Gas Networks Ireland

Strategic Gas Emergency Reserve – Marine Site Investigation (SI) Works

Supporting Information for Screening for Appropriate Assessment (SISAA) Report

RSK General Notes

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1 Introduction

1.1 Overview

Following a review carried out by the Department of the Environment, Climate and Communications (DECC) of the Security of Energy Supply of Ireland's Electricity and Gas Systems, there is need to improve the resilience of Ireland's natural gas supplies and infrastructure in the event of a disruption to the country's natural gas supplies for the short to medium term.

Energy Security in Ireland (ESI) to 2030 outlines a comprehensive strategy aimed at ensuring energy security throughout the current decade while facilitating a sustainable transition towards a carbon-neutral energy system by 2050.

Action 17 of ESI proposes the implementation of a "Strategic Gas Emergency Reserve to protect Ireland in the event of a gas supply disruption as Ireland makes a secure transition to a majority renewable energy".

In January 2025, the Government of Ireland issued the "Programme for Government 2025 – Securing Ireland's Future" which included the commitment that the government will "Take all necessary action to ensure and protect Ireland's energy security".

In March 2025, the Government of Ireland gave approval to proceed with the development of a State-led strategic gas emergency reserve. The delivery of a temporary gas reserve is deemed critical to Ireland's energy security as we continue to transition to indigenous, clean renewable energy.

Based on the above decision, Gas Networks Ireland (GNI) proposes to construct a receiving terminal and jetty to accommodate a Floating Storage and Regasification Unit (FSRU), which will allow for the importation of and storage of Liquified Natural Gas (LNG) within Ireland's jurisdictional waters. The FSRU will be connected to the national grid network for injection in case of a supply emergency. The project will involve the construction of a receiving terminal and jetty to accommodate the FSRU. Depending on the site chosen, there may be capital dredging required.

GNI intends to apply to the Maritime Area Regulatory Authority (MARA) for a Maritime Usage Licence (MUL) to conduct marine Site Investigations (SI) and environmental surveys within the Shannon Estuary adjacent to the townlands of Shannakea Beg, Cahiracon, Foynes Island, Leahys and Corgrig.

This report has been prepared as part of the MUL application process. The proposed works are designed to provide high quality baseline data that will contribute to site selection and any subsequent design, EIAR, and Appropriate Assessment, undertaken for the Strategic Gas Emergency Reserve (SGER) Project; in the event that a site is taken forward to the planning/consenting stage.

1.2 Purpose of the report

This document has been prepared by RSK Environment Ltd. on behalf of GNI in support of the Maritime Usage Licence Application to the MARA. The goal of this report is to provide supporting information necessary for the MARA to reach a Screening for Appropriate Assessment (AA) Determination. . Under Section 177U (5) of the Planning and Development Act 2000 (as amended), the competent authority shall determine that an AA of a proposed development is not required if it can be excluded, on the basis of objective information, that the proposed development, individually or in combination with other

plans or projects, will have a significant effect on a European site. This report contains an analysis on whether the works are likely to have a significant effect on a European site/s in view of the site's conservation objectives. The results of the site survey and investigation work will also be used to provide baseline data for any subsequent Environmental Impact Assessment Report (EIAR) and Appropriate Assessment Natura Impact Statement (NIS) should the development be taken forward to the planning/consenting stage.

1.3 Statement of Authority

This report has been prepared by RSK on behalf of GNI. The technical competence of the authors is outlined below:

[redacted] is Technical Director within the International Projects Group Marine Team in RSK. He has over 20 years of experience in marine environmental surveying and consulting. He holds an honours degree in Marine Biology and Oceanography and a Masters in Marine Resource Development and Protection. He has particular experience in marine ecology surveys, and the subsequent analysis and reporting of marine survey data for EIA projects, and AA and Annex IV species reports.

[redacted] is a Senior Marine Consultant within the International Projects Group Marine Team in RSK. She has over 10 years of experience in the marine ecology field. She holds an honours degree in Marine Science and a Masters in Biology. She has contributed to numerous marine environmental projects including AA Screening, Natura Impact Statements and EIAR chapters.

This Supporting Information for Screening for Appropriate Assessment (SISAA) report has been prepared in compliance with the legislative and policy requirements described below.

1.4 Legislation

1.4.1 European Legislation

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) provides protection for habitats and species of European importance; Council Directive 79/409/EEC (the Birds Directive) aims to protect all 500 wild bird species naturally occurring in the European Union (EU). Areas designated for protection under the Habitats Directive are described as Special Areas of Conservation (SAC) and those designated under the Birds Directive, as Special Protection Areas (SPA) and the sites are known collectively as Natura 2000 sites (see Section 1.4.2.5). As each member of the EU is required to designate areas in their jurisdictions, the establishment of this network of Natura 2000 sites under Articles 3 to 9 of Directive 92/43/EEC is the key measure to protect nature and biodiversity in the EU.

Articles 6(3) and 6(4) of the Habitats Directive set out the decision-making tests for plans and projects likely to have a significant effect on or to adversely affect the integrity of Natura 2000 sites. Article 7 of the Habitats Directive extends the scope of its articles 6(3) and 6(4) to the Birds Directive.

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

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

site's conservation objectives. Considering the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the public."

Further detail on the stages of AA is provided in Section 3.2 of this report.

Each Natura 2000 site has assigned Conservation Objectives (COs) and a list of Qualifying Interests (QI). The CO concept appears in the eighth recital of Directive 92/43/EEC which reads: "whereas it is appropriate, in each area designated, to implement the necessary measures having regard to the conservation objectives pursued". Article 1 then explains that "conservation means a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora at a favourable status".

The National Parks and Wildlife Service (NPWS) has established COs for each Natura 2000 site in Ireland. These are published on their website. NPWS advise in the general introductory notes of their site-specific conservation objectives (SSCO) series publications, that an appropriate assessment based on their "published conservation objectives will remain valid even if the CO targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out".

NPWS advise that to assist in that regard, it is essential that the date and version are included when objectives are cited.

1.4.2 National Legislation

1.4.2.1 Maritime Area Planning Act

The Maritime Area Planning Act, 2021 (as amended) established the Maritime Area Regulatory Authority (MARA). One of the functions of MARA is to consider licence applications and the granting of licences.

Schedule 7 of the Maritime Area Planning Act, 2021 (as amended) lists maritime usages which may be undertaken in the maritime area pursuant to licence. Of relevance to this site investigation project are the following items within Schedule 7:

3. Marine environmental surveys for the purposes of site investigation or in support of an application under Part XXI of the Act of 2000.

5. The installation of non-permanent platforms, pontoons, or slipways.

6. The deposit of any substance or object, either in the sea or on or under the seabed, from-

a) a vehicle, vessel (including a craft capable of travelling on, in or under water, whether or not self-propelled), boat, aircraft or marine structure (other than a pipeline).

7. The use of a vehicle, vessel (including a craft capable of travelling on, in or under water, whether or not self-propelled), boat, aircraft, marine structure (other than a pipeline) or floating container to remove any substance or object from the seabed.

11. The deposit, construction or removal of any mooring not requiring authorisation under any other enactment.

12.

a) The removal of beach material from, or the disturbance of beach material in, the maritime area otherwise than in the course of the ordinary or reasonable recreational enjoyment of the maritime area.

b) In this paragraph, "beach material" means sand, clay, gravel, shingle, stones, rocks, mineral substances, seashells, coral and maerl and any flora, in or on the surface of the seabed or suspended in the water of the maritime area, and includes outcrops of rock or any other mineral substance above the surface of the seabed.

GNI is applying to MARA for the grant of a licence for the above Schedule 7 usages, as more fully described in Section 2 of this report.

1.4.2.2 Requirements in Relation to Appropriate Assessment

The following definitions in relation to AA are included in Section 2(1) of the Maritime Area Planning Act, 2021 (as amended):

"screening for appropriate assessment" shall be construed in accordance with, as appropriate—

a) section 177U of the Act of 2000, or

b) (b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011)

"appropriate assessment" shall be construed in accordance with, as appropriate—

a) section 177V of the Act of 2000, or

b) Part 5 of the European Communities (Birds and Natural Habitats) Regulations (S.I. No. 477 of 2011);

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

The European Communities (Birds and Natural Habitats) Regulations 2011 have also been amended.

Under Section 112 of the Maritime Area Planning Act, 2021 (as amended), MARA has been designated as a competent authority for the purposes of Part 5 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011); and appropriate assessments to which that Part applies.

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

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

1.4.2.3 Screening Out for AA

Under Section 177U (5) of the Planning and Development Act 2000 (as amended), the competent authority shall determine that an AA of a proposed development **is not required** if it can be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Under Regulation 42(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the public authority shall determine that an AA of a project **is not required** where the plan or

project is not directly connected with or necessary to the management of the site as a European Site and if it can be excluded on the basis of objective scientific information following screening that the project, individually or in combination with other plans or projects, will have a significant effect on a European site.

1.4.2.4 Screening In for AA

Under Section 177U (4) of the Planning and Development Act 2000 (as amended), the competent authority shall determine that an AA of a proposed development **is required** if it cannot be excluded, on the basis of objective information, that the proposed development, individually or in combination with other plans or projects, will have a significant effect on a European site.

Under Regulation 42(6) of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) the public authority shall determine that an AA of a plan or project **is required** where the plan or project is not directly connected with or necessary to the management of the site as a European Site and if it cannot be excluded, on the basis of objective scientific information following screening under this Regulation, that the plan or project, individually or in combination with other plans or projects, will have a significant effect on a European site.

Where the competent authority determines that an AA is required, they shall make a determination under Article 6.3 of the Habitats Directive as to whether or not the proposed development would adversely affect the integrity of a European site and an appropriate assessment shall be carried out by the competent/ public authority before consent is given for the proposed development (see Section 177V(1) of the Planning and Development Act 2000 (as amended) and Regulation 42(11) European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).

1.4.2.5 European Sites and Natura 2000 Sites

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

"European Site" means—

a) a candidate site of Community importance,

b) a site of Community importance,

c) a candidate special area of conservation,

d) a special area of conservation,

e) a candidate special protection area, or

f) a special protection area.

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

"Natura 2000" means the European network of SACs under the Habitats Directive and SPAs under the Birds Directive, provided for by Article 3(1) of the Habitats Directive and, for the purposes of these Regulations, includes European Sites.

The two terms are often used interchangeably. For the purposes of this report, the term European site is used.

2 Project Description

2.1 Site Location

The proposed MUL Area covers an area of 11.19km^2 and extends from the townland of Shannakea Beg along the Clare coast to Cahiracon (Ed Killadysert), across the Shannon Estuary to Shannon Foynes Island and along the Limerick coast to the townland of Leahys and Corgrig (Figure 2.1). The works described in this application relates solely to the SI / sampling works within the proposed MUL Area (Figure 2.2 and Figure 2.3). Marine SI is required to inform preliminary design and facilitate environmental assessment in advance of Planning for the SGER project. Site investigations are to be completed over two phases, with Phase 1 being used to determining the optimum location of the SGER and Phase 2 being used at a later date to coordinate with the detailed design stage.

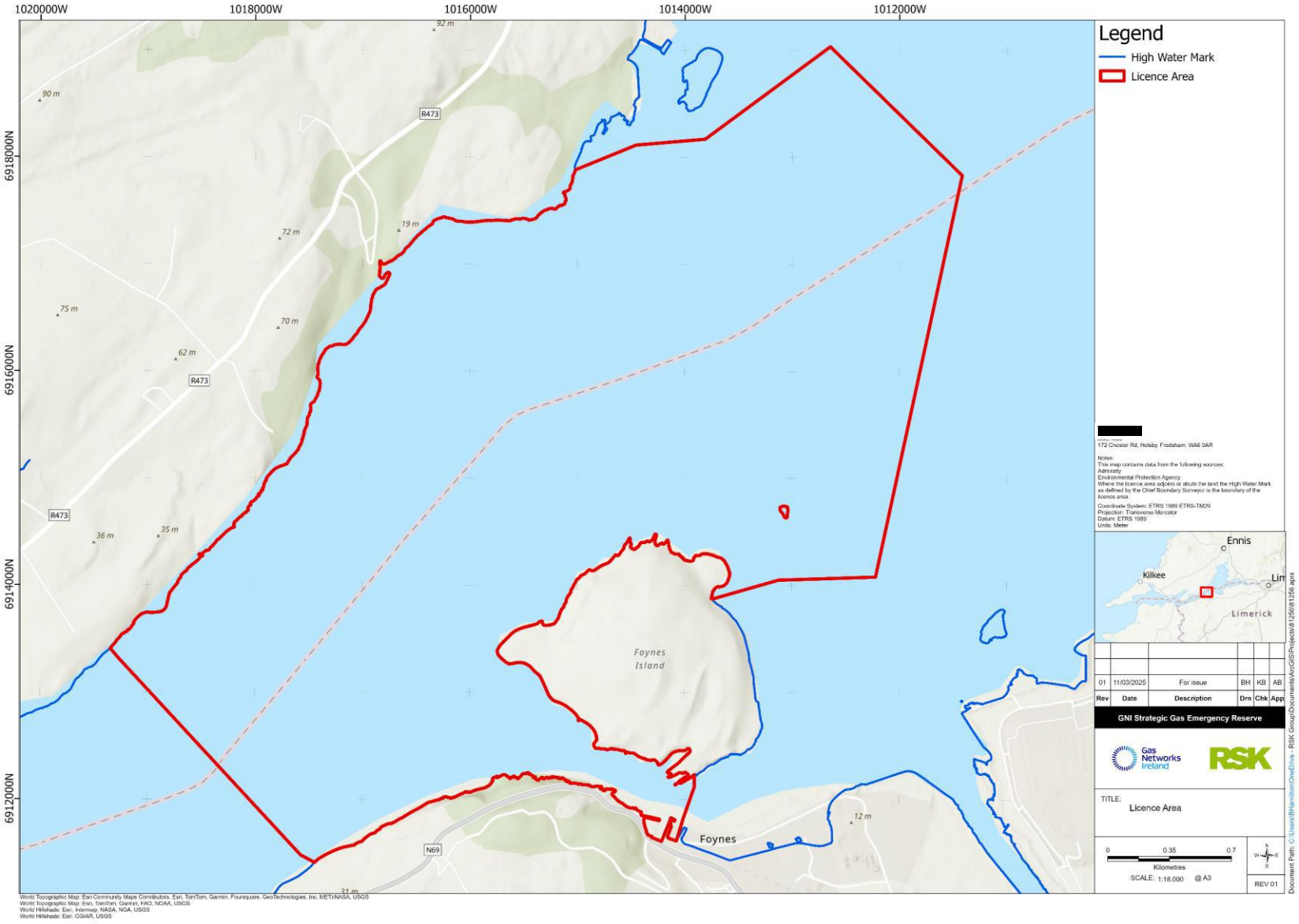

Figure 2.1
Proposed MUL Area

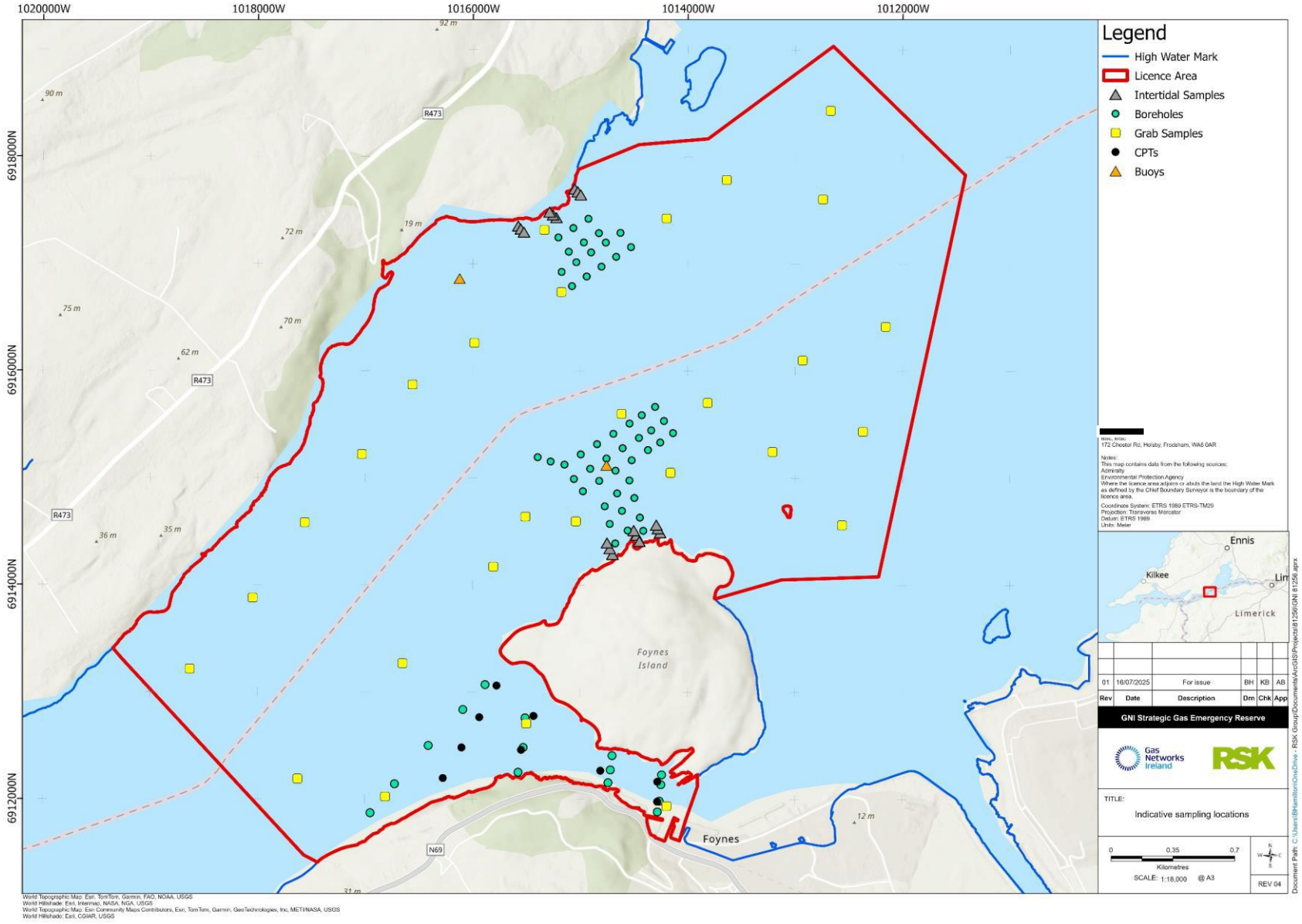

Figure 2.2
Indicative sampling location

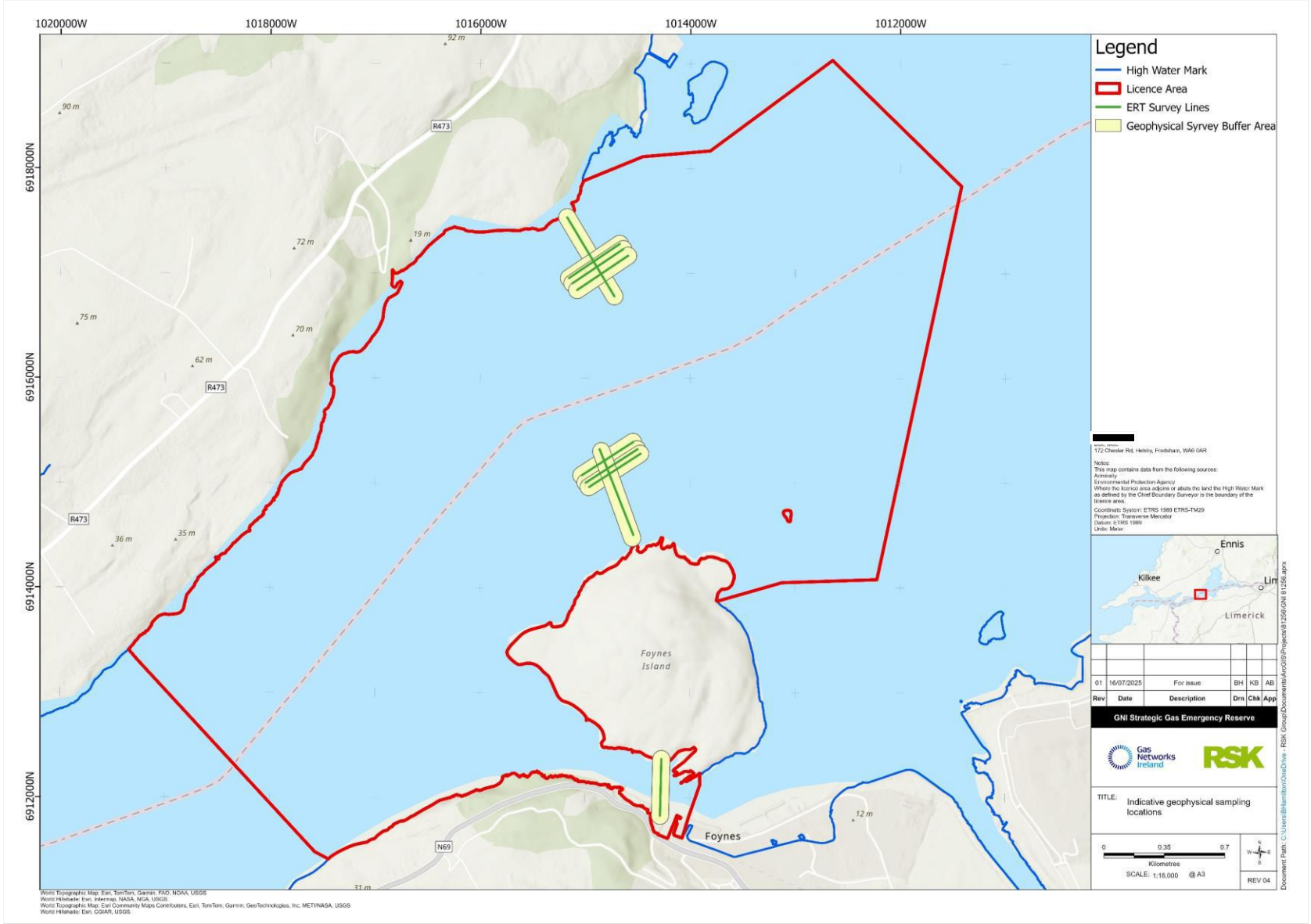

Figure 2.3

Indicative Geophysical Survey and Electrical Resistivity Tomography (ERT) electrode deployment locations

2.2 Description of the Works

2.2.1 Overview

The objective of the proposed surveys is to provide high-quality data that can contribute to a reliable baseline for site selection and subsequent project design and development as well as informing the EIA. As such, the following survey investigations are considered necessary and detailed further in Table 2.1:

- Drop-down camera survey
- Geophysical survey, including:
  - Magnetometer
  - Sub-bottom profiler
  - Side-scan sonar
  - Multibeam Echo Sounder (MBES)
  - Marine Refraction Seismic
  - Marine Electrical Resistivity Tomography (ERT)
- Boreholes
- Cone penetration tests (CPTs)
- Grab samples
- Surface water samples
- Intertidal walkover survey
- Intertidal core samples
- Archaeological surveys and other investigations (i.e. underwater inspections, walkovers, metal detectors, dive surveys).
- Deployment of metocean monitoring buoys to collect physical oceanographic data.

These works are collectively referred to as the Site Investigation (SI) works throughout this report.

Indicative sampling locations within the proposed MUL Area are designed to inform a potential jetty and vessel, with the addition of potential pipeline route options from the southwest side of Foynes Island to the mainland. It should be noted that all locations shown for sampling within the proposed MUL Area are indicative and may be subject to a degree of change on-site.

The following drawings have been prepared in support of the Maritime Usage Licence application to the MARA:

- Proposed Licence Area Map
- Proposed Grab Sample Locations Map
- Proposed Borehole Locations Map
- SI Indicative Table of Coordinates

The exact technical specification of the equipment to be used will not be known until the survey contract has been awarded. However, descriptions of typical equipment and survey parameters has been used within this report.

Predicted time and footprint for the activities are presented in Table 2.2. It is noted that the requirement for additional and more refined works may arise as the SI works progress and are analysed. This may include areas of particular interest using more targeted techniques and/or refined borehole locations

and quantities.

There will be no permanent structures and all site investigation works will be temporary in nature. The moving marine plant will remain on site for the duration of the works.

2.2.2 SI Schedule

The intention is to begin SI activities as soon as feasible following MUL award. Timing of the SI activities is dependent on many factors including weather, tidal flows, availability of vessels and the grant of the MUL. The granting of the MUL will have a direct effect on the timing of SI activities. The duration of the phase 1 SI works is approximately 16 weeks and are currently scheduled for Q3 2025. Phase 2 SI works (if required) will be carried out at a later date to coordinate with the detailed design stage which is dependent on consenting for the main project. The proposed licence duration is for 5 years to account for potential delays in the consenting process.

Table 2.1
Description of proposed works

Survey	Method	Method detail	Sampling Effort
Geophysical	Side Scan Sonar (SSS)	SSS surveys are used to determine sediment characteristics and seabed features. The EdgeTech 4205 may be taken as an indicative example of an SSS device and for these surveys will have a potential operating frequency range of approximately 300/600kHz in the offshore area and 600/900kHz in the shallower nearshore area with sound pressure levels of 220-230dB re1µPa @1m. The SSS will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing	SSS may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Magnetometer	A magnetometer is used to identify magnetic anomalies and hazard mapping for metal obstructions, shipwrecks and unexploded ordnance on the surface and in the shallow sub-surface. The Geometrics G-882 can be taken as an indicative equipment example. It is a passive device (i.e. it does not emit any sound waves into the marine environment) the sensor responds to local variability in magnetic field. The magnetometer will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	Magnetometer survey may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) – Parametric Sub Bottom Profiler	SBP is used to develop an image of the subsurface, identifying different strata encountered in the shallow sediments. The Innomar "standard" Sub-Bottom Profiler is an indicative example of a parametric system with a primary and secondary frequency range of 85-115kHz and 2-22kHz, respectively, and sound pressure levels of up to 232 dB (typically operated at <200dB) re1µPa @ 1m, which would be used in both nearshore and offshore areas. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	SBP Parametric Sub Bottom Profiler may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) - Boomer	The Applied Acoustics AA301 is an indicative example of a boomer, the instrument consists of a piezo electric plate transducer mounted on a surface tow catamaran frame. Reflected sound signals are recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m). The Boomer SBP operates in a frequency range of 0.5 kHz to 5 kHz, with sound pressure levels in the range of 205-211dB re1µPa @ 1m which would be used in the nearshore shallower area. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	SBP Boomer may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Sub-Bottom Profiling (SBP) -	The applied Acoustics Dual 400 Tip is an indicative example of a sparker system used in sub-bottom profiling. Reflected sound signals are	SBP Sparker may be undertaken across the proposed MUL Area to

Survey	Method	Method detail	Sampling Effort
	Sparker	recorded using a separate hydrophone such as the Applied acoustics HYD-360/08 (50m) or a multi-channel hydrophone such as the Geometrics GeoEel LH-16™ Digital Streamer. The sparker source has a frequency range of between 0.4-5kHz and a recorded sound pressure of 203dB re1µPa @1m. The SBP will be towed behind a small survey vessel using 20 m spacing of main lines and cross lines at 100 m spacing.	a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Multibeam Echo Sounder (MBES)	A bathymetric survey will be conducted using multibeam echo sounders. These systems may be mounted on a dedicated survey vessel or towed behind a smaller vessel, depending on site conditions and water depths. Multibeam systems emit wide acoustic signals to generate high-resolution images, creating three-dimensional maps of the seabed. Line spacing will be between 5 and 20m, depending on depth. The operating frequencies emitted from MBES will be 300-700 kHz with a peak operating frequency of approximately 400kHz. Exposure time is approx. 0.05 ms per 1 ms for multibeam operating with 200-400 kHz, or 0.05 per 0.3 ms for higher frequencies (>400 kHz). Sound pressure levels will be approximately 215-220dB re 1µPa @ 1m.	MBES may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 10 days.
	Marine Refraction Seismic	Marine refraction surveys use controlled seismic sources, such as air guns or weight drops, to generate seismic waves that travel through sediment and rock layers. Arrays of hydrophones or geophones deployed on the seabed record the refracted seismic waves as they bend and travel along subsurface interfaces. By analysing the travel times and velocities of these refracted waves, detailed models of sediment thickness, bedrock depth, and structural features can be developed. Airgun impulse energy is mostly concentrated within low frequencies, with peak frequencies between 5 and 90kHz. Source levels are predicted to be within the range of 186-220dB re 1µPa @1m.	Marine Refraction Seismic may be undertaken across the proposed MUL Area to a suitable percentage coverage. This activity is anticipated to occur within daylight hours over a period of up to 8 days.
	Marine Electrical Resistivity Tomography (ERT)	ERT surveys are conducted to investigate the electrical properties of subsurface sediments and rocks. The technique involves deploying a series of electrodes along the seabed, either towed or fixed. As a non-invasive, non-seismic geophysical method, marine ERT produces no significant underwater noise and has minimal environmental impact.	Maximum **20 ERT lines** of 315m length line with diameter of 20mm. This activity is anticipated to occur within daylight hours over a period of up to 8 days.
Marine Environmental / Ecological	Benthic ecology samples (including subtidal and intertidal	Identify benthic communities and habitats at the site. Subtidal sample locations may be subject to drop down video in advance of sampling, intertidal sample locations may be subject to walkover/drone survey in advance of sampling.	There will be up to **30 no.** dedicated subtidal benthic ecology grab sampling locations within the proposed MUL Area and multiple samples (max 4) may be taken at each location.

Survey	Method	Method detail	Sampling Effort
	habitats surveys)		Samples would be of volume 0.1 m^2. There will be up to **30 no**. dedicated intertidal coring /grab locations if shoreline conditions allow for sediment sampling.
Archaeological	Walkover	Intertidal walkover to be undertaken at low tide to assess for the presence of sensitive archaeological features. Survey methodology may also involve the use of a metal detector along the foreshore. Pending the results of geophysical surveys there may be a requirement for further archaeological surveys (i.e. underwater video, dive surveys, etc.)	To be confirmed pending the results of the geophysical surveys.
Geotechnical	Drop-down video	Drop-down video survey to inspect the seabed and identify any reef structures in the vicinity without disturbance to the seabed.	There will be up to **30 transects** of up to 30 m each using a drop down camera and video surveillance.
	Boreholes	Boreholes may be up to 50 m below bed level but some may be terminated if sufficient bedrock is encountered. The boreholes will be carried out using sonic methods through the seabed sediment, with rotary coring used to advance through the bedrock. The typical frequencies emitted from rotary drilling are between 0.001-0.120kHz and a recorded sound pressure of approximately 145dB re1µPa @1m. Marine rotary drilling involves rotating a drill bit attached to a drill string and applying downward pressure to cut through the rock formations. Geotechnical sampling tools, including push and piston samples, can then be deployed into the ground to recover intact material. All drilling equipment used will follow the ISO and API technical specifications for drilling equipment. All boreholes will be drilled from a jack-up barge to maintain stability when drilling. Each location would require the 4 legs to penetrate the seabed and cause a temporary disturbance on each occasion. Each leg is typically less than 1m^2 in footprint.	A maximum of **80 no**. boreholes of a diameter of 300 mm will be required within the proposed MUL Area.
	Cone penetration tests (CPTs)	CPTs are to progress to a maximum depth of 20m but will be terminated when bedrock is encountered. In the CPT, an instrumented electronic probe (cone penetrometer) is situated at the front end of a string of steel rods that are hydraulically pushed into the ground at a constant rate of 20mm/s to measure soil response, geo-stratigraphy, and engineering parameters. A CPT vehicle or hydraulic ram set are often used to provide	**80 no. CPTs** will be conducted of a diameter of 44mm. 60 of the CPTs will be at borehole locations to clear for unexploded ordnance (UXOs) and 20 as standalone investigation sites.

Survey	Method	Method detail	Sampling Effort
		the reaction and pushing force. The equipment used will conform to relevant international standards, such as ISO, ensuring consistent and reliable geotechnical data.	
	Grab samples	Grab samples using 0.1 m^2 grabs will be collected for grading, loss on ignition and assessment of benthic community.	A maximum of **50 no**. grab samples of volume 0.1 m^2 will be taken within the proposed MUL Area.
	Metocean monitoring buoys	Metocean monitoring buoys are floating sensors with an anchorage system secured on the seabed. The buoys record various metocean conditions through the following monitoring equipment: • Conductivity, Temperature, Depth Sensors • Optical Salinity Sensor • Acoustic Doppler Current Profiler (ADCPs operating in the range of 600 Khz or 1 Mhz will be used. The instrument emits low amplitude "pings" of sound at a sampling rate of 1-minute average every 10 minutes. These pings will be emitted in a narrow sound beam (typically a few degrees in width) with a typical echo intensity profile of 80 dB (+/- 1.5 dB)) • Optical or Electrochemical Dissolved Oxygen Sensor • pH Sensor/Probe • Turbidity sensor • Turbidity meter/sediment trap. Metocean monitoring buoys will be anchored with two anchors per buoy. Anchors will have a maximum footprint of 4m^2 each.	**2 buoys** will be placed within the study area initially, with the possibility for **up to a further 4**.

Table 2.2
Predicted time and footprint of each survey activity

Survey Activity	Total time for activity	Maximum number of samples	Footprint per sample (m^2)	Maximum total footprint per activity (km^2)
Geophysical survey	Up to 4 months	SSS, Magnetometer, SBP 20 m spacing of main lines and 100 m spacing of cross lines with 25% overlap onto neighbouring lines MBES: 5 -20 m line spacing	-	Area up to 2.155
Marine refraction seismic	Up to 4 months	20 m line spacing	-	Area up to 2.155
ERT	Up to 4 months	20 maximum ERT lines	6.3	0.0000063
Marine Environmental / Ecological	Up to 4 months	120 subtidal (30 no. grab locations with max 4 samples taken at each location) 120 intertidal (30 no. grab locations with max 4 samples taken at each location)	0.1	0.000024
Geotechnical: Drop down video	Up to 4 months	30 transects	30	0.0009
Geotechnical: Boreholes	Up to 4 months	80	0.071	0.00000568
CPTs	Up to 4 months	80	0.00152	0.0000001216

Survey Activity	Total time for activity	Maximum number of samples	Footprint per sample (m^2)	Maximum total footprint per activity (km^2)
Jack-up barge leg	Up to 4 months	640 legs*	1	0.00064
Geotechnical: Grab samples	Up to 4 months	50	0.1	0.000005
Metocean monitoring buoy anchors	Maximum of 24 months (2 years)	12 anchors	4	0.000048

** 80 Borehole locations and 80 CPT locations x 4 legs*

2.3 General Survey Requirements

All appointed survey contractors shall obtain and comply with all necessary marine operational permits including routine and customary vessel/crew/equipment clearances from Customs Agencies, Port Authorities, Marine Survey Office, etc. This will include adherence to all major international shipping conventions adopted by the International Maritime Organization (and the International Labour Organization) concerning maritime safety and pollution prevention.

2.3.1 Quality Assurance

Each of the appointed survey contractors shall comply with the following as a minimum:

- Quality and Environmental Management Systems based on ISO9001:2015 and ISO14001
- Provision of site and activity specific Method Statements for all the marine operations within their scope
- Provision of Quality Management Plans for all the marine operations.

2.3.2 Health & Safety

Health, safety, environment, and welfare considerations will be a priority in the evaluation of possible contractors for the various survey scopes and will be actively managed during the survey work.

Appointed contractors will be required to comply with all legislation relevant to the activities within their scope of work, such as the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) and Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007), as amended.

Project / survey specific Health, Safety and Environment (HSE) plans will be put in place which will form part of the project / survey execution plans.

2.3.3 Working Hours

The working hours for the SI works are proposed to be up to 24 hours per day, seven days a week. It is anticipated that the main SI works will be carried out over a period of approximately four months including mobilisation and demobilisation. While metocean monitoring buoy deployment will be for period of up to two years, the devices will be autonomous apart from maintenance visits every two to four months. Such maintenance visits will occur during daylight hours only.

Weather conditions and/or sea-state will impact on the working hours, and it may be necessary to temporarily suspend operations when adverse weather conditions and/or sea-state are encountered or forecast. As such, survey plans will remain flexible to take advantage of optimal weather windows. Similarly, equipment or vessel maintenance and repair may impact on the SI works resulting in changes to the survey schedule.

2.3.4 Environmental Procedures

Environmental procedures to be followed by the appointed survey contractors are detailed within Section 7 of the accompanying AIMU report.

2.3.5 Vessels

All vessels will be fit for purpose, certified and capable of safely undertaking all required survey work. Marine vessels will be governed by the provisions of the Sea Pollution Act 1991, as amended. In addition, all vessels will adhere to published guidelines and best working practices such as: the National Maritime Oil/HNS Spill Contingency Plan (NMOSCP), Marine Pollution Contingency Plan (MPCP), Chemicals Act 2008 (No. 13 of 2008), Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated regulations.

Vessels shall have a Health, Safety and Environmental Management system which should conform to the requirements of the latest International Maritime Organisation (IMO), Safety of Life at Sea (SOLAS) and environmental requirements for their classification and with any national requirement of the territorial or continental / EEZ waters to be operated in.

The SI works will be undertaken from vessels in accordance with the relevant guidelines[1] required to manage the risk to marine mammals from man-made sound sources in Irish waters (DAHG, 2014).

[1] Relevant guidance may include the incorporation of the methods outlined in the following text, additional activity-specific mitigation is outlined in Section 6 and within the guidance document (DAHG, 2014). A3: Avoid critical habitats for marine mammals, A4: Avoid operations during key periods of species life cycles, A5: Avoid time periods when effective impact mitigation is not possible, A6: Risk minimisation measures, including minimisation of duration over which sound producing activity takes place, and minimise sound pressure and exposure levels delivered into the environment (i.e., lower impact methods), clear ramp-up procedure, bubble curtain implementation (where relevant), use of dedicated Marine Mammal Observer (MMO) (where relevant).

3 Methodology

3.1 Appropriate Assessment Guidance

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

- EC (2000). Communication from the Commission on the Precautionary Principle. Office for Official Publications of the European Communities, Luxembourg
- EC (2002). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission
- EC (2007). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. European Commission
- DoEHLG (2009, rev. 2010). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government;
- EC (2013). Interpretation Manual of European Union Habitats. Version EUR 28. European Commission, Luxembourg
- EC (2018). European Commission Notice C (2018) 7621 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg
- OPR (2021). Practice Note PN01: Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin Ireland
- EC (2021). European Commission Notice C (2021) 6913 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg.

3.2 Stages of Appropriate Assessment

The AA is a four-stage process with tests at each stage. The four stages are shown in Figure 3.1 below. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

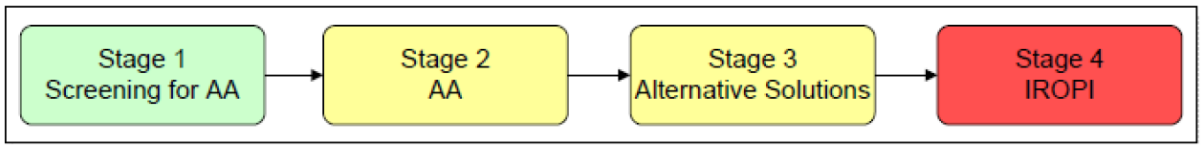

Figure 3.1
Four Stages of Appropriate Assessment

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

The screening for AA carried out by the public authority/ competent authority (Stage 1), will determine whether an AA (Stage 2) of the proposed project is required. Stage 2 is required if it cannot be excluded, on the basis of the objective information provided at Stage 1, that the proposed project, individually or in combination with other projects or plans, will have a significant effect on a European site, in view of the site's conservation objectives. In this case, a Natura Impact Statement (NIS) must be prepared to assist the public authority/competent authority to conduct the Stage 2 AA. If it is not possible during Stage 2 to reduce impacts to acceptable, non-significant levels by avoidance and/or mitigation, Stage 3 of the process must be undertaken which is to objectively assess whether alternative solutions exist by which the objectives of the plan or project can be achieved. If alternative solutions exist that do not have negative impacts on European sites; they should be adopted regardless of economic considerations. The process must then return to Stage 2, as any alternative proposal must be subject to a Stage 2 AA before it can be subject to the Article 6(4) test. If it can be demonstrated that all reasonable alternatives have been considered and assessed, the AA progresses to Stage 4. This final stage is undertaken when it has been determined that negative impacts on the integrity of a European site will result from a plan or project and there are no alternative solutions. At Stage 4 of the AA process, it is the characteristics of the plan or project itself that will determine whether or not the competent authority can allow it to progress. This is the determination of Imperative Reasons for Overriding Public Interest (IROPI).

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

As per DoEHLG (2009):

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

In summary, the test for the screening for AA is to assess, in view of objective scientific information, if the proposed development, individually or in combination with other plans/projects is likely to have a significant effect on a European site. The precautionary-principle approach is required, meaning decisions must avoid deterioration and disturbances that could significantly impact the site's integrity, even where there is uncertainty regarding a likely effect. Under the Habitats Directive, a plan or project cannot be authorised if there remains reasonable scientific doubt that it will adversely affect the integrity of a European site. If there are any significant, potentially significant, or uncertain effects, it will be necessary to proceed to AA and submit an NIS.

3.3 Stage 1 Screening / Test of Significance

This process identifies whether the proposed development is directly connected to or necessary for the management of a European site(s) and identifies whether the development is likely to have significant impacts upon a European site(s) either alone or in combination with other projects or plans.

The screening for AA will incorporate the following steps:

1. determining whether a project or plan is directly connected with or necessary to the conservation management of any European sites;
2. describing the project or plan;
3. identifying the European sites potentially affected by the project or plan;
4. identifying and describing any potential effects of the project or plan on European sites, alone, in combination and cumulatively with other plans/projects;
5. determining the likelihood of significant effects on European sites.

The output from this stage is a determination for each European site(s) of the likelihood of not significant, significant, potentially significant, or uncertain effects. The latter three determinations will cause that site to be brought forward to Stage 2.

3.4 Desk Study

Information on the receiving environment was analysed to determine the potential for significant effects to qualifying interests (QI) of the European sites with established connectivity to the works (see Section 4.4). The following publications and data sources were reviewed:

- Environmental Protection Agency (EPA) online interactive mapping tools (https://gis.epa.ie/EPAMaps) and (https://www.catchments.ie/maps/) for water quality data including surface and ground water quality status, and river catchment boundaries
- Information on ranges of mobile QI populations in Volume 1 of NPWS' Status of EU Protected Habitats and Species in Ireland (NPWS, 2019), and associated digital shapefiles obtained from the NPWS Research Branch
- Inland Fisheries Ireland mapping (http://wfdfish.ie/)
- BirdWatch Ireland (https://birdwatchireland.ie/)
- Mapping of European site boundaries and Conservation Objectives for relevant sites, available online from the NPWS included site synopsis, Natura 2000 Data form and Conservation Objective Supporting Documents where available (https://www.npws.ie/protected-sites)
- Distribution records for QI of European sites held online by the National Biodiversity Data Centre (NBDC) (www.biodiversityireland.ie)
- Geohive online Environmental Sensitivity Mapping tool (https://airomaps.geohive.ie/ESM/)
- Geological Survey Ireland (GSI) (https://www.gsi.ie/en-ie/Pages/default.aspx)
- Local surveys of flora, fauna, and habitat available using the Heritage Councils mapping website (https://heritagemaps.ie/WebApps/HeritageMaps/index.html)
- Ordnance Survey of Ireland maps and aerial photography (https://osi.ie).

The identification of relevant European sites to be included in this report was based on the criteria provided in OPR (2021), namely:

- any European site within or immediately adjacent to the project area
- identification of European sites where a Source-Pathway-Receptor (S-P-R) link exists, explained in Section 3.5.

3.5 Identification of Relevant European Sites

3.5.1 Source-Pathway-Receptor Model

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

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

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

3.5.2 Zone of Influence

Determination of the project's zone of influence was achieved by assessing the project's requirements and deliverables against the ecological receptors within the project footprint, in addition to the ecological receptors that could be connected to and subsequently impacted by the project through abiotic and biotic vectors.

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

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

The zone of influence of the works on mobile species (e.g., birds, mammals, and fish), and static species and habitats (e.g., saltmarshes, woodlands, and flora) is considered differently. Mobile species have 'range' outside of the European sites in which they are QI. The range of mobile QI species varies considerably, from several metres (e.g., in the case of whorl snails *Vertigo* spp.), to hundreds of kilometres (in the case of migratory wetland birds). A project's zone of influence may extend well beyond the project boundary and can impact or have an effect on static species and habitats remote from the proposed works; for example, where an aquatic QI habitat or plant is located many kilometres downstream from a pollution source. In particular, hydrological linkages between the proposed works and European sites (and their QIs) can occur over significant distances; however, any effect will be site-specific depending on the receiving water environment and nature of the potential impact.

To this end, the zone of influence for this project extends outside of the immediate proposed MUL Area to include ecological receptors connected to the SI works through proximity and connectivity through features such as watercourses and waterbodies in addition to potential connectivity through land and air. See Section 4.4 for the identification of relevant European sites.

4 Identification of Relevant European Sites

4.1 Assessment of Connectivity

Connectivity is identified via the S-P-R model which identifies the potential impact pathways such as land, air, hydrological pathways etc., which may support direct or indirect connectivity between the SI works (source) and European sites and their QIs (receptors).

Where it is evident that there is no connectivity between the SI works and receptors (i.e., European sites and/or habitats and species for which the sites are selected), the receptors are excluded from the AA process. Where connectivity exists between the SI works and receptors, these receptors are taken forward to the assessment of likely significant effects (Section 5.2).

4.2 Identification of Potential Receptors

Receptors with the potential to be affected by the SI works are:

- QI habitats of European sites within the proposed MUL Area, or within an area likely to be affected by the SI works
- QI species of the European sites within or immediately adjacent to the proposed MUL Area
- mobile QI species to forage or transit into the proposed MUL Area or an area likely to be affected by the SI works (ex situ effects).

Following identification of potential sources of impact, the potential for a pathway to various receptors is considered, followed by the identification of relevant European sites.

4.3 Identification of Potential Sources of Impacts

Identification of a risk of impact does not constitute a prediction that it will occur or, if it does occur, that there is an intrinsic likelihood that it will result in ecological or environmental damage or that it will cause or create a significant effect on the European sites in question. The level and significance of the effect depends upon the magnitude, duration or intensity of the impacts ensuing from the proposal and the existence of a credible or tangible S-P-R link between the SI works and the European sites. It is also determined by the extent of the exposure to the risk and the characteristics of the receptor.

When assessing impact, the QI habitats and species are only considered receptors where a credible or tangible S-P-R link exists between the SI works and the receptor. In order for an impact to occur there must be a risk initiated by having a ‘source’ - the origin of potential impacts (e.g., near stream construction works), an impact pathway - the means by which the effect reaches the receptor (air, water, or ground) between the source and the receptor (e.g., a watercourse which connects the development site to the site designated for the protection of a receptor) and a 'receptor' (e.g., a protected species associated aquatic or riparian habitats). If the source, pathway, or receptor is absent, no linkage exists and thus, there will be no potential for an impact to be transmitted.

The potential impacts arising from the SI works have been identified as follows:

- Noise, vibration, lighting, and human presence-related species disturbance

- Habitat loss or disturbance
- Increased Suspended Sediment Concentrations (SSC)
- Underwater noise (Injury and/or displacement of Annex II marine mammals, otter, and fish from underwater noise and/or the presence of increased marine traffic (visual))
- Entanglement (Injury and/or disturbance of Annex II marine mammals, otter and fish from towed gear and seabed gear)
- Accidental pollution event
- Collision with survey vessels.

Table 4.1 identifies the SI works associated with each impact, and the receptors with the potential to be affected.

Table 4.1
Source-Pathway-Receptor assessment for the works

Impact	Potential source of Impact	Description of Effect Pathway	Relevant Receptors
Noise, vibration, lighting, and human presence-related species disturbance	Jack-up barge and vessel activity associated with the SI works.	Potential for direct impacts by disturbing species, leading to displacement from the area.	Otter, marine mammals, birds
Habitat loss, alteration, and fragmentation.	Interactions with the seabed resulting from geotechnical surveys, deployment of seabed equipment, and marine environmental sediment sampling.	Potential for direct effects on sensitive habitats and indirect effects to species which rely on those habitats for feeding and/or breeding.	Marine habitats, marine mammals, otter, fish, birds
Increased Suspended Sediment Concentrations (SSC).	Interactions with the seabed resulting from geotechnical surveys, deployment of seabed equipment, and marine environmental sediment sampling	Potential for direct effects on sensitive habitats and indirect effects to species which rely on those habitats for feeding and/or breeding.	Marine habitats, marine mammals, otter, fish, birds
Underwater noise, including injury and or displacement of Annex II marine mammals, otter, and fish from underwater noise and/or the presence of increased marine traffic (visual).	Noise emissions and increased marine traffic from survey equipment and vessels associated with the SI works. May cause injury and/or displacement of Annex II marine mammals, otter, and fish.	Potential for direct effects on species in the marine environment including injury, disturbance and/or displacement.	Marine mammals, otter, fish, birds
Entanglement, including injury and/or disturbance of Annex II marine mammals, otter, and fish from the presence of towed gear and seabed gear.	Risk of entanglement from the towed and seabed equipment associated with the geophysical and geotechnical survey works. May cause injury and/or displacement of Annex II marine mammals, otter, and	Potential for direct effects on species in the marine environment including injury, disturbance and/or displacement.	Marine mammals, otter, fish birds

Impact	Potential source of Impact	Description of Effect Pathway	Relevant Receptors
	fish.		
Accidental pollution event.	Jack-up barge and vessel activity associated with the SI works.	Potential for direct effects on marine habitats and species, and indirect effects through contamination of supporting habitats.	Marine habitats, marine mammals, otter, fish, birds
Collision with survey vessels	Vessel activity associated with the SI works.	Potential for direct effects to large species in the marine environment.	Marine mammals, otter

4.4 Identification of Relevant European sites

Using the S-P-R model to identify the zone of influence for each impact as outlined in Table 4.1, the following summarises the zone of influence of the SI works within which relevant European sites will be selected:

- those which occur within or immediately adjacent to the proposed MUL Area boundary (Figure 4.1)
- the water body within which the proposed surveys will be undertaken to capture any hydrological linkages (i.e., the Shannon Estuary)
- foraging ranges of relevant QI species (i.e., potential for ex situ effects).

The Lower River Shannon SAC (002165) and the River Shannon and River Fergus Estuaries SPA (004077) are within / immediately adjacent to the SI works area and extend throughout most of the Shannon Estuary, therefore both sites will be considered in this SISAA. The potential for connectivity with receptors from other European sites is considered in the proceeding sections.

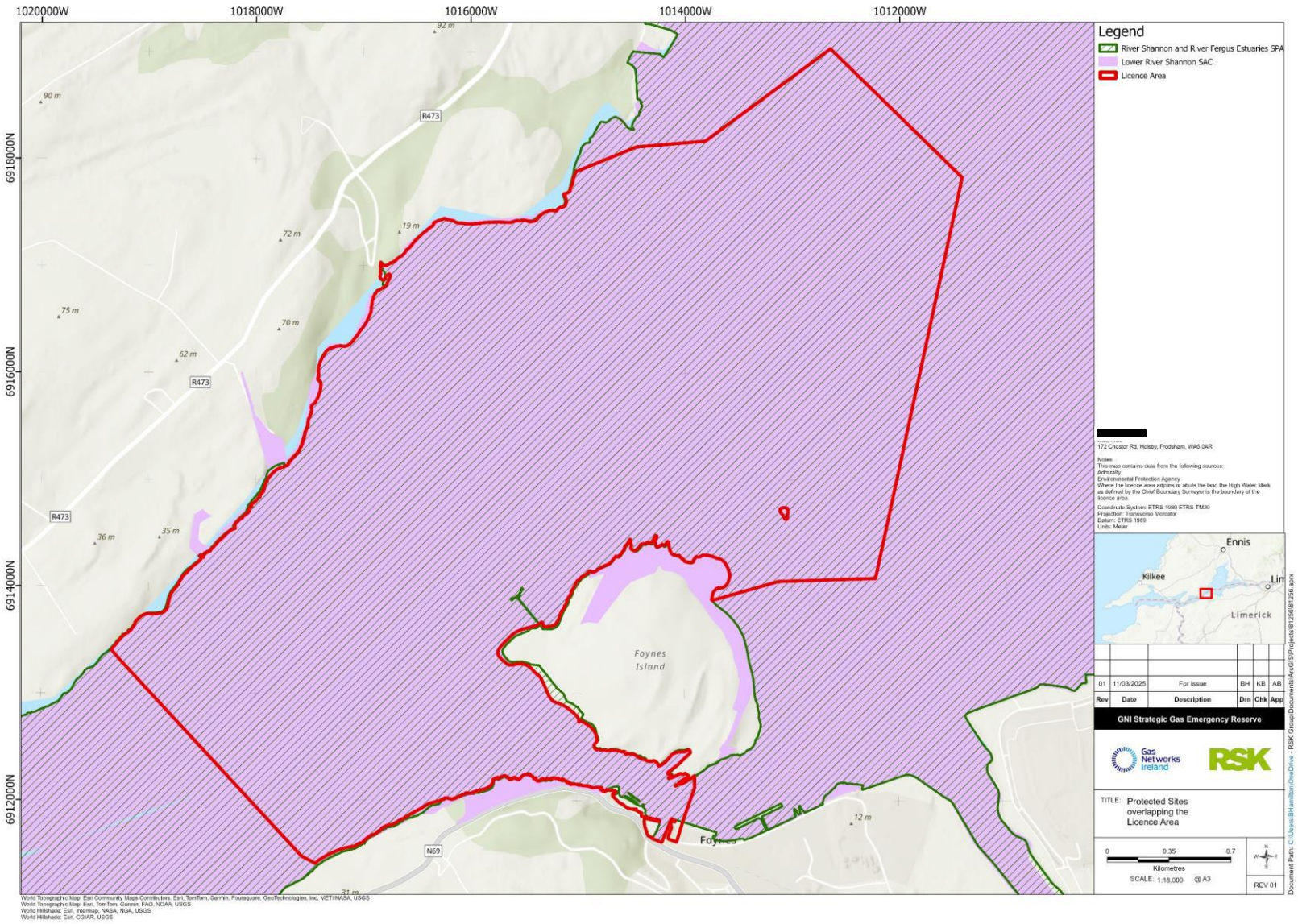

Figure 4.1

Protected areas in proximity to the proposed MUL Area

4.4.1 Potential for Connectivity with ex situ Annex II Marine Mammals

4.4.1.1 Cetaceans

Bottlenose dolphin (*Tursiops truncatus*) is a QI of the Lower River Shannon SAC, within which the proposed SI works will occur. Bottlenose dolphins in the River Shannon are present throughout the year and are genetically discrete compared to bottlenose dolphins found elsewhere in Irish waters due to geographical and social isolation (Mirimin et al., 2011) and that the estuary is an important calving area (MERC, 2021). The population is estimated at around 145 individuals with only 80 adults (Baker et al., 2018 in MERC, 2021). This small, genetically discrete population is vulnerable to even small increases in adult mortality or a reduction in reproduction rates (Blásquez et al., 2020 in MERC, 2021). An overview of existing data on bottlenose dolphin populations in the Lower Shannon Estuary shows that there is a well-known hotspot for the species in the waters off Moneypoint Power Station (MERC, 2021). Rogan et al. (2000) recorded bottlenose dolphins in the estuary all year round with a peak from May to September and noted the presence of neo-natal calves from July to September as evidence of a well-defined breeding season in the Shannon Estuary. There has been a total of 19 recorded dolphin sightings within the last 12 months along the Shannon Estuary, concentrated in the area of the Shannon Ferry route, with 3 dolphin sighted within approximately 3 km of the proposed MUL Area (IWDG, 2025). Hence, there is potential for them to overlap with SI works.

Although common bottlenose dolphin individuals within the Shannon estuary are likely to be part of the resident population, there is the potential for connectivity with other SACs for which bottlenose dolphin are qualifying interests. A screening distance of 200 km is suggested for considering potential ex-situ connectivity for this species. 200 km has regularly been used as a screening distance for ex-situ connectivity for similar screenings as it represents a realistic expected foraging distance for small coastal cetacean species. Projects that have implemented the same screening distance include Cenos Offshore Windfarm, Salamander Offshore Windfarm and Stromar Offshore Windfarm. As such, three additional SACs are considered screened in for potential ex-situ connectivity for bottlenose dolphin as listed in Table 4.2.

Table 4.2
SACs with bottlenose dolphin as QI within 200 km of the proposed MUL Area

SAC	Distance (km)
Slyne Head Peninsula	160
West Connacht Coast	165
Slyne Head Islands	167

Very few sightings of harbour porpoise (*Phocoena phocoena*) have been recorded within the Shannon Estuary (IWDG, 2025). There was one sighting adjacent to Moneypoint in 2018 (IWDG), and strandings have been recorded as far up the estuary as Foynes (O'Callaghan et al., 2021). Violent interactions have been recorded between bottlenose dolphins and harbour porpoise (Ross and Wilson., 1996; Gross et al., 2020) and suggested reasons for this aggression include interspecies territoriality, defence of group members, food competition, feeding interference and object-orientated play (Gross et al., 2020). Two sightings of harbour porpoise occurred within the past 12 months, located at the entrance of the Shannon Estuary off Aill Na Brun (IWDG, 2025). From the lack of recorded sightings of harbour porpoise within the Shannon Estuary, it is likely that they largely avoid the area. As a result, spatial overlap with harbour porpoise individuals from other SACs within foraging range is considered highly unlikely, and SACs with harbour porpoise as a QI are not considered relevant for ex situ effects within the Shannon.

4.4.1.2 Pinnipeds

Telemetry data indicates that harbour seal (*Phoca vitulina*) foraging trips in the south-west of Ireland extend no further than 20 km from haul-out sites (Cronin et al., 2008). No sightings of harbour seal have been recorded in the Shannon Estuary within the last 12 months (IWDG, 2025). The closest European site designated for harbour seal is the Kenmare River SAC, located more than 85 km from the proposed MUL Area. It is therefore highly unlikely that harbour seals from this SAC will be present within the Shannon Estuary and therefore SACs with harbour seal as a QI are not considered relevant for ex situ effects.

Grey seals (*Halichoerus grypus*) have been recorded undertaking foraging trips over hundreds of kilometres, although the mean distance travelled in a telemetry study carried out in 2011 for NPWS was 50.85 km (Cronin et al., 2011). NPWS-funded aerial thermal-imaging of seals in Ireland (Morris and Duck, 2019) shows very low usage of the Shannon Estuary by both harbour seal and grey seal, indicating that the estuary is not likely to be an important area for hauling out. No sightings of grey seals have been recorded in the Shannon Estuary within the last 12 months (IWDG, 2025). The closest European site designated for grey seal is the Blasket Islands SAC, more than 110 km distance from the proposed MUL Area by sea. While it is possible that individuals from the Blasket Islands population may be present in the Shannon Estuary, it is considered unlikely that the proposed MUL Area represent an important foraging ground and as a result SACs with grey seal as a QI are not considered relevant for ex situ effects.

4.4.2 Potential for Connectivity with ex-situ Annex IV turtles and basking shark

Four Annex IV turtle species known to occur in Ireland include the leatherback turtle (*Dermochelys coriacea*), Kemp's Ridley turtle (*Lepidochelys kempii*), loggerhead turtle (*Caretta caretta*) and hawksbill turtle (*Eretmochelys imbricata*)[2]. Leatherback turtles have been recorded along the west coast of Ireland and within the Lower Shannon Estuary (at Ballylongford (1970) and at Kilkee (IWDG, 2025)); however, no sightings of leatherback turtles have occurred in the proposed MUL Area within the last 12 months

[2] https://www.npws.ie/legislation accessed 30/05/2024.

(IWDG, 2025). Kemps Ridley have been recorded along the west coast at Banna Strand in Co. Kerry (approximately 40 km south-west). This is beyond the proposed surveys boundary with no suspected impacts from the proposed surveys; there have additionally been no recorded sightings of Kemps Ridley turtles and Loggerhead turtles in the Shannon Estuary within the last 12 months (IWDG, 2025), and therefore no significant impacts are expected. One record of hawksbill has been recorded in the south of Ireland at Cork Harbour as bycatch, no records have been noted along the west coast or in close proximity to the proposed MUL Area. Of the turtle species noted in Ireland, leatherback turtles have the potential to utilise the Lower River Shannon Estuary based on historical records, but as these counts only amount to one or two individuals across many years it is unlikely that they will be present within the proposed MUL Area during the proposed SI works.

Basking sharks (*Cetorhinus maximus*) tend to arrive in Irish waters during spring, with numbers peaking in May and June. There have been several sightings of this species in proximity to the Shannon Estuary over the past 12 months, with recordings concentrated to Aill Na Brun and Derrynadivva (IWDG, 2025). Given the lack of sightings within the estuary itself, it is unlikely basking sharks will be present within the proposed MUL Area during the SI works.

4.4.3 Potential for Connectivity with ex situ Annex II Migratory Fish

The Lower Shannon Estuary is used by several of Ireland's native diadromous fish species as they pass through to or from freshwater spawning grounds or use the area for feeding during maturation. These species include twaite shad (*Allosa fallax fallax*), sea lamprey (*Petromyzon marinus*), river lamprey (*Lampetra fluviatilis*) and Atlantic salmon (*Salmo salar*).

Inland Fisheries Ireland conducted fish stock surveys in the Lower Shannon Estuary in October 2017, recording generally low abundance for most species, with the exception of four species: sprat (*Sprattus sprattus*), common goby (*Pomatoschistus microps*), sand goby (*Pomatoschistus minutus*) and flounder (*Platichthys flesus*) (Coyne et al, 2018). This was consistent with the previous two surveys in 2014 and 2008. Overall, the Shannon Estuary was given a status of "good" for fish populations, an improvement on the previous surveys.

4.4.4 Potential for Connectivity with ex situ Birds

Certain species of seabird can forage considerable distances from their colonies (Woodward et al., 2019), however, given the limited size, scale and duration of the proposed surveys, it is considered unlikely that there is a reasonable impact pathway to SPAs beyond the immediate proposed MUL Area, as it becomes increasingly unlikely that individuals from distant SPAs will be present. Seabirds are more likely to forage in the open sea where they can access the rich foraging habitat of continental shelf waters (Cummins et al., 2019), as opposed to foraging within estuaries or harbours where availability of fish prey may be more limited.

Wintering waders and wildfowl tend to be sedentary once they arrive in their over-wintering areas; often only moving short distances between roosting and feeding areas. Therefore, it is considered unlikely that wintering birds from other SPAs will travel to/from the Shannon Estuary to feed or roost. As a result, no additional SPAs are considered relevant for ex situ effects.

4.5 Relevant European Sites

Based on the S-P-R model, connectivity has been established between the SI works and the following European sites:

- Lower River Shannon SAC
- River Shannon and River Fergus Estuaries SPA
- Slyne Head Peninsula SAC
- West Connacht Coast SAC
- Slyne Head Islands SAC.

These European sites are the only sites considered to be within the zone of influence of the SI works.

Table 4.3 lists the QI of these European sites, while Figure 4.1 shows the location of the SI works relative to these European sites.

Table 4.3
European sites selected for assessment

European Site	Qualifying Interests for which site has been selected[2]	Proximity to Proposed MUL Area
Lower River Shannon SAC (002165)	Sandbanks which are slightly covered by sea water all the time [1110] Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Coastal lagoons* [1150] Large shallow inlets and bays [1160] Reefs [1170] Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] Salicornia and other annuals colonizing mud and sand [1310] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Molinia meadows on calcareous, peaty, or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) * [91E0] Freshwater pearl mussel (*Margaritifera margaritifera)* [1029] Sea lamprey [1095] Brook lamprey (*Lampetra planeri)* [1096] River lamprey [1099] Atlantic salmon [1106] Common bottlenose dolphin [1349] Otter [1355]	0 km (proposed works take place within and immediately adjacent to the SAC)

European Site	Qualifying Interests for which site has been selected[2]	Proximity to Proposed MUL Area
River Shannon and River Fergus Estuaries SPA (004077)	Cormorant (*Phalacrocorax carbo)* [A017] (breeding and wintering) Whooper swan (*Cygnus cygnus)* [A038] (wintering) Light-bellied Brent goose (*Branta bernicla hrota*) [A046] (wintering) Shelduck (*Tadorna tadorna*) [A048] (wintering) Wigeon (*Anas penelope*) [A050] (wintering) Teal (*Anas crecca*) [A052] (wintering) Pintail (*Anas acuta*) [A054] (wintering) Shoveler (*Anas clypeata*) [A056] (wintering) Scaup (*Aythya marila*) [A062] (wintering) Ringed plover (*Charadrius hiaticula*) [A137] (wintering) Golden plover (*Pluvialis apricaria*) [A140] (wintering) Grey plover (*Pluvialis squatarola*) [A141] (wintering) Lapwing (*Vanellus vanellus*) [A142] (wintering) Knot (*Calidris canutus*) [A143] (wintering) Dunlin (*Calidris alpina*) [A149] (wintering) Black-tailed godwit (*Limosa limosa*) [A156] (wintering) Bar-tailed godwit (*Limosa lapponica*) [A157] (wintering) Curlew (*Numenius arquata*) [A160] (wintering) Redshank (*Tringa totanus*) [A162] (wintering) Greenshank (*Tringa nebularia*) [A164] (wintering) Black-headed gull (*Chroicocephalus ridibundus*) [A179] (wintering) Wetlands and Waterbirds [A999]	0 km (proposed works take place within and immediately adjacent to the SPA)
Slyne Head Peninsula SAC	Coastal lagoons [1150] Large shallow inlets and bays [1160] Reefs [1170] Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] Mediterranean salt meadows (*Juncetalia maritimi*) [1410] Embryonic shifting dunes [2110] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2120] Machairs (*in Ireland) [21A0] Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-*	160 km

European Site	Qualifying Interests for which site has been selected[2]	Proximity to Proposed MUL Area
	Nanojuncetea [3130] Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] European dry heaths [4030] Juniperus communis formations on heaths or calcareous grasslands [5130] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) [6510] Alkaline fens [7230] Bottlenose dolphin (*Tursiops truncatus*) [1349] Petalwort (*Petalophyllum ralfsii*) [1395] Slender Naiad (*Najas flexilis*) [1833]	
West Connacht Coast SAC	Bottlenose dolphin (*Tursiops truncatus*) [1349] Harbour porpoise (*Phocoena phocoena*) [1351]	165 km
Slyne Head Islands	Reefs [1170] Bottlenose dolphin (*Tursiops truncatus*) [1349] Grey seal (*Halichoerus grypus*) [1364]	167 km

[2] Asterisk indicates a priority habitat under the Habitats Directive.

4.6 Conservation Objectives

The integrity of a European site (referred to in Article 6(3) of the EU Habitats Directive) is determined based on the conservation status of the QIs of these sites.

European and national legislation places a collective obligation on Ireland and its citizens to maintain at favourable conservation status areas designated as SAC and SPA. The government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological

integrity of these sites.

Favourable conservation status of a habitat is achieved when:

- its natural range and area it covers, are stable or increasing within that range
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The specific conservation objectives for each European site in Ireland are available on www.npws.ie. These have been accessed for the sites listed in Table 4.3 above on 10/03/2025.

Site specific and detailed conservation objectives documents were available for all sites:

- Lower River Shannon SAC (002165). Published 7 August 2012;
- River Shannon and River Fergus Estuaries SPA (004077). Published 17 September 2012;
- Slyne Head Peninsula SAC (002074). Published 5 February 2015;
- West Connacht Coast SAC (002998). Published 17 January 2025;
- Slyne Head Islands SAC (00328). Published 17 December 2024.

5 Supporting Information for Screening for Appropriate Assessment

5.1 Management of European Sites

The SI works are not directly connected with or necessary to the management of any European site(s).

5.2 Assessment of Likely Significant Effects

This section determines whether the impacts identified in Section 4.3 could have significant effects on the qualifying interests (QI) of the European sites identified in Section 4.4 in view of the conservation objectives of the sites. As described in Section 4.3, the potential impacts arising from the proposed works are as follows:

- Noise, vibration, lighting, and human presence-related species disturbance.
- Habitat loss or disturbance
- Increased Suspended Sediment Concentrations (SSC)
- Underwater noise (Injury and/or displacement of Annex II marine mammals, otter, and fish from underwater noise and/or the presence of increased marine traffic (visual))
- Entanglement (Injury and/or disturbance of Annex II marine mammals, otter and fish from towed gear and seabed gear)
- Accidental pollution event
- Collision with survey vessels.

5.3 Lower River Shannon SAC (002165)

The SAC is selected for the protection of populations of the following aquatic, or in the case of otter semi-aquatic, species:

- freshwater pearl mussel (*Margaritifera margaritifera*) [1029]
- sea lamprey (*Petromyzon marinus*) [1095]
- brook lamprey (*Lampetra planeri*) [1096]
- river lamprey (*Lampetra fluviatilis*) [1099]
- Atlantic salmon (*Salmo salar*) (only in fresh water) [1106]
- bottlenose dolphin (*Tursiops trucatus*) [1349]
- otter (*Lutra lutra*) [1355].

5.3.1 Noise, vibration, lighting, and human presence-related species disturbance

The Lower Shannon Estuary is a busy shipping area, handling up to 1,000 ships carrying 12 million tons of cargo per annum (Clare County Council, 2023). Animals within the area are likely to be habituated to marine traffic, and the increase in vessel traffic as a result of the SI works is very low and temporary. It is considered unlikely that there will be any significant disturbance to marine species as a result of the presence of survey vessels. The presence of the jack-up barge will introduce artificial light to the area while SI works happen during the hours of darkness. This impact will be temporary and is not expected

to result in any impacts beyond the SI works campaign. Therefore, further assessment of this impact is not considered necessary.

Underwater noise impacts are considered in Section 5.3.4.

5.3.2 Habitat Loss or Disturbance

In the vicinity of the proposed MUL Area, the SAC boundary extends from the high water mark out into the marine area away from the land. Of the 14 Annex I habitat types selected for protection as part of the Lower River Shannon SAC (see Table 4.3), 11 are categorised as being 'Coastal and Halophytic' in their distributions, while the remaining three habitats are categorised as freshwater, grasslands, and forests. The distribution of all annexed habitats within the SAC are presented in the conservation objectives document (NPWS, 2012a). The marine based geotechnical works may impact on annexed habitats within the SAC. The distribution of the following habitats may occur within the area where the marine elements of the SI works will occur:

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Reefs [1170]

As identified in Table 4.1, there is the potential for loss and/or disturbance to these marine habitats as a result of the sediment sampling methods. In addition to direct habitat loss when taking samples, there will also be temporary habitat loss due to the four feet of the jack-up barge used to conduct sampling, as well as temporary placement of equipment associated with seismic surveys and the anchoring of metocean monitoring buoys.

The substrate in the proposed MUL Area is dominated by fine sandy habitat with water depths up to 30 m below chart datum. The Lower River Shannon SAC has one or more Annex I Marine Habitats as QIs that are potentially overlapping with the proposed MUL Area. These protected habitats include reefs, estuaries, and mudflats and sandflats not covered by seawater at low tide (Table 4.3).

There is uncertainty as to whether or not significant habitat loss or alteration effects within the Estuaries [1130] and Reefs [1170] QIs are likely, without the implementation of mitigation measures. In light of this there is, similarly, uncertainty about habitat fragmentation impacts. In circumstances where there are any significant, potentially significant, or uncertain effects, further assessment of this impact is considered necessary.

5.3.3 Increased Suspended Sediment Concentrations

The deposition arising from the drilling of the geotechnical marine boreholes and from the other sediment sampling methods has the potential to result in indirect effects of Annex I habitats associated with increased SSC and smothering that may undermine the conservation objectives of benthic habitats. There is potential for limited SSC within the immediate footprint of the sediment sampling but due to the small number of sites, relative footprint and limited duration of the SI works, SSC from seabed sampling is expected to be negligible. Increased SSC and smothering may also occur from other activities such as positioning of equipment on the seabed (e.g., jack-up barge legs, equipment

associated with seismic survey methods and metocean monitoring buoy anchors). The sediment type noted within the proposed MUL Area is noted as sand (fine to medium) with mixed sediment (INFOMAR, 2025). This sediment type typically falls out of suspension quite rapidly and as the works will take place in the Lower Shannon Estuary this would aid in the rapid dispersal of any suspended sediments due to the water depth, tidal influence, the nature of the estuary and currents near the proposed MUL Area. Therefore, it is not anticipated that SSC will be in large enough quantities to significantly impact the Annex I habitats (e.g., estuaries and reef) in the area. Additionally, best practice methods will ensure sediment mobilisation is kept to minimal levels during the SI works. Therefore, further assessment of this impact is not considered necessary.

5.3.4 Underwater Noise

As identified in Table 4.1, there is potential for effects as a result of the underwater noise emitted by the SI works.

When assessing the potential impact of underwater noise sources on the marine environment a range of variables such as source level, frequency, duration, and directivity influence received sound levels. Increasing the distance from the sound source usually results in attenuation with distance. The factors that affect the way noise propagates underwater include: water column depth, pressure, temperature gradients, salinity, as well as water surface and seabed type and thickness. When sound encounters the seabed the amount of noise/sound reflected back depends on the composition of the seabed, i.e., mud or other soft sediment will reflect less than rock. The water depth in the vicinity of the proposed MUL Area ranges up to 50 m below chart datum, with a mixed substrate type, of muds, sands, coarse gravels, and exposed bedrock. All factors listed above reduce the propagation of the sound, decreasing the zone of influence of the geophysical survey.

The active acoustic instruments, such as those proposed on this survey, operate by emitting extremely short pulses and are mostly directional or omni-directional (e.g., sparker) (Ruppell et al, 2022). The range of the geophysical equipment will be limited principally by water depth and attenuation particularly of high frequency sources such as SBP systems. Coupled with the narrow beam angle and short duty cycles (‘on’ for microseconds or milliseconds per second) means that surveying sonars have relatively low acoustic impact.

5.3.4.1 Cetaceans

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

Should the noise levels from sources exceed the thresholds, there is the potential for underwater noise

generated during the geophysical and seismic survey to result in injury and/or disturbance to bottlenose dolphin associated with the SAC in the vicinity of the SI works.

Cetacean species can be split into functional hearing groupings, according to their frequency-specific hearing sensitivity (Southall et al., 2019). Bottlenose dolphins are considered a high frequency cetacean (HF). As noted in Section 4.4.1, it is unlikely that harbour porpoise will be active within the estuary.

Continuous sources (i.e., survey vessels) are shown as almost 20 dB lower than the continuous noise threshold. Taking this and directionality into account there is no significant risk to marine mammals or fish from continuous noise.

As there is the potential for disturbance and/or displacement of bottlenose dolphin of the Lower River Shannon SAC due to geophysical and seismic survey noise sources in the absence of mitigation measures, further assessment of this impact is considered necessary.

5.3.4.2 Otter

Due to a lack of studies on the underwater hearing of Eurasian otter (*Lutra lutra*), sea otters (*Enhydra lutris*) are typically references as a proxy. Sea otters are not considered sensitive to underwater noise as the species are primarily adapted to hearing airborne sounds and are not specialized for detecting signals in background noise (Ghoul & Reichmuth, 2016), therefore underwater anthropogenic noise impacts are not considered further for otters.

5.3.5 Accidental Pollution Event

The SI works will result in a slight increase in vessel traffic within the proposed MUL Area for the temporary duration of the SI works. Although the increase is slight, this could in theory increase the potential risk of an accidental release of pollutants (e.g., fuels, oils, and lubricants) to the marine environment, which has the potential to result in toxic effects to Annex I benthic habitats and, consequently, on Annex II species that rely on these habitats for food.

The proposed MUL Area lies within a busy shipping area where many commercial and recreational vessels operate. Given that the survey would amount to, at most, one jack-up barge, six metocean monitoring buoys, and one additional vessel operating in the area during the SI works period, the likelihood of a collision resulting in a pollution event is considered insignificant. The survey vessel will use diesel or petrol fuel, will not use heavy fuel oil, and will operate at a low speed. As vessels are required by law to adhere to regulations governing accidental leakages and spillages similarly the likelihood of such an occurrence is considered very unlikely. In addition, all substances handled and/or used whilst undertaking the works are required to be handled, used, stored, and documented in accordance with assessments and the Chemicals Act 2008 (No. 13 of 2008) and Chemicals (Amendment) Act 2010 (No. 32 of 2010) and associated Regulations.

Given the nature of the works, the limited scale and duration, and the insignificant increase in vessel activity, it is considered highly unlikely that there will be a pollution incident, e.g., accidental spills of small quantities of fuel. As such, the possibility for impacts on protected species from accidental pollution events associated with the proposed works can be excluded from further consideration.

5.3.6 Collision with Survey Vessels

Vessel strikes have been known to cause mortality in marine mammals (Laist et al., 2001) as well as injuries from non-lethal collisions (Laist et al., 2001; Van Waerebeek et al., 2007). Injuries from such collisions can be divided into two broad categories: blunt trauma from impact and lacerations from propellers. Injuries may result in individuals becoming vulnerable to secondary infections or predation.

It is expected that a maximum of one vessel will be operating at any one time within the proposed MUL Area. Due to the nature of the works, the vessels conducting discrete sampling would be travelling directly to sampling locations and then remaining stationary during sampling while vessels conducting the geophysical survey will move in slow and predictable line patterns.

The Lower Shannon Estuary is a busy shipping area (Clare County Council, 2023). Marine mammals in the area are likely to be habituated to marine traffic, and the temporary addition of a single vessel operating at either low speeds or stationary for the proposed works is unlikely to constitute a significant increase in vessel activity given the levels of vessel activity typical for the area. As such, the possibility for impacts on marine mammal features from collisions with survey vessels can be excluded from further consideration.

5.3.7 Invasive Species

All vessels have the potential to introduce invasive non-native species. The vessel to be used during the proposed works will already be operating within Irish waters, meaning there is no risk of invasive non-native species introduction. All equipment will be cleaned and checked prior to deployment and will only be used for the duration of the SI works. Therefore, potential impacts from invasive species introduced as a result of the works can be excluded from further consideration.

5.3.8 Risk of Entanglement

All towed equipment and seabed gear has the potential to pose an entanglement risk to marine fauna. However, the equipment to be used during the proposed works will be closely monitored and managed, with all gear inspected prior to deployment and only used for the temporary duration of the SI works. Given these controls and the temporary nature of the activity, the potential for entanglement-related impacts is considered negligible. Therefore, potential impacts from entanglement introduced as a result of the works can be excluded from further consideration.

5.4 River Shannon and River Fergus Estuaries SPA (004077)

The SPA is selected for the protection of 21 populations of seabirds and wildfowl, 20 of which are migratory, non-breeding overwintering populations. The QIs waterbird species of the site and their ecological requirements are listed in Table 5.1. It is assumed that the species listed below represent those likely to be most impacted by the works. Potential impacts to other bird species would, therefore, be considered lesser.

Table 5.1
River Shannon and River Fergus Estuaries SPA QI species and their ecological requirements

Species	Food/prey requirements	Primary supporting habitat within site
Cormorant	Highly specialised	Sheltered & shallow subtidal over sand and mud flats
Whooper swan	Wide	Lagoon and associated habitats, Intertidal mudflats and shallow subtidal
Light-bellied -brent goose	Highly Specialised	Intertidal mud and sand flats
Shelduck	Wide	Intertidal mud and sand flats Shallow subtidal
Wigeon	Narrower	Intertidal mud and sand flats and sheltered and shallow subtidal
Teal	Wide	Intertidal mud and sand flats and sheltered and shallow subtidal
Pintail	Wide	Shallow subtidal
Shoveler	Wide	Lagoon, brackish and freshwater lakes plus intertidal mud and sand flats
Scaup	Wide	Subtidal
Ringed plover	Wide	Intertidal mud and sand flats
Golden plover	Wide	Intertidal mud and sand flats
Grey plover	Wide	Intertidal mud and sand flats
Lapwing	Wide	Intertidal mud and sand flats
Knot	Narrower	Intertidal mud and sand flats
Dunlin	Wide	Intertidal mud and sand flats
Black-tailed Godwit	Wide	Intertidal mud and sand flats
Bar-tailed godwit	Wide	Intertidal mud and sand flats
Curlew	Wide	Intertidal mud and sand flats
Redshank	Wide	Intertidal mud and sand flats
Greenshank	Wide	Intertidal mud and sand flats
Black-headed gull	Wide	Intertidal flats and sheltered and shallow subtidal

5.4.1 Noise, vibration, lighting, and human presence-related species disturbance

As shown in Table 5.1, the species associated with the SPA rely primarily on tidal, intertidal and estuarine habitats for foraging. Within the proposed MUL Area, the habitats are largely terrestrial above the high water mark and marine below the high water mark. The two areas of concentrated study at Cahiracon and Foynes Island, in particular, are characterised by rocky shoreline with little to no intertidal area (see Figure 5.1). Therefore, the species associated with the SPA are unlikely to utilise the habitats within the proposed MUL Area when their preferred habitats are available elsewhere within the SPA. As such, it is concluded that the QI species of the SPA are unlikely to be present within the proposed MUL Area during SI works in significant numbers or for sustained periods of time, making exposure to

significant disturbance or displacement as a result of the temporary presence of vessels or structures associated with the SI works improbable. Therefore, further assessment of this impact is not considered necessary.

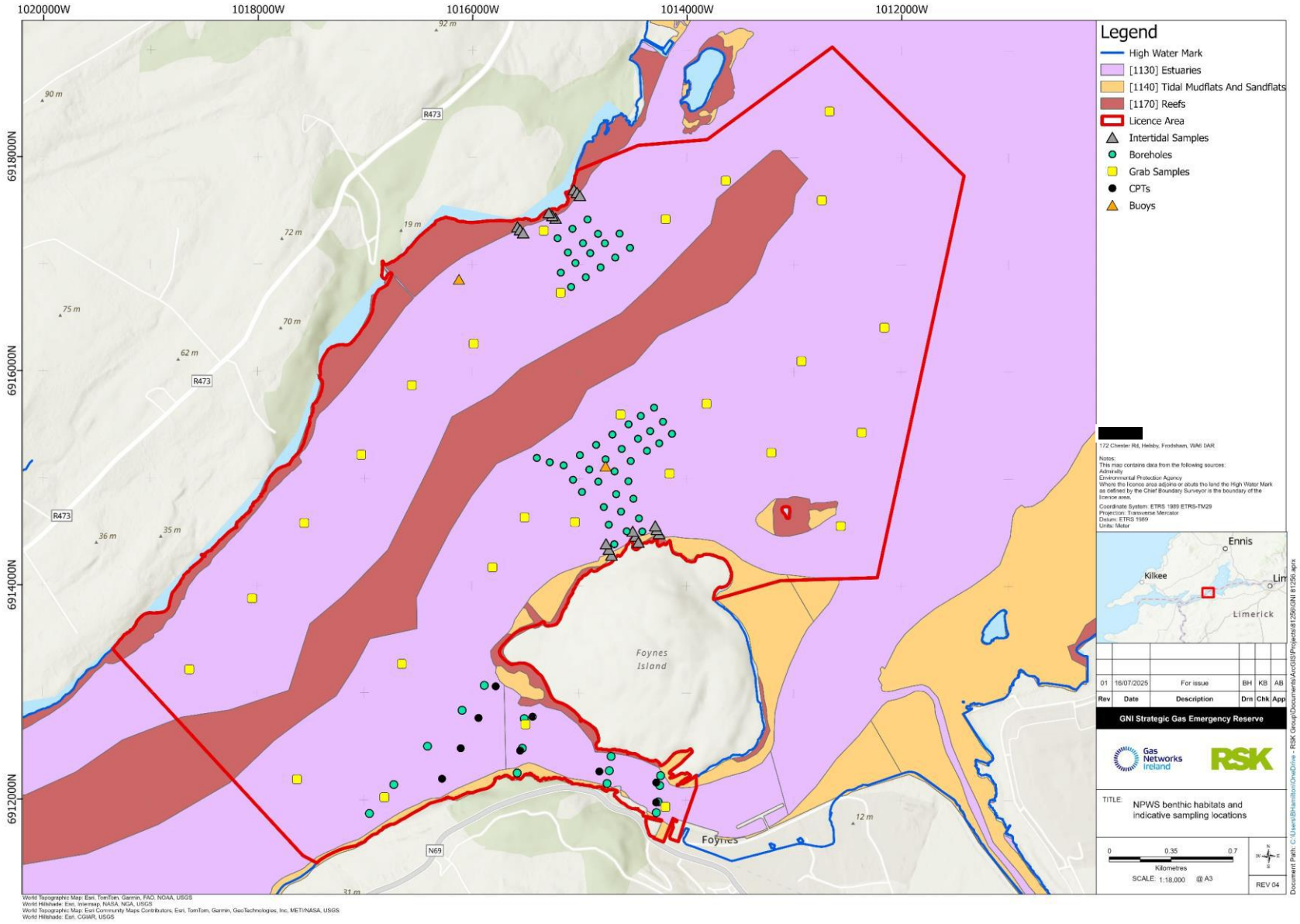

Figure 5.1
Benthic habitats of relevance to the SI works (NPWS, 2021b)

5.4.2 Habitat Loss or Disturbance

The SPA is designated for wetlands habitat. Because there is no wetland habitat within the proposed MUL Area, it is not anticipated that the SI works will have any significant impact on this designated habitat.

NPWS mapping of bird roost sites within the Shannon (NPWS, 2012b) indicates that there are two small (<50 individuals) roosting sites within the proposed MUL Area on the southwest tip of Foynes Island and on Sturamus Island to the east of Foynes Island.

Given the vessel traffic levels experienced around Foynes, the temporary addition of the SI works vessels and equipment is not anticipated to be significantly different from background levels of disturbance for roosting birds in the southwest of Foynes Island. Given the temporary nature and spacing of sampling around Sturamus Island, it is similarly anticipated that there will be no significant impact on roosting birds at that site. Therefore, roosting habitat will not be significantly impacted by the SI works.

As mentioned previously, the proposed MUL Area is largely terrestrial and marine habitat, with little intertidal habitat. Therefore, it is considered that significant habitat loss or alteration impacts on the area of wetland habitat is not likely.

Due to the conclusion that significant habitat loss or alteration is not considered likely as a result of the SI works, further assessment of this impact is not considered necessary.

5.4.3 Increased Suspended Sediment Concentrations

As discussed in Section 5.3.3, the SI works have the potential to cause temporary increases in suspended sediment concentrations. This could potentially lead to indirect effects on SPA QI species due to the smothering of fish prey species and increases in turbidity. However, due to the limited and temporary nature of sampling, it is considered that significant impacts are unlikely. Therefore, further assessment of this impact is not considered necessary.

5.4.4 Underwater Noise

Little evidence exists of impacts to diving seabirds from acoustic survey activities. Given the limited extent of sound-producing activity and as the majority of QI bird species at this SPA are not divers (with the exception of cormorant and scaup), it is considered that there is a very low likelihood of interaction between underwater noise sources and diving birds. Therefore, further assessment of this impact is not considered necessary.

5.4.5 Accidental Pollution Event

While water quality is not a conservation objective, it is considered that maintaining water quality is essential for supporting the ecology and functioning of the SPA. As discussed in Section 0, due to the limited and temporary nature of the SI works, it is considered unlikely that there will be a pollution event. Therefore, further assessment of this impact is not considered necessary.

5.5 Sites with potential ex-situ connectivity

Slyne Head Peninsula SAC (002074), West Connacht Coast SAC (002998) and Slyne Head Islands SAC (00328) have been screened in for potential ex-situ connectivity for bottlenose dolphin [1349], which are a qualifying interest of each site. It is possible that individuals associated with these SACs could travel to the proposed MUL Area and be exposed to potential project impacts.

As there is the potential for disturbance and/or displacement of QI species of the Lower River Shannon SAC due to geophysical survey noise sources in the absence of mitigation measures, the potential for impact on individuals travelling to the proposed MUL Area from potentially connected SACs cannot be ruled out and further assessment is considered necessary. The potential impact on marine mammals is underwater noise, as described in Section 5.3.4.

5.6 In-combination Effects

As part any SISAA, other relevant projects and plans in the region must also be considered for the possibility of the proposed project having significant effects on European sites when combined with existing, ongoing, or foreseeable future plans or projects, even in the case that the SI works have no anticipated significant effects when assessed in isolation. The in-combination assessment is scoped regarding the site-specific pressures and threats identified for the protected sites identified in Table 4.3.

5.6.1 Plans

The plans that are considered in-combination with the survey works proposed within the Shannon Estuary include:

- Clare County Development Plan (2023-2029)
- Kerry County Development Plan (2022-2028)
- Limerick County Development Plan (2022-2028)
- National Biodiversity Action Plan (2023-2020).

There are no anticipated in-combination effects from plans and therefore in-combination effects are not considered for further assessment.

5.6.2 Projects

Other marine projects, when considered in-combination with the SI works, could potentially give rise to either direct or indirect impacts. A search of planning authority applications and foreshore/MUL applications which could interact with the proposed surveys (within 10k m) was conducted using the planning authority websites (i.e., My Plan.ie, EIA planning portal which include applications from Clare Co. Co. planning website, Kerry Co. Co. planning website, An Bord Pleanála (ABP) website and Department of Housing and Local Government and Heritage (DHPLG) website). Several projects were identified as having the potential for overlap with the proposed works (Table 5.2).

Table 5.2
Applications with potential to interact with the proposed MUL Area, their current application status, and the assessed potential for cumulative effects

Application	Project	Status	Potential for Cumulative Effects
LIC230008	EBS Moneypoint surveys	Determined	This proposal has been supported by documents relevant to appropriate assessment which identified that the proposed SI works would not have potential to give rise to likely significant effects upon the Lower River Shannon SAC, or any other relevant European sites. On this basis it is considered that the proposed SI works would have no potential to act in-combination with this project.
LIC230014	Shannon Foynes Port Company	Determined	This application was subject to appropriate assessment as part of the submission. This assessment concluded that subject to the implementation of mitigation measures at construction stage, principally to avoid the potential for pollution and associated water quality and habitat deterioration effects, there would be no adverse impacts upon any European sites as a result of the development. However, if the works were to happen concurrently with the proposed SI works, there is the possibility of cumulative visual disturbance, underwater noise, suspended sediment concentration, and water quality impacts on QI species. The SI activities associated with LIC230014 are expected to be completed prior to the proposed SI activities.
LIC230004	Aughinish Alumina Ltd	Determined	This application was subject to appropriate assessment as part of the submission. This assessment concluded that subject to the implementation of mitigation measures, there would be no adverse impacts upon any European sites as a result of the SI works. On this bases it is considered that the proposed SI works would have no potential to act in combination with this project.
MAC20230032	Net Zero Energy Project 4 Limited	Applied	The proposed project is set to deploy up to 300MW of floating solar photovoltaic (PV) units and ancillary infrastructure including mooring systems, inter-array cabling and export cables off the coast of Killadysert and nearby islands. At the time of this application, no project description details or impact assessments are available to determine the possibility of cumulative impact potential.

Application	Project	Status	Potential for Cumulative Effects
MUL240034	Gas Networks Ireland, Shannon Estuary	Applied	This proposal has been supported by documents relevant to appropriate assessment which identified that the proposed survey activity would not have potential to give rise to likely significant effects upon the Lower River Shannon SAC, or any other relevant European sites. On this basis it is considered that the proposed SI works would have no potential to act in-combination with this project.

Considering the level of activity in the vicinity along with the limited and temporary nature of the SI works, with no permanent or continuous impacts, it is considered that the SI works will not have any likely significant cumulative impacts with other plans or projects in the area with the exception of the case of possible overlap with the Shannon Foynes Port Company works (LIC230014). Therefore, further assessment of in-combination effects for the Lower River Shannon SAC cannot be ruled out.

6 Summary and Conclusions

A summary of the findings of the preceding section is presented in Table 6.1.

Table 6.1
Summary of SISAA

Impact	Further assessment required per site (Y/N)				
	Lower Shannon SAC (002165)	River Shannon and River Fergus Estuaries SPA (004077)	Slyne Head Peninsula SAC (002074)	West Connacht Coast SAC (002998)	Slyne Head Islands SAC (000328)
Noise, vibration, lighting and human presence-related species disturbance	N	N	n/a	n/a	n/a
Habitat loss, alteration, and disturbance	**Y**	N	n/a	n/a	n/a
Increases suspended sediment concentrations	N	N	n/a	n/a	n/a
Underwater noise	**Y**	N	Y	Y	Y
Accidental pollution event	N	N	n/a	n/a	n/a
Collision with survey vessels	N	n/a	N	N	N
Risk of Entanglement	N	n/a	N	N	N
Invasive species	N	N	n/a	n/a	n/a
In-combination effects	**Y**	N	N	N	N

6.1 Conclusions

This report has been prepared to provide a sufficient level of information for MARA to complete a Screening for AA of the potential for likely significant effects on European sites, in view of their conservation objectives, arising from the proposed SI works either individually or in combination with other plans or projects. The likely significant effects have been considered in the context of the European sites potentially affected, their QIs and their conservation objectives, through the application of the S-P-R model, which considered the potential extent of effects from the SI works and the potential in-combination effects with other plans or projects. The overall findings are as follows:

- The SI works are not connected with or necessary to the management of the nature conservation interest of any European site.
- The likelihood of significant effects on the conservation goals of the identified European sites from **noise, vibration, lighting and human presence-related species disturbance** from the SI works can be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **habitat loss, alteration and disturbance** from the SI works cannot be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **increased suspended sediment concentrations** from the SI works can be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **underwater noise** from the SI works cannot be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **accidental pollution events** from the SI works can be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **collision with survey vessels** from the SI works can be safely excluded.
- **Entanglement with marine survey equipment** from the SI works can be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from **invasive species** from the SI works can be safely excluded.
- The likelihood of significant effects on the conservation goals of the identified European sites from the SI works **in combination with other plans and projects** for the area cannot be safely excluded.

It is our opinion, therefore, that there is a need to advance the AA process further to NIS stage.

7 References

Baker, I., O'Brien, J., McHugh, K, and Berrow, S. (2018). Female reproductive parameters and population demographics of bottlenose dolphins (*Tursiops truncatus*) in the Shannon Estuary, Ireland. Marine Biology 165:15.

Clare County Council (2023). Strategic Integrated Framework Plan (SIFP) for the Shannon Estuary, Volume 9, Clare County Development Plan 2023-2029. Available at: https://clarecdp2023-2029.clarecoco.ie/ .

Cronin, M.A., McConnell, (2008). B.J. SMS seal: A new technique to measure haul-out behaviour in marine vertebrates, Journal of Experimental Marine Biology and Ecology, Volume 362, Issue 1, Pages 43-48, ISSN 0022-0981.

Coyne, J., Ryan, D., Corcoran, W., Robson, S. and Roche, W. (2018). Fish Stock Survey of Transitional Waters in the Shannon International River Basin District – Limerick Dock, Shannon Upper, Shannon Lower, and Fergus Estuaries 2017. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

Cronin, M.A., Jessopp, M.J., & Del Villar, D. (2011). Tracking grey seals on Irelands' continental shelf; Report to National Parks & Wildlife Service, Department of Arts, Heritage and Gaeltacht; Available at: https://www.npws.ie/sites/default/files/publications/pdf/Tracking%20grey%20seals_Final%20report%202011.pdf

Cummins, S., Lauder, C., Lauder, A. & Tierney, T. D. (2019). The Status of Ireland's Breeding Seabirds: Birds Directive Article 12 Reporting 2013 – 2018. Irish Wildlife Manuals, No. 114. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland

Department of Arts, Heritage and the Gaeltacht (DAHG) (2014). Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters. Available at: https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf

Department of the Environment, Heritage and Local Government (DoEHLG) (2009, rev. 2010). Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Government of Ireland.

European Commission (EC) (2007). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive 92/43/EEC. European Commission

EC (2018). European Commission Notice C (2018) 7621 'Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg;

EC (2021). European Commission Notice C (2021) 6913 'Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC', Office for Official Publications of the European Communities, Luxembourg

Environmental Protection Agency (EPA) (2022). Guidelines on the information to be contained in

Environmental Impact Assessment Reports; Wexford. Ireland

Ghoul, A., & Reichmuth, C. (2016). Auditory sensitivity and masking profiles for the sea otter (*Enhydra lutris*). In The effects of noise on aquatic life II (pp. 349-354). Springer New York.

Gross, S., & Claus, P., Wohlsein, P., & Kesselring, T., Lakemeyer, J., Reckendorf, A., Roller, M., Tiedemann, R., & Siebert, U. (2020). Indication of lethal interactions between a solitary bottlenose dolphin (*Tursiops truncatus*) and harbor porpoises (*Phocoena phocoena*) in the German Baltic Sea. BMC Zoology. 5. 12.

Integrated Mapping for the sustainable development of Ireland's marine resource (INFOMAR) (2025). Seabed and sediment data. Available at: https://www.infomar.ie/maps/interactive-maps/seabed-and-sediment

Irish Whale and Dolphin Group (IWDG) (2025). Sightings Data. Available at [https://iwdg.ie/browsers/sightings.php] (Accessed March 2025).

Laist, D.W., Knowlton, A.R., Mead, J.G., Collet, A.S. and Podesta, M. (2001). Collisions between ships and whales. Marine Mammal Science 17: 35-75.

MERC (2021). Preliminary overview of marine ecological data. Moneypoint Hub.

Mirimin L., Miller R., Dillane E., Berrow S.D., Ingram S., Cross T.F., & Rogan E. (2011). Fine-scale population genetic structuring of bottlenose dolphins in Irish coastal waters; Animal Conservation. 14 (2011) 342–353. Available: https://iwdg.ie/cms_files/wp-content/uploads/2019/04/Mirimim-et-al.-2011-Fine-scale-population-genetic-structuring-of-bottlenose-dolphins-in-Irish-coastal-waters.-Animal-Conservation.pdf

Morris, C.D. & Duck, C.D. (2019). Aerial thermal-imaging survey of seals in Ireland, 2017 to 2018. Irish Wildlife Manuals, No. 111 National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland National Parks and Wildlife Service (NPWS) (2012a). Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012a) Conservation Objectives: Lower River Shannon SAC 002165. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2012b). River Shannon & River Fergus Estuaries. Special Protection Area (Site Code 4077). Conservation Objectives Supporting Document. Version 1. National Parks & Wildlife Service.

NPWS (2014). Guidance to manage the risk to marine mammals from man-made sound sources in Irish waters – January 2014. National parks and Wildlife Service, 7 Ely Place, Dublin 2.

NPWS (2015). Slyne Head Peninsula SAC 002074. Conservation Objectives Series. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2019). The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report.

NPWS (2024). Slyne Head Islands SAC 000328. Conservation Objectives Series. Version 2. National Parks and Wildlife Service.

NPWS (2025). West Connacht Coast SAC 002998. Conservation Objectives Series. Version 2. National

Parks and Wildlife Service.

O'Callaghan, S. A., Daly, M., Counihan, R., O'Connell, M., Berrow, S., & O'Brie, J. (2021). Harbour Porpoise (*Phocoena phocoena*) sightings, strandings and acoustic detections from within the inner Shannon Estuary. *The Irish Naturalists' Journal*, *38*, 84-87.

OPR (2021). Practice Note PN01: Appropriate Assessment Screening for Development Management. Office of the Planning Regulator, Dublin Ireland.

Rogan E., Ingram S., Holmes B., & O' Flanagan C. (2000). A Survey of Bottlenose Dolphins (*Tursiops truncatus*) in the Shannon Estuary; Marine Resource Series, Marine Institute 2000. Available at: https://oar.marine.ie/handle/10793/208

Ross, H. & Wilson, B. (1996). Violent interactions between bottlenose dolphins and harbour porpoises. Proceedings of the Royal Society, London. B. 263:283-286.

Ruppel, C. D., Weber, T. C., Staaterman, E. R., Labak, S. J., & Hart, P. E. (2022). Categorizing active marine acoustic sources based on their potential to affect marine animals. Journal of Marine Science and Engineering, 10(9), 1278.

Southall, B. L., Finneran, J. J., Reichmuth, C., Nachtigall, P. E., Ketten, D. R., Bowles, A. E., ... & Tyack, P. L. (2019). Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals, *45*(2), 125-232.

Van Waerebeek, Koen & Baker, Alan & Félix, Fernando & Gedamke, Jason & Iñiguez, Miguel & Sanino, Gian & Secchi, Eduardo & Sutaria, Dipani & van Helden, Anton & Wang, Yamin. (2007). Vessel collisions with small cetaceans worldwide and with large whales in the Southern Hemisphere, an initial assessment. Latin American Journal of Aquatic Mammals. 6. 43-69. 10.5597/lajam00109.

Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P., (2019). Desk-based revision of seabird foraging ranges used for HRA screening, Report of work carried out by the British Trust for Ornithology on behalf of NIRAS and The Crown Estate, ISBN 978-1-912642-12-0