 02/12/2024
Checked: GME		**Scale:** 1:590,000 (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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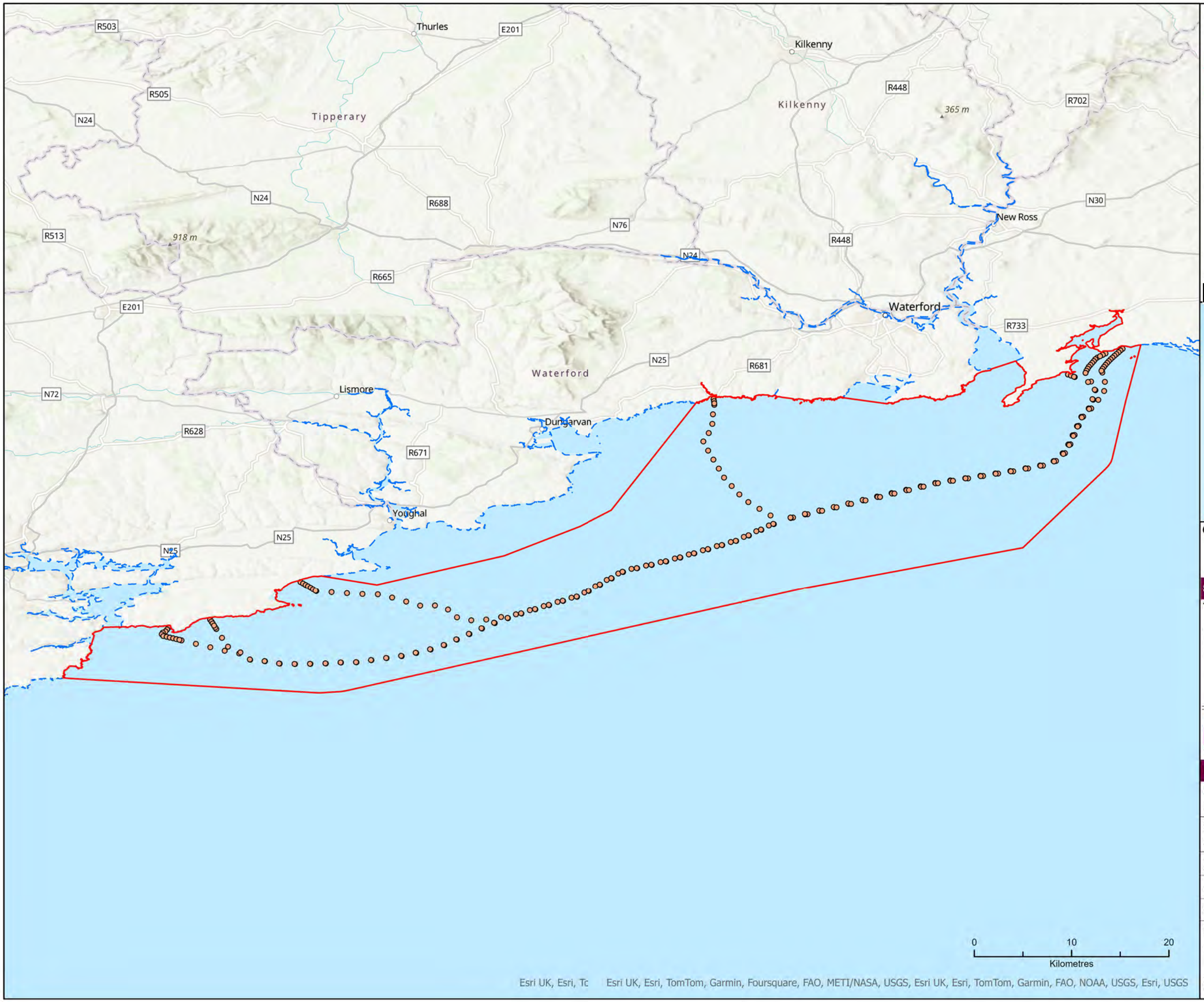

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Shallow CPT

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

N

Prepared by:
[redacted]

Client

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South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Shallow CPT

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0007

Status:	Rev:	Model File Identifier:
A1	C03	

Drawn: MV	**Date:** 02/12/2024
Checked: GME	**Scale:** 1:590,000 (A3)
Approved: GME	**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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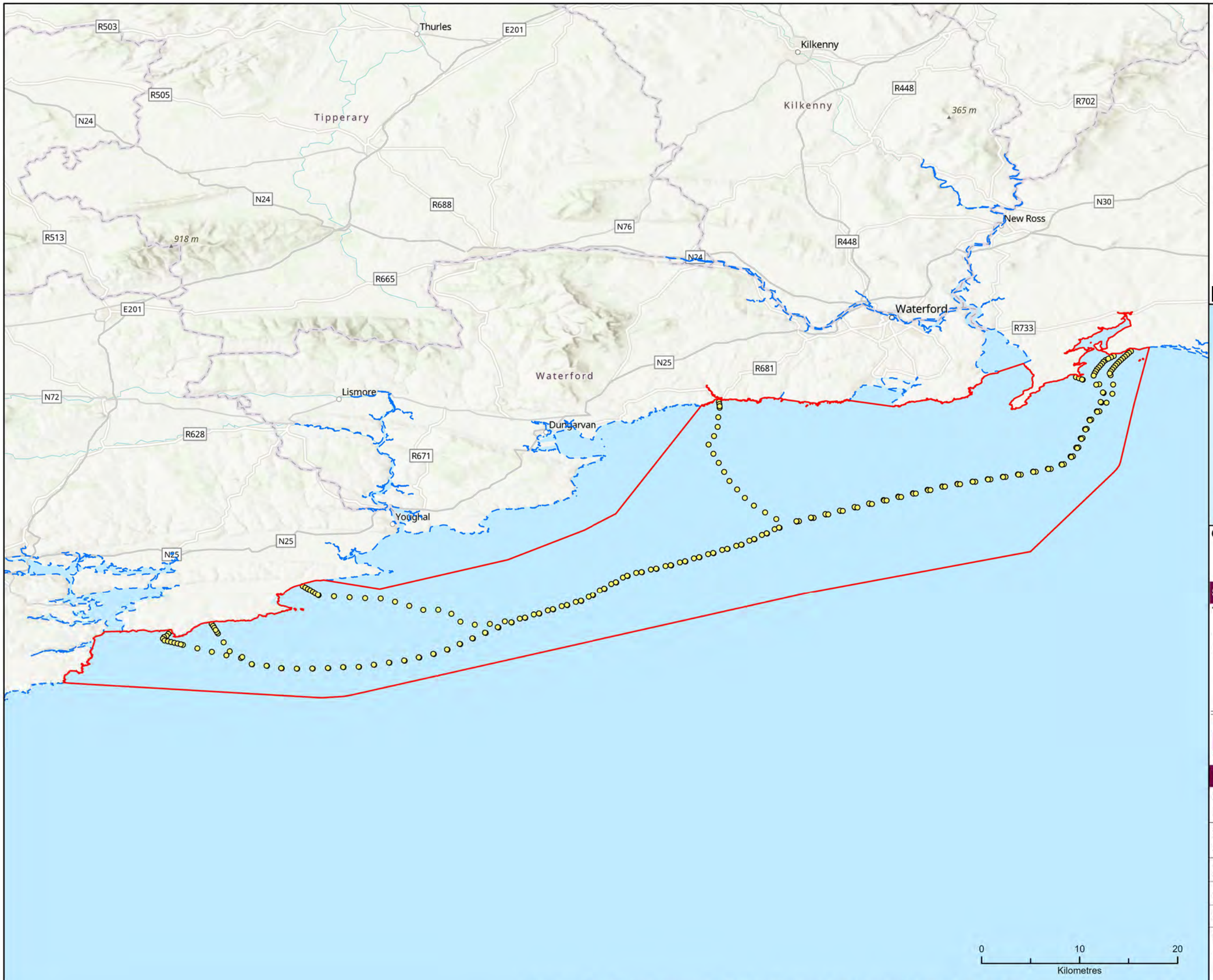

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Vibrocores

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

N

Prepared by:
[redacted]

Client

EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Vibrocores

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0008

Status:	Rev:	Model File Identifier:
A1	C03	

Drawn:	MV	**Date:** 02/12/2024	
Checked:	GME	**Scale:** 1:590,000	(A3)
Approved:	GME	**Projection:**	ETRS1989 UTM Zone 28N, 29N or 30N projection

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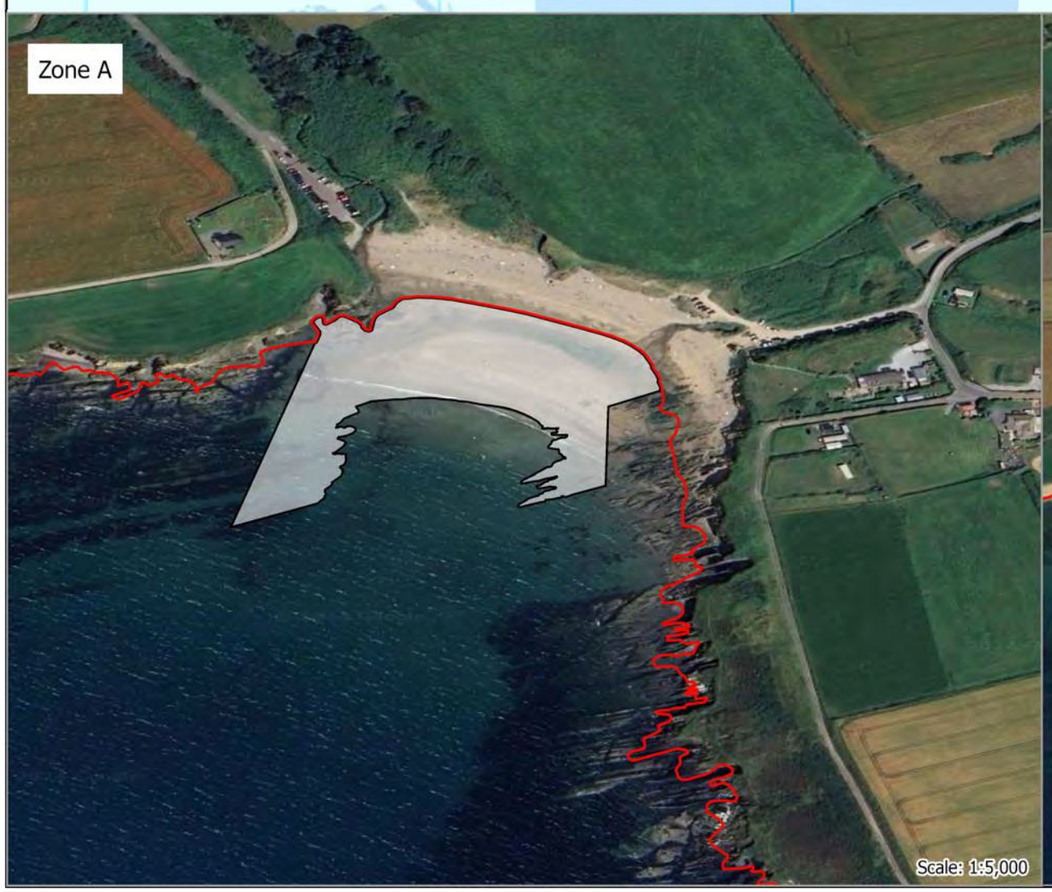

Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Trial Pit Zones

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by: [redacted]

N

Client

EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Trial Pit

Page 1 of 4

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0009

Status:	Rev:	Model File Identifier:
A1	C02	

Drawn:	MV	**Date:**	04/10/2024
Checked:	GME	**Scale:**	different scales (A3)
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Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Trial Pit Zones

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by:
[redacted]

N

Client
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Title

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Issue Details

File Identifier: IE001220-RPS-AP-XX-DG-EN-0009		
Status: A1	**Rev:** C02	**Model File Identifier:**
Drawn: MV		**Date:** 04/10/2024
Checked: GME		**Scale:** different scales (A3)
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Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Trial Pit Zones

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by: [redacted]

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Client

EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Trial Pit

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0009

Status:	Rev:	Model File Identifier:
A1	C02	
Drawn: MV		**Date:** 04/10/2024
Checked: GME		**Scale:** different scales (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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Legend

- Maritime Usage License Area of Interest
- High Water Mark (HWM)
- Trial Pit Zones

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

Prepared by:

[redacted]

N

Client

EirGrid

South Coast Offshore Transmission Project

Title

Indicative Sampling Locations Trial Pit

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0009

Status:	Rev:	Model File Identifier:
A1	C02	
Drawn: MV		**Date:** 02/12/2024
Checked: GME		**Scale:** different scales (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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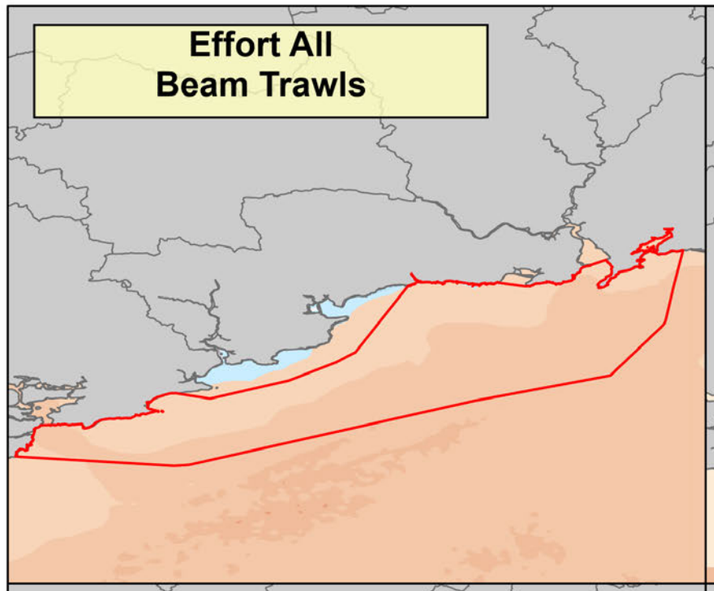

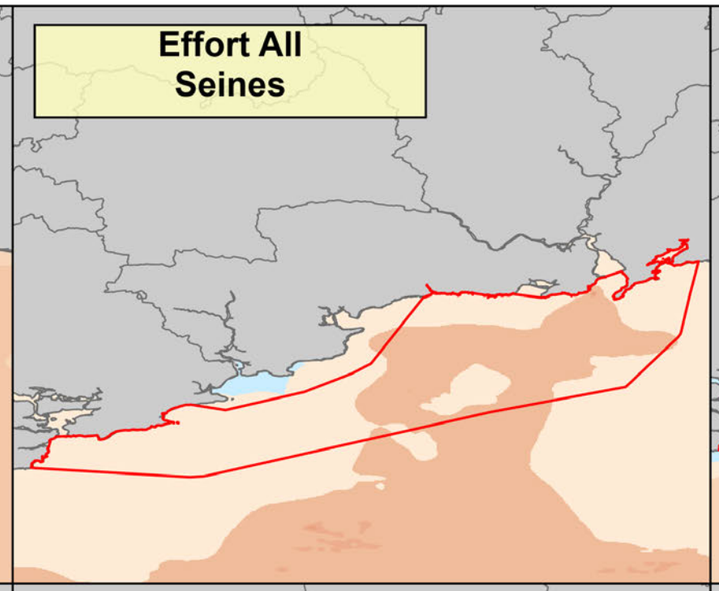

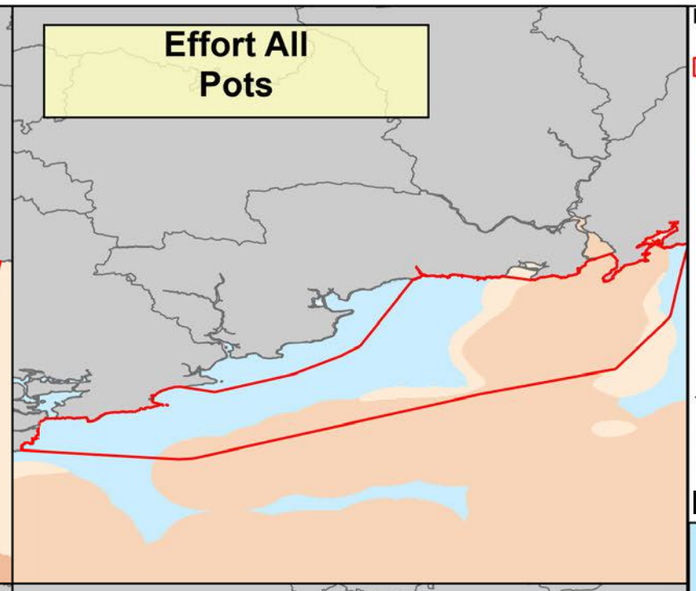

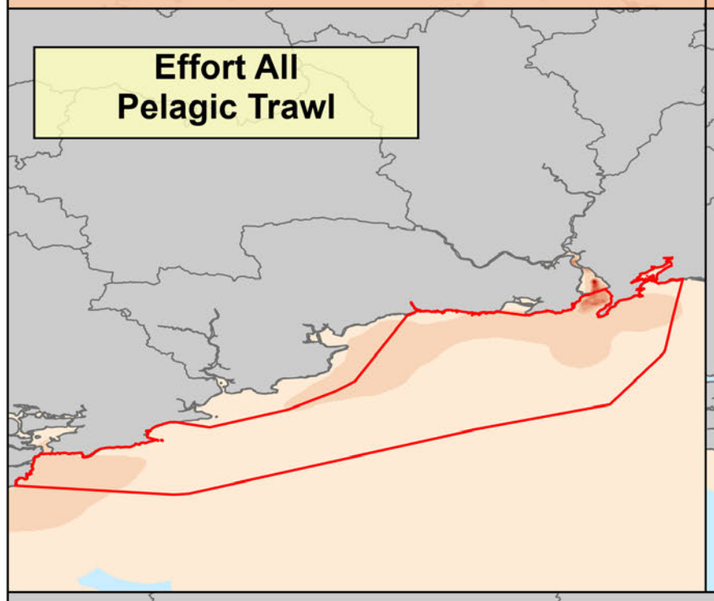

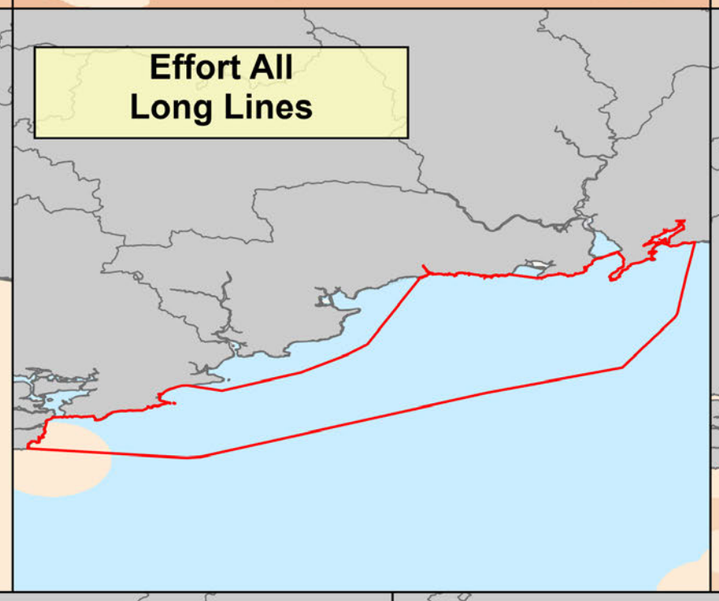

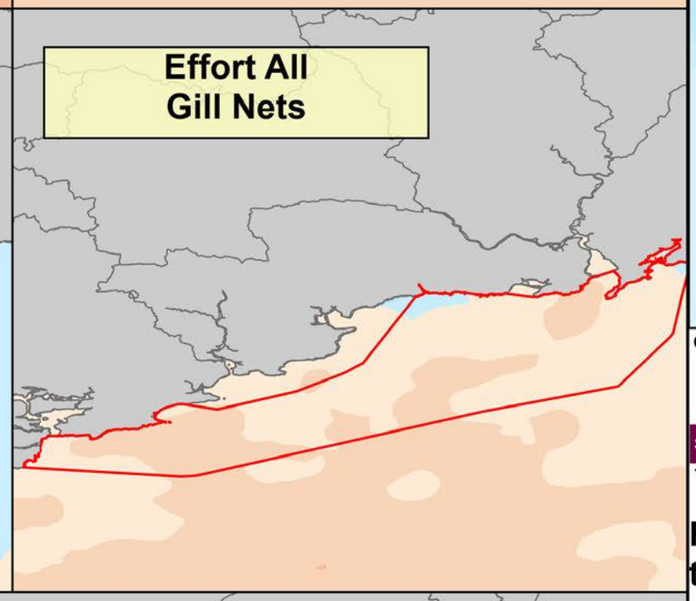

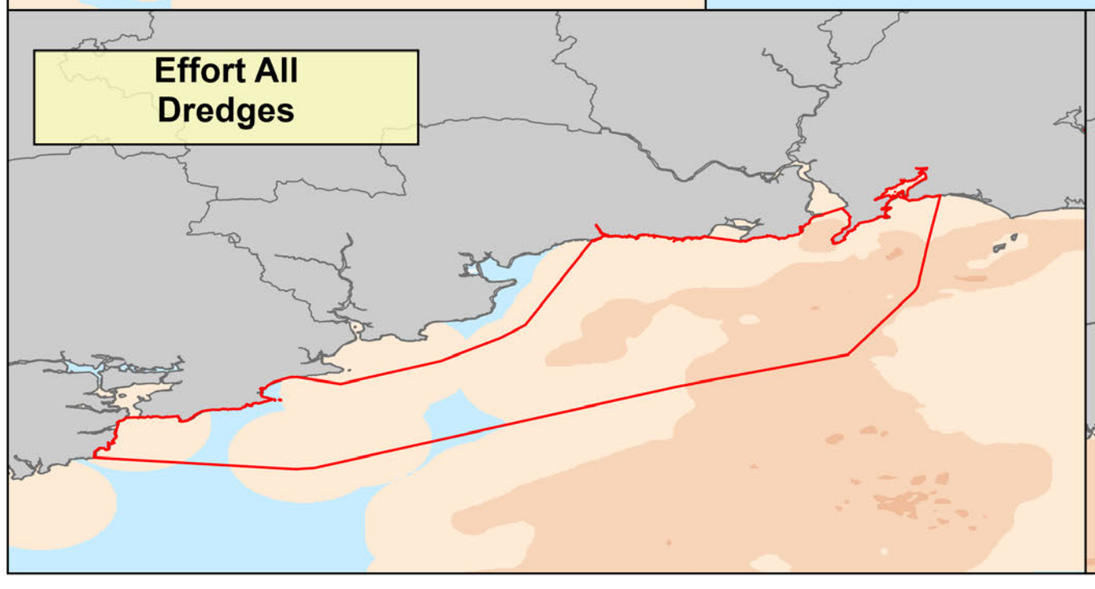

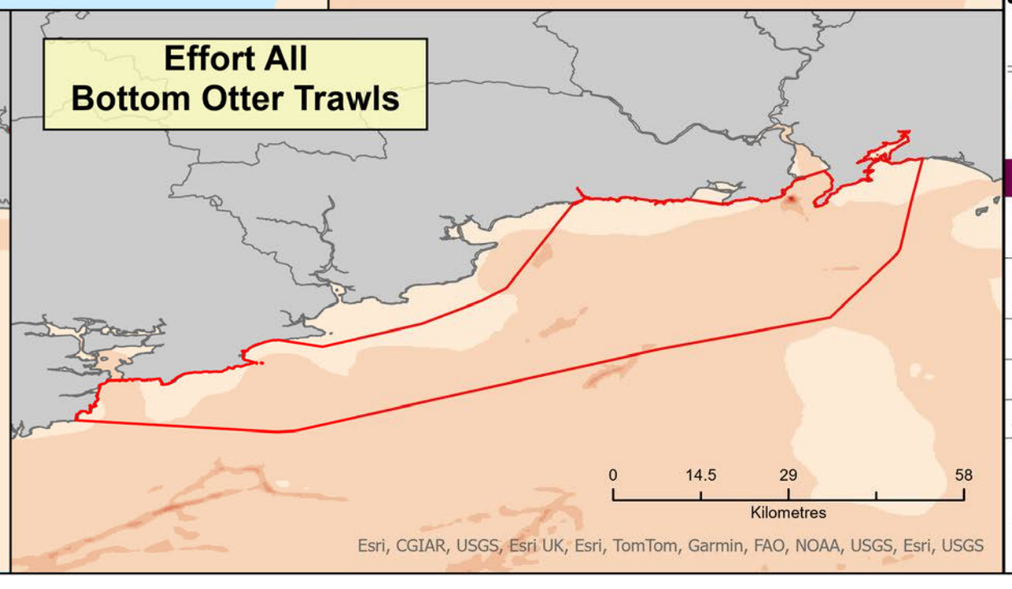

Legend

Maritime Usage License Area of Interest

Fishing Effort h/km2/y

- 0-0.1
- 0.1-5
- 5-10
- 10-15
- 15-20
- 20-25
- 25-30
- 30-35
- 35-40

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

MARA File Reference No:

TBA

Fishing Data: *Gerritsen, Hans. (2024) Atlas of Commercial Fisheries around Ireland, Fourth Edition 2024. Marine Institute. doi: 10/mfb7*

Prepared by: [redacted]

N

Client

EirGrid

South Coast Offshore Transmission Project

Title

Fishing effort within the AoI for all gear types

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0012

Status:	Rev:	Model File Identifier:
A1	C01	

Drawn: PK	**Date:** 16/10/2024
Checked: AE	**Scale:** 1:1,650,000 (A3)
Approved: GME	**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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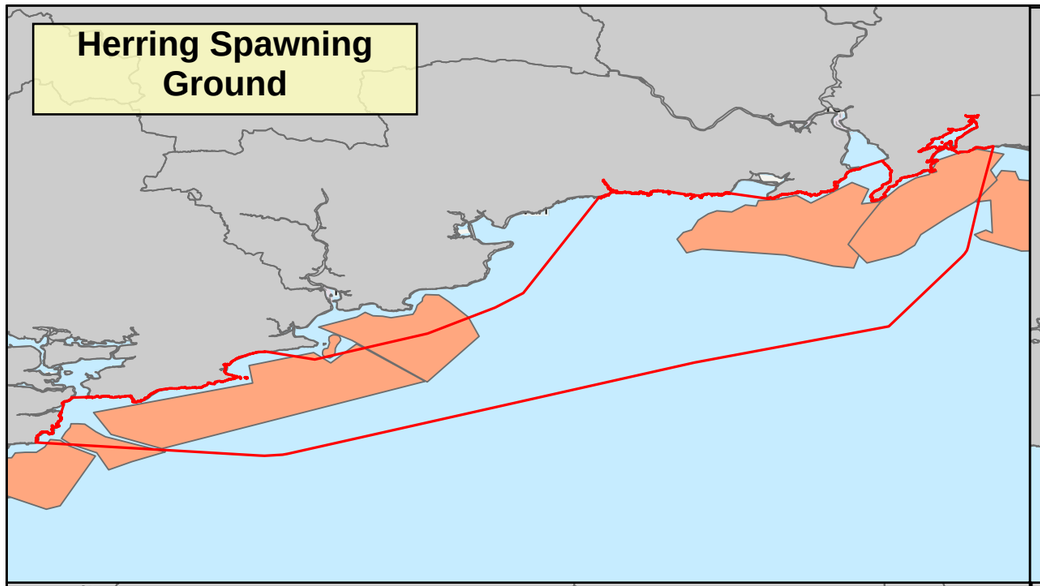

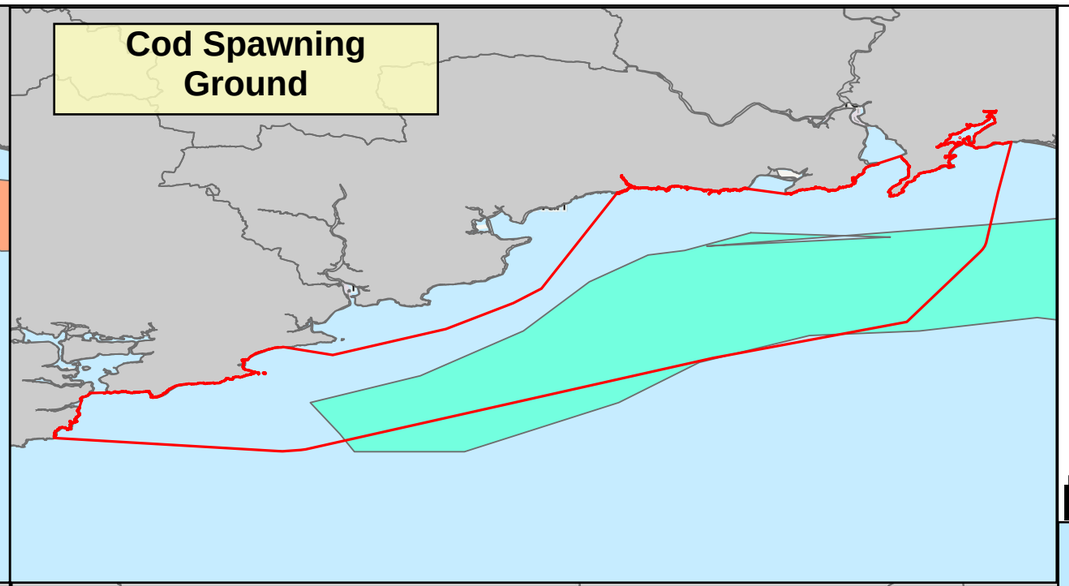

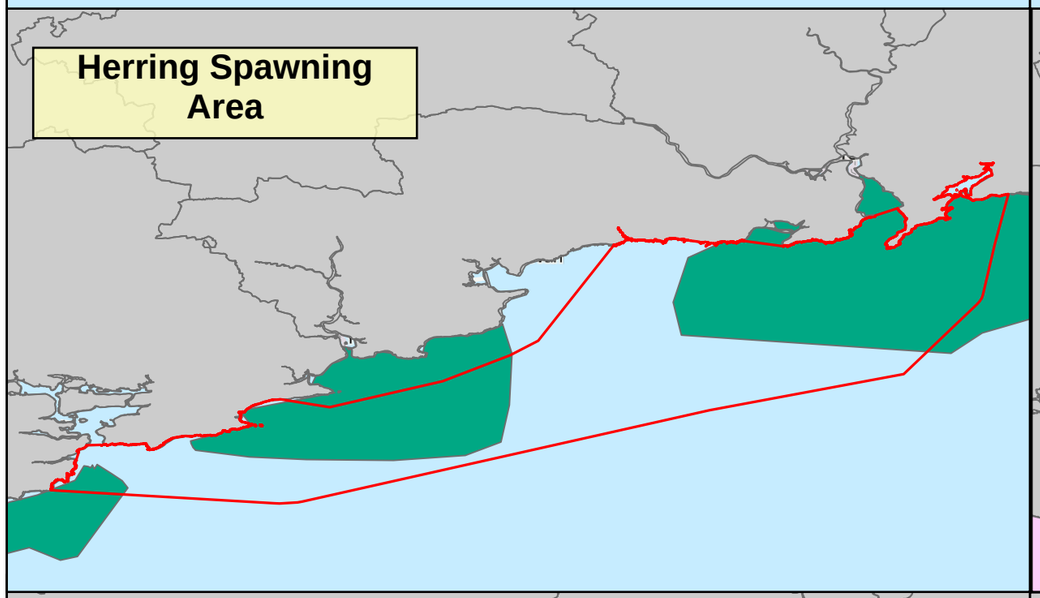

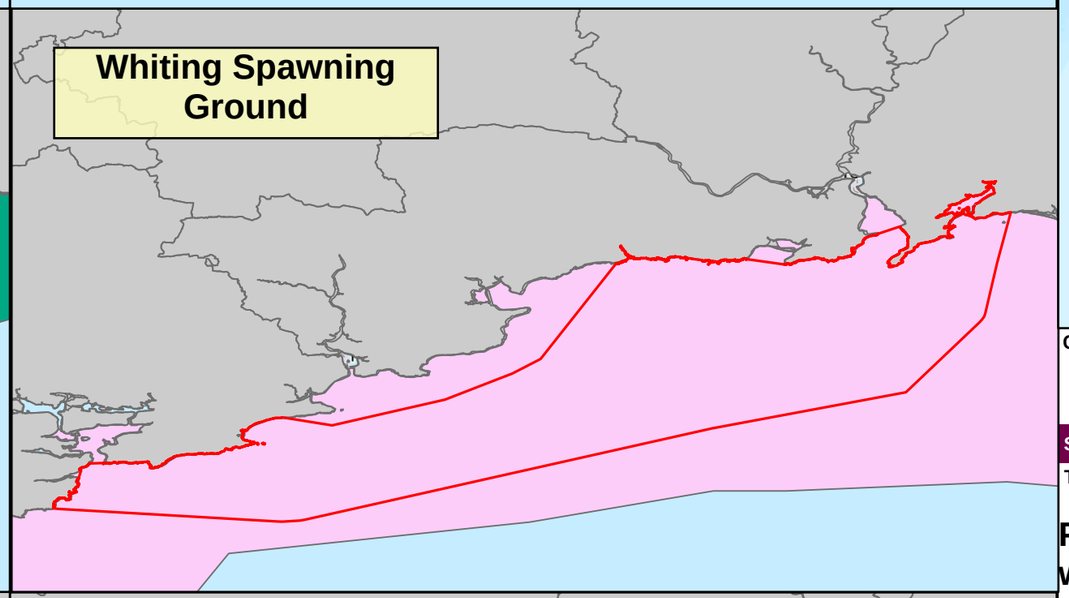

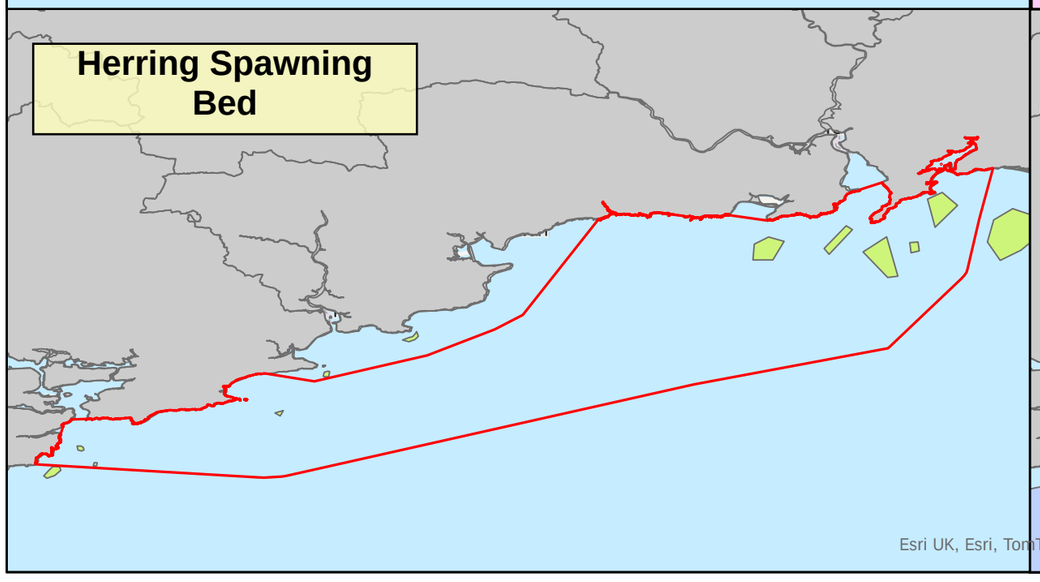

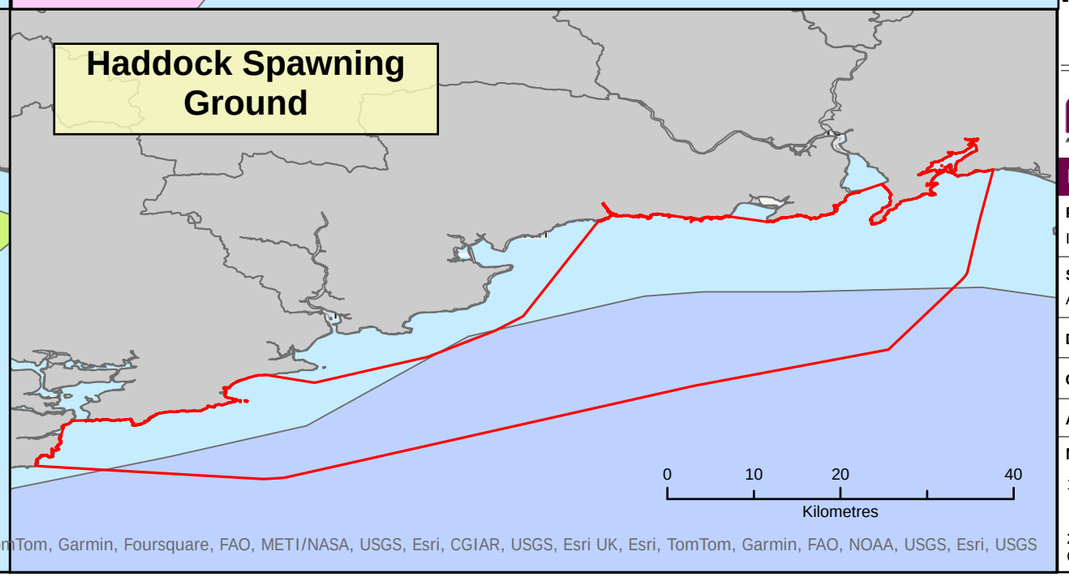

Legend

Maritime Usage License Area of Interest

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

MARA File Reference No:
TBA

Prepared by:
[redacted]

Client

EirGrid

South Coast Offshore Transmission Project

Title

Fish spawning grounds within the AoI

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Issue Details

File Identifier: IE001220-RPS-AP-XX-DG-EN-0013		
Status: A1	**Rev:** C01	**Model File Identifier:**
Drawn: PK		**Date:** 08/10/2024
Checked: AE		**Scale:** 1:1,150,000 (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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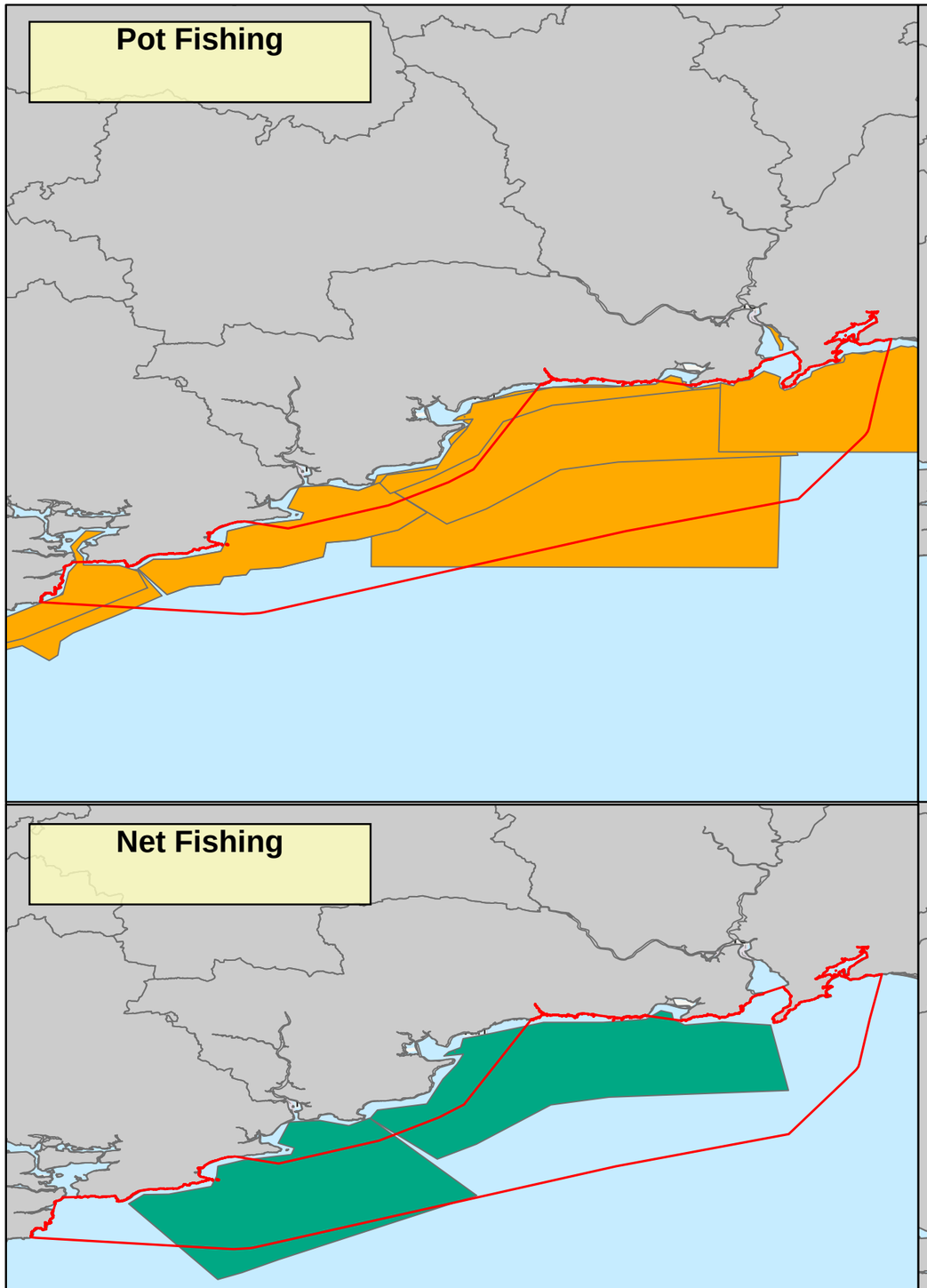

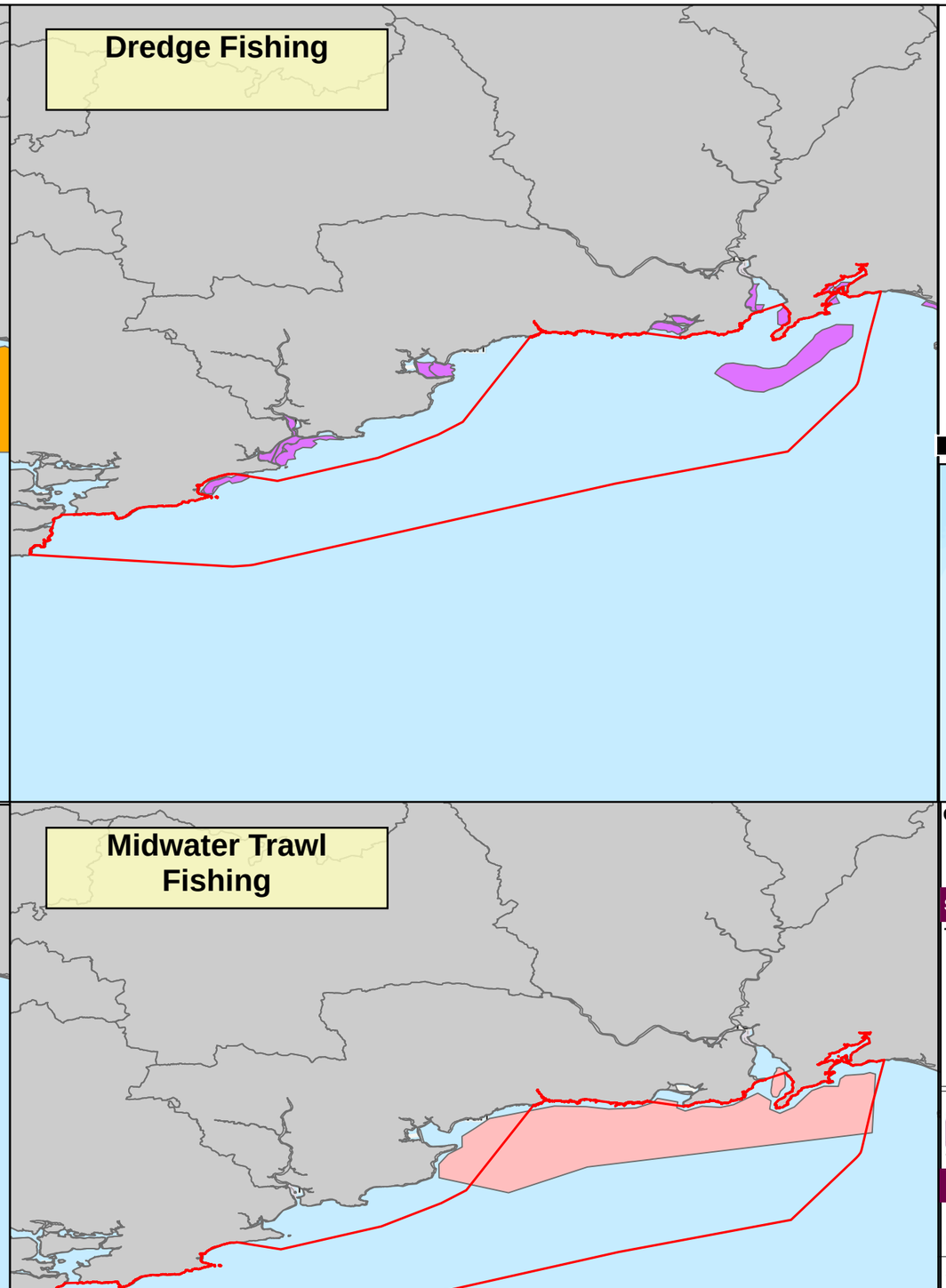

0 10 20 40
Kilometres

Legend

Maritime Usage License Area of Interest

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

MARA File Reference No:
TBA

Prepared by:
[redacted]

Client
EirGrid

South Coast Offshore Transmission Project

Title

Inshore fishing within the AoI

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Issue Details

File Identifier: IE001220-RPS-AP-XX-DG-EN-0014		
Status: A1	**Rev:** C01	**Model File Identifier:**
Drawn: PK		**Date:** 09/10/2024
Checked: AE		**Scale:** 1:1,150,000 (A3)
Approved: GME		**Projection:** ETRS1989 UTM Zone 28N, 29N or 30N projection

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Legend

- Maritime Usage License Area of Interest
- Designated Shellfish Waters
- Aquaculture Sites

Where the licence area adjoins or abuts the land the High Water Mark as defined by the Chief Boundary Surveyor is the boundary of the licence area.

MARA File Reference No:
TBA

Prepared by:
[redacted]

0 5 10 20
Kilometres

Client

EirGrid

South Coast Offshore Transmission Project

Title

Aquaculture sites and designated shellfish waters

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Issue Details

File Identifier:
IE001220-RPS-AP-XX-DG-EN-0015

Status:	Rev:	Model File Identifier:
A1	C01	

Drawn: PK	**Date:** 08/10/2024
Checked: AE	**Scale:** 1:600,000 (A3)
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